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Clinical Characteristics, Sleep, and Temperament in Infants and Young Children with Problematic Hair Pulling and Skin Picking

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Abstract

Background: This study examined clinical characteristics of problematic hair pulling (HP) and skin picking (SP) in infants and young children and their association with self-soothing, sleep, and temperament.

Methods: An internet survey of parents/caregivers of 0–5-year-olds (n = 384 with data analyzed, of whom 26 experienced HP, 62 experienced SP, and 302 were controls free of HP and SP) assessed demographics and medical history, HP and SP characteristics, contextual factors, self-soothing, sleep patterns, and temperament. Participants were recruited through both HP and SP advocacy and support webpages and general webpages (e.g., parenting groups). Descriptive statistics, chi-square tests of independence, independent samples t-test clinically characterized HP, SP, and control groups. Logistic regression and one-way analysis of covariance controlled for sex and age in analyses.

Results: HP and SP rates were 6.1% (n = 26) and 14.5% (n = 62), respectively. SP presented in 23.1% of children with HP, and HP presented in 9.7% of children with SP. Mean HP and SP onset occurred at 12.2 (SD = 11.2) and 24.1 (SD = 15.8) months, respectively. Contextual factors, including boredom, upset, and awake-in-bed were common in HP and SP. Common caregiver responses included distracting the child, moving the hand away, and telling the child to stop. Few caregivers sought professional help for the child. Children with HP engaged in more hair twirling than controls, and children with SP engaged in more nail biting than controls. Children with HP,

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Ethical Approval

This research was approved by the University of California, Los Angeles, Medical IRB 3 and conducted in accordance with the 1964 Declaration of Helsinki and its subsequent amendments.

Consent to Participate

Informed consent was obtained from all individual participants included in the study.

Animal Rights

No approval of research ethics committees was required for animal subjects, as this research did not include any studies with animal subjects.

but not SP, had more sleep disturbance than controls. In terms of temperament, children with HP displayed sensitivity to stimuli, children with SP exhibited low persistence, and both HP and SP groups displayed serious, observant mood relative to controls.

Conclusions: Findings expand clinical understanding of HP and SP in children aged 0–5 and provide targets (contextual factors, sleep, sensory sensitivity, persistence, and mood) for behavioral interventions. Low rates of treatment seeking highlight the need for expansion of clinical guidelines for HP and SP in this age range.

Keywords

infant; hair pulling; skin picking; self-soothing; sleep; temperament

Introduction

Trichotillomania (Hair Pulling Disorder; TTM) and Excoriation (Skin Picking) Disorder (SPD) are body-focused repetitive behaviors (BFRBs) involving recurrent hair pulling and skin picking, resulting in hair loss and tissue damage, respectively (APA, 2022). These conditions are associated with negative physical and psychosocial sequelae for affected individuals across the lifespan, including early childhood (Lin et al., 2023). In addition to hair loss, ingestion of hair (trichophagia) may result in trichobezoars (i.e., masses of hair) that may produce gastrointestinal complications (Snorrason, Ricketts, Stein, & Björgvinsson, 2021), and SPD may result in scarring, ulcerations and infections of the skin (Odlaug & Grant, 2008a). Beyond these physical consequences, BFRBs are associated with reduced quality of life, poorer family functioning, increased emotional distress, and social and recreational avoidance (Franklin et al., 2008; Ricketts et al., in press; Selles et al., 2018; Tolin et al., 2008). TTM and SPD are considered to have significant etiological and clinical overlap (Grant et al., 2022; Monzani et al., 2014; Snorrason, et al. 2012), and both can emerge across the age spectrum from infancy to adulthood (Lin et al., 2023; Ricketts et al., 2018; Ricketts et al., 2019). Exploring the phenomenology of these conditions based on age is an active area of research (Lin et al., 2023). However, research on clinical characteristics in young children is extremely limited.

There are several similarities but also notable differences in BFRBs in young children compared to older children and adults. For example, the average age of onset for TTM and SPD is during adolescence, often with a high female preponderance (Snorrason, Belleau et al., 2012). However, research has suggested that for TTM, there may be a distinct developmental subtype of the disorder characterized by early childhood onset, and a more balanced female to male sex ratio (Keren, Ron-Miara, Feldman, & Tyano, 2006; Santhanam, Fairley, & Rogers, 2008; Snorrason, Ricketts, Stein, Thamrin et al., 2021; Wright & Holmes, 2003) or, less commonly, a sex ratio more skewed toward male predominance (Muller, 1987). In children presenting with hair pulling in early childhood, the scalp is more often reported to be the sole body site for pulling (Walther et al., 2014; Wright & Holmes, 2003), whereas older children and adults tend to pull from multiple body sites, most commonly the scalp, eyelashes, and eyebrows (Franklin et al., 2008; Woods et al., 2006). Symptom severity appears to be similar in young children (i.e., 0–5 years) compared to older children (i.e., 6–10 years) and adolescents (i.e., 10–17 years), but impairment and distress

are generally reported to be lower in young children, presumably due to the increasing social ramifications of these behaviors as children move from preschool to school-age and adolescent years (Franklin et al., 2008; Walther et al. 2014). Psychiatric comorbidity is common in both young children and adults with BFRBs, though the rates of comorbidities are slightly lower in young children, and specific comorbidities, such as attention-deficit hyperactivity disorder (ADHD) and tic disorder, are observed more commonly in young children (Sathe et al., 2016; Wilton et al., 2020). In contrast, generalized anxiety disorder (GAD), major depressive disorder (MDD), and obsessive-compulsive disorder (OCD) are documented commonly across children and adults (Franklin et al., 2008; Odlaug & Grant, 2008b; Reeve, Bernstein, & Christenson, 1992; Walther et al. 2014). Beyond psychiatric comorbidity, self-soothing behaviors/habits are commonly linked to hair pulling in infants and young children (Santhanam, Fairley, & Rogers, 2008; Swedo & Leonard, 1992). Although repetitive behaviors in this age group such as hand shaking, body rocking, head banging, and self-biting are categorized separately from TTM and SPD in DSM-5, falling under stereotypic movement disorder within the Neurodevelopmental Disorders section, some authors have argued that SMD, TTM, and SPD should be conceptualized as more closely related than the DSM taxonomy would suggest (Stein, Chamberlain & Fineberg, 2006; Stein et al., 2008; Stein, Grant & Franklin 2010; Lochner et al., 2002).

Hair pulling and skin picking frequently coincide with specific affective correlates in older children and adults, with many reporting rising tension or anxiety preceding a BFRB episode and gratification, relief, or reduction in tension during and/or following the episode (Diefenbach et al., 2002; Franklin et al., 2008; Meunier, Tolin, & Franklin, 2009; Neziroglu et al., 2008; Woods et al. 2006). While such affective correlates are difficult to assess in young children (Wright & Holmes, 2003), the majority of parents/caregivers report their child experienced tension associated with pulling–although this was endorsed more frequently for older children and adolescents than younger children in a large sample (Walther et al. 2014). Other affective states (e.g., feeling bored) and environmental contexts (e.g., lying awake in bed) have been shown to be drivers of BFRB maintenance in older children and adults (Diefenbach et al. 2002; Reeve et al., 1992; Ricketts et al. 2017), yet contextual factors for hair pulling and skin picking in young children with BFRBs have not been well characterized. Available studies indicate that nighttime when falling asleep, tiredness or fatigue, boredom or sedentary activities, stress, and points of separation from caregivers are common contexts for hair pulling in infants and young children (Fodstad et al., 2021; Swedo et al. 1992; Wright & Holmes, 2003), though these are case series with small samples. Notably, treatment-seeking for BFRBs appears to be lower in early childhood (i.e., 38.5% for preschool-aged children) compared to school-aged youth (69.5%), adolescents (64.5%), and adults (61.8%).

While the body of knowledge focused on early childhood-onset BFRBs continues to grow, it remains unclear whether hair pulling and skin picking have a unique functional etiology in this age group. One hypothesis for the emergence of hair pulling and skin picking behaviors in young children is that they serve a self-soothing function (Walther et al., 2014). Self-soothing refers to the ability of a child to regulate their emotional and physiological states independently, calming and comforting themselves in response to distressing states; it is an important and well-studied behavior during infancy and the first few years of life

(Cole et al., 2004). In early childhood, there is an association between self-soothing deficits and poor sleep (Burnham et al, 2002; Goodlin-Jones et al., 2005), and poor sleep has consistently been related to infant temperament (Field, 2017, Netsi et al. 2015, Sorondo & Reeb-Sutherland 2015). Given that BFRBs and sleep problems may both be related to self-soothing deficits in early childhood, along with the close association between sleep and temperament in this age range, it is important to examine the association of BFRBs with sleep patterns, self-soothing, and temperament in young children.

Available research has shown that adults with TTM, and SPD have greater sleep disturbance relative to healthy controls (Cavic et al., 2017; Ricketts et al., 2017). However, data on sleep and BFRBs in young children is very sparse. Some studies have shown that children aged 7–17 years with BFRBs have more sleep problems relative to controls (Clark et al., in press). Beyond the association between BFRBs and sleep, as previously mentioned, the pre-sleep period is an important context for hair pulling and skin picking (Ricketts et al., 2017) and commonly cited contextual trigger for hair pulling in several case series of infants and young children (Fodstad et al., 2021; Swedo & Leonard, 1992; Wright & Holmes, 2003). Continued investigation of the association between BFRBs and sleep in infants and young children is warranted.

It should be noted that among the nascent early childhood BFRB literature, studies evaluating skin picking are particularly scarce. More broadly, as hair pulling and skin picking both remain far less extensively characterized in infants and young children compared to adolescents and adults, expert consensus treatment guidelines for infants and young children are not well-elaborated relative to those for adolescents and adults (Golomb et al., 2016). Understanding the nature of these BFRBs in infants and young children will provide insights to inform treatment approaches and clinical guidelines. Thus, the primary aim of the present study was to examine the clinical characteristics of problematic hair pulling and skin picking in children aged 0–5 years, each relative to controls (i.e., infants and children free of both hair pulling and skin picking). In light of the association between sleep disturbance and BFRBs in older age groups (Clark et al., in press; Ricketts et al., 2018), and the relationship between sleep, self-soothing, and temperament in infants and young children (Burnham et al, 2002; Field 2017; Gaylor et al., 2005; Netsi et al. 2015, Sorondo & Reeb-Sutherland, 2015), this study also investigated the presence of self-soothing behaviors, sleep disturbance, and child and parent temperament traits in infants and young children with problematic hair pulling and skin picking each relative to controls.

Methods

Participants

Participants were 384 adult (M = 34.4 years, SD = 6.1 years) parents or primary caregivers of children aged 0–5 years (M = 26.9 months, SD = 18.1 months), recruited for an online survey. Participants were recruited by posting advertisements with links to the 10-minute survey within an academic medical center, and in Reddit groups, Facebook parenting groups, Instagram, Twitter, the TLC Foundation for Body Focused Repetitive Behaviors, and Picking Me Foundation websites. The survey was advertised as examining health and behavior in children aged 0–5 years to reduce selection bias for specific sub-topics covered,

though the advertisement did disclose that we were recruiting both parents of children with hair pulling and/or skin picking and parents of children who do not engage in hair pulling or skin picking.

Eligibility criteria for survey entry included an age of 18 years or older, and status as a parent or primary caregiver to one or more children within the age range of 0–5 years. Participants who did not meet eligibility criteria were still able to complete the survey, but their responses were later excluded (see Procedure section below).

Measures

Parent and Child Demographics.—Parents or caregivers reported on child age, sex, and living situation, and their own highest degree obtained.

Psychiatric and Medical Comorbidity.—Respondents were prompted to rate the presence and severity of their child's lifetime co-occurring psychiatric and/or medical conditions. The following conditions were assessed: Tourette syndrome, anxiety problems, depression, Down syndrome, behavioral or conduct problems, developmental delay, intellectual disability, speech or other language disorder, learning disability, autism spectrum disorder (ASD) including Asperger's disease or pervasive developmental disorder (PDD), attention deficit disorder (ADD) or attention deficit/hyperactivity disorder (ADHD), iron deficiency anemia, eczema, asthma, and Prader-Willi syndrome. Respondents rated each using the following response options: No, never diagnosed (1), mild (2), moderate (3), and severe (4). Parents also reported whether their child was born premature (i.e., born before 37 week's gestation) using a yes or no question.

Clinical Characteristics of Hair Pulling and Skin Picking.—Respondents were asked to rate the following three items to assess for clinically significant hair pulling: "My child has a habit of pulling out his/her hair," "My child's hair pulling causes thinning, balding, or other skin/hair damage," and "I am concerned or worried about my child's hair pulling." They were also asked to rate three items assessing clinically significant skin picking, including "My child has a habit of picking his/her skin," "My child's skin picking causes skin damage," and "I am concerned or worried about my child's skin picking." Items were rated using a 5-point Likert scale with the following anchors: (1) Not at all, (2) Mild, (3) Moderate, (4) Severe, and (5) Extreme. Respondents who selected "Mild" or above in response to one or more of the three statements were prompted to complete questions regarding clinical characteristics of hair pulling and/or skin picking, including age of onset, body sites, frequency and duration of episodes, and situational BFRB context. Parental responses to BFRB engagement, parental engagement in BFRBs, and treatment seeking were also assessed.

Age of onset was assessed with the following item: "Please select the age when your child started pulling out their hair/picking their skin." Pulling sites were assessed using the following checklist-based item: "My child pulls their hair from…" scalp, eyelashes, eyebrows, arms, legs, or other body site. Picking sites were evaluated using the following checklist-based item: "My child picks their skin from…" face, scalp, arms, legs, chest/abdomen/stomach, back, fingers/cuticles, hands, shoulders, neck, pubic area, feet/toes,

buttocks, or other. Frequency of BFRB episodes was assessed as follows: “In the past 3 months, on average, how many episodes of hair pulling/skin picking has your child had?” Duration of each BFRB episode was assessed with the following question: “On average, how many minutes does each hair-pulling/skin picking episode last?” Situational context surrounding BFRB engagement was assessed using the following questions: “My child pulls out their hair/picks their skin when they are…” “happy or excited,” “upset,” “bored,” “alone,” “sleeping,” or “awake in bed;” “My child plays with their hair/skin after they pull it out/pick it,” “My child eats their hair/skin after they pull it out/pick it,” “My child pulls out their hair/picks their skin because of a skin disease or dermatological problem,” and “My child pulls out hair/picks skin on other people (e.g. siblings, parents etc.). Items were rated using the following response options: (1) “Never/almost never (0–10%),” (2) “A little of the time (11–29%),” (3) “Some of the time (30–70%),” (4) “Most of the time (71–89%),” or (5) “All of the time (90–100%).”

Parental reactions were assessed with the following item. “When I notice my child pulling out their hair, I … (mark all the apply)” Options included “distract them,” “soothe them,” “wrap them up/dress them up so they cannot pull out their hair/pick their skin,” “move their hand away from the pulling/picking site,” “tell them to stop,” “discipline them,” “give them a medication,” “Other (please specify),” and “None of the above.”

Treatment items included “Please specify the medication/s you give your child when you notice them pulling out their hair/picking their skin:,” “Have you ever sought professional help for your child’s hair pulling/skin picking?,” “Please indicate from whom you sought professional help:” (options: “Physician,” “Therapist,”, and/or “Other (please specify)”), “Has your child ever been diagnosed by a health professional with Trichotillomania (also known as Hair Pulling Disorder)/ Skin Picking Disorder (also known as Excoriation Disorder or Dermatillomania)?” Family history items included “Does your child have any first degree biological relatives (i.e., parents or full siblings) who have a history of excessive skin picking or excoriation disorder/dermatillomania/skin picking disorder?”/ Does your child have any first degree biological relatives (i.e., parents or full siblings) who have a history of excessive hair pulling or trichotillomania/hair pulling disorder?”

Self-Soothing Behaviors.—Self-soothing was defined as any behavior a child uses to regulate their emotional state by themselves. Participants were asked to rate the frequency of their child’s self-soothing behaviors, including thumb, finger, or toe sucking, sucking on clothing or other objects, nail biting or picking, favorite doll, blanket, or other toy or item, self-stroking, self-talking, rocking, knuckle cracking, head banging, biting the ends of pencils or other objects, and hair twirling, using a 5-point Likert scale ranging from Never (1), Rarely (2), Sometimes (3), Most of the Time (4), and All the Time (5).

Tayside Children’s Sleep Questionnaire (TCSQ).—The TCSQ (McGreavey, Donnan, Pagliari, & Sullivan, 2005) is a 10-item measure providing parent report of child (i.e., 1 to 5 years) sleep patterns within the prior 3 months. Items 1–9 assess sleep onset latency, bedtime reluctance, difficulty sleeping without a parent present, difficulty sleeping in one’s own bed, night wakings, difficulty falling back to sleep following night waking, co-sleeping in the parent’s bed, use of a pacifier upon night waking, and need for a parent

to replace it, and desire for a drink during the night. Item 10 assesses parental perception of child sleep patterns as 'difficulties' using a yes or no option. The first nine items are summed to yield a total score, with higher scores indicative of more sleep problems (McGreavey et al, 2005). The TCSQ demonstrates good internal consistency and good discriminant validity (McGreavey et al., 2005). Because the TCSQ has only been validated in children 12 months or older, this measure was only analyzed for children aged 1–5 years old in our study sample.

Infant Toddler Temperament Tool (IT^3).—The IT^3 (Georgetown University, n.d.) is a parent-reported measure evaluating both parent and infant (birth to 18 months) or toddler (18 to 36 months) temperament traits to ascertain degree of child and parent temperament match in service of improved child well-being. Response options for temperament items are dichotomized across the following nine domains: activity level (highly active or less active), distractibility (easily distracted or less distracted), intensity (intense personality or relaxed personality), regularity (highly regular or more spontaneous), sensitivity (highly sensitive or less sensitive), approachability (highly approachable or less approachable), adaptability (highly adaptable or less adaptable), persistence (highly persistent or less persistent), and mood (positive mood or serious mood). Participants were provided a link to the IT^3 website (Georgetown University, n.d.) to view detailed definitions of each temperament trait. The measure does not produce summary scores.

Parent/Caregiver Psychiatric History.—The parent or caregiver respondent was asked, *"Do you have a history or hair pulling or skin picking?"* Response options included Never (1), Mild (2), Moderate (3), Severe (4), and Extreme (5).

Procedure

Participants completed the survey via a link hosted by SurveyMonkey from February 19th, 2022 to July 17th, 2022. Upon clicking the survey link, interested parents or caregivers were presented with a web-based IRB-approved study information form stating that the goal of the survey was to examine sleep, temperament, self-soothing, and clinical characteristics in young children with and without body-focused repetitive behaviors, including hair pulling and skin picking. They were also shown a message indicating that they should only proceed if they are over the age of 18 years and have a child between the ages of 0–5 years. After being prompted to complete parent and child demographic information, and medical and psychiatric history, participants were asked, "Do any of your children under the age of six have a habit of pulling out their hair and/or picking their skin?" Hair-pulling was defined as gripping one or more hairs with the fingers or hands and pulling away from the skin. Skin-picking was defined as picking, scratching, squeezing, or rubbing one's skin with the fingers or other tools. Parents or caregivers who endorsed that their child engaged in hair pulling and/or skin picking were asked more detailed questions about clinical characteristics (see *Measures*). Questions about child self-soothing, child sleep patterns, child and parent temperament, and parental BFRB engagement followed. Participants who reported having more than one child with hair pulling or skin picking were asked to select one of their children randomly to answer all remaining survey questions about. Participants indicating that their child(ren) under the age of six did not have a habit of hair pulling or skin

picking were directed to complete items assessing child self-soothing, parental BFRB engagement, child sleep patterns, and child and parent temperament. Participants did not receive compensation.

Of the 629 who accessed the survey, 620 consented to participate. Of the 620 who consented, 590 answered the first survey item. Despite designing the survey to be more inclusive of hair pulling and skin picking endorsement (see Measures and Procedure), for the present analysis, hair pulling and skin picking groups were defined to capture clinically significant hair pulling (HP) and skin picking (SP) symptoms. Thus, parents needed to endorse "Mild" or above for "My child has a habit of pulling out their hair/picking their skin" in addition to either of the following: "Mild" or above for "My child's hair pulling/skin picking causes damage" or "Mild" or above for "I am concerned or worried about my child's hair pulling/skin picking". Of the 590, 554 completed at least the 3 picking questions or 3 pulling questions. Of these 554, 126 participants were excluded from analyses due to reporting they resided outside of the United States, and three additional participants were excluded from analyses due to reporting erroneous responses to items (e.g., indicated that they had more children under the age of six than they had total children), yielding 425 adults. Of the 425, 78 endorsed mild or above for one or more of the three skin picking items. Of the 78, 16 were excluded for not meeting clinical SP threshold (described above), yielding 62 participants with SP. Of the 425, 50 participants endorsed mild or above for one or more of the three hair pulling items. Of the 50, 24 were excluded for not meeting clinical threshold level of HP (as previously described), yielding 26 participants with HP. Of the 425, 302 endorsed 'not at all' for the three hair pulling and skin picking items, generating our non-HP and non-SP control group. The final sample included 384 participants (see Figure 1).

Data Analysis

Analyses were performed using Statistical Package for Social Sciences (SPSS) version 28.0. Descriptive statistics (see Table 1) were performed to obtain frequencies and/or means for demographic and clinical characteristics. Co-occurring medical and psychiatric conditions were dichotomized to "Never Diagnosed" and Diagnosed (i.e., "Mild, Moderate, or Severe"). Self-soothing behavior items were dichotomized to "Never" and Endorsed (i.e., "Rarely, Sometimes, Most of the Time, or All the Time") Chi-square tests of independence or Fisher's exact test were performed to compare self-soothing behaviors and temperament traits (Infant Toddler Temperament Tool) in HP and SP groups relative to controls. Cramer's V (φ_C) effect size estimates, which range from 0 to 1, are reported. For chi-square tests in which the minimum number of categories in either rows or columns is 2, Cramer's V may be interpreted according to the following ranges: .10–.29 (small), .30–.49 (medium), ≥.50 (large) (Cohen, 1988). Independent samples t-test was performed to compare sleep patterns (Tayside Sleep Questionnaire) in each of HP and SP relative to controls. Cohen's *d* effect size estimates are reported and can be interpreted according to the following guidelines: 0.2 (small), 0.5 (medium), and 0.8 (large) (Cohen, 1988). Children with SP were significantly older than controls (see Results). There were also significantly more females in the HP group relative to controls (see Results). Therefore, subsequent analyses controlled for sex and age. For significant findings resulting from chi-square tests of independence,

a series of logistic regressions were performed, with significant self-soothing behaviors (hair twirling and nail biting) and temperament items (sensitivity, persistence, and mood) entered as outcome variables and age, sex, and BFRB group entered as predictors. For significant independent samples t-test findings, a between-group analysis of covariance was performed, with BFRB group entered as the factor, age and sex entered as covariates, and sleep disturbance entered as the dependent variable.

Results

BFRB Rates and Demographics

The final child sample included 384 participants, with 302 being controls (i.e., free of HP and SP). The child sample had an average age of 26.9 (SD = 18.3) months and 50.3% were female (n = 193). The rates of HP and SP were 6.1% (n = 26) and 14.6% (n = 62), respectively. Six children met criteria for both HP and SP; thus, SP presented in 23.1% of children with HP, and HP presented in 9.7% of children with SP. There was a significantly higher rate of HP among females (12.0%, n = 20) than males (3.7%, n = 155), $\chi 2$ (1, n = 328) = 6.56, p = .010, φ_c = .15. There was no significant difference in the rate of SP between females (16.9%, n = 30) and males (17.1%, n = 32), $\chi 2$ (1, n = 364) < 0.001, p > .999, φ_c = .002. There was no significant difference in the age of children with HP (M = 25.2 months; SD = 18.1 months) relative to controls (M = 25.5 months; SD = 17.7 months), t(326) = .086, p = .932. Children with SP were significantly older (M = 34.9 months; SD = 18.9 months) than controls (25.5 months), t(362) = −3.75, p < .001. See Table 1 for demographic characteristics by group.

Rates of Co-occurring Conditions

Of the fifteen co-occurring conditions listed, those with SP had a significantly higher rate of anxiety problems relative to controls, p = .025. This finding did not remain significant (p = .138) after controlling for sex and age. There were no other significant group differences in co-occurring conditions (see Table 2).

Clinical Characteristics, Contextual Factors, Parent-caregiver Responses, and Treatment Seeking

The average age of onset was 11.7 (SD = 10.8) months for HP and 21.5 (SD = 14.9) months for SP (see Table 3). Among parents reporting their child had HP, the scalp (73.1%), eyelashes (11.5%), and eyebrows (3.8%) were the most highly endorsed pulling sites. Among children with SP, fingers (22.6%), face (21.0%), and legs (21.0%) were the most commonly endorsed picking sites. For children with HP, 33.3% endorsed pulling at least once per day (M = 3.4, SD = 1.8 episodes/day), 23.8% endorsed pulling every week (M = 4.2, SD = 1.2 episodes/week), and 42.9% reported pulling every month (M = 3.6, SD = 1.2 episodes/month). In children with SP, 56.5% endorsed picking at least once per day (M = 6.2, SD = 5.3 episodes/day); 28.3% per week (M = 3.5, SD = 1.3 episodes/week); and 15.2% per month (M = 5.3, SD = 4.0 episodes/month). Each episode lasted an average of 5.7 (SD = 7.5) minutes for HP, and 5.9 (SD = 6.4) minutes for SP.

Children with HP and SP most commonly pulled when they were awake in bed (HP: 66.7%; SP: 78.4%), bored (HP: 61.9%; SP: 76.1%), upset (HP: 61.9%; SP: 65.2%), and alone (HP: 52.4%; SP: 76.1%). Hair pulling behaviors commonly endorsed in children with HP were pulling hair from other people (e.g., siblings, parents) (52.4%), playing with pulled out hair (28.6%), and eating hair (14.3%). For children with SP, common behaviors and reasons for picking included picking skin because of a skin disease or dermatological problem (26.1%), picking skin from other people (23.9%), playing with skin after picking it (19.6%), and eating skin (17.4%). The most common caregiver responses to HP and SP were to distract the child (HP: 57.7%; SP: 50.0%), move the child's hand away from the picking/pulling site (HP: 46.2%; SP 45.2%), and tell the child to stop (HP: 42.3%; SP: 48.4%). Few caregivers had ever sought professional help for their child's HP or SP (HP: 3.8%; SP: 12.9%).

Self-Soothing Behaviors

Hair twirling was endorsed at significantly higher rates in children with HP relative to controls, $p < .001$, and remained significant after controlling for sex and age, $p < .001$. Nail biting was endorsed at significantly higher rates in children with SP relative to controls, $\chi 2$ (1, $n = 287$) = 18.88, $p < .001$, even after controlling for sex and age, $p = .013$. Hair twirling was also endorsed at significantly higher rates in children with SP relative to controls, $\chi 2$ (1, $n = 287$) = 4.86, $p = .028$, but this finding was no longer significant after controlling for sex and age, $p = .085$. Thumb/finger sucking was reported at higher rates in controls relative to children with SP, $\chi 2$ (1, $n = 287$) = 8.80, $p = .003$, though this finding was no longer significant after controlling for sex and age, $p = .215$. See Table 4 for frequencies for all self-soothing behaviors.

Parental History of BFRBs

Parents of children with HP were more likely to engage in hair pulling ($n = 10$, 55.6%) compared to parents of controls ($n = 45$, 18.3%), $p < .001$, $\varphi_c = .23$. There were no significant differences in rates of skin picking between parents of children with HP and parents of controls, χ^2 (1, $n = 264$), $p = .713$, $\varphi_c = .04$. Parents of children with SP were more likely to engage in hair pulling ($n = 16$, 42.1%) compared to parents of controls ($n = 45$, 18.3%), $\chi 2$ (1, $n = 284$) = 9.70, $p = .002$, $\varphi_c = .20$. Parents of children with SP were also more likely to engage in skin picking ($n = 29$, 76.3%) relative to controls ($n = 132$, 53.7%), χ^2 (1, $n = 284$) = 5.99, $p = .014$, $\varphi_c = .16$.

Sleep Problems

Children (12 months or older) with HP had significantly greater sleep disturbance ($M = 15.4$, $SD = 6.4$) relative to controls ($M = 9.9$, $SD = 6.4$), $t(217) = 2.47$, $p = .014$, $d = .71$, even when controlling for age and sex, $p = .027$. There were no significant differences in sleep disturbance between children (12 months or older) with SP (12 months or older) ($M = 9.4$, $SD = 6.4$) relative to controls ($M = 9.9$, $SD = 7.9$), $t(242) = -0.38$, $p = .707$, $d = -.07$.

Child and Parent/Caregiver Temperament

With regard to child and parent temperament (see Table 5), children with HP and children with SP were each more sensitive to stimuli relative to controls, HP: $\chi 2$ (1, $n = 275$) = 4.02,

$p = .045$; SP: $\chi 2$ (1, $n = 296$) = 5.96, $p = .015$, but only findings for HP remained significant ($p = .021$) after controlling for sex and age (SP: $p = .123$). Children with SP had higher rates of low persistence (i.e., moves on to new task in the face of obstacles and becomes frustrated easily) relative to controls, $\chi 2$ (1, $n = 290$) = 5.65, $p = .018$, with findings remaining significant ($p = .035$) after controlling for covariates. Finally, children with HP and children with SP were more likely to display serious mood (i.e., react to situations in an observant or serious way) relative to controls (who more commonly displayed positive mood (i.e., reacting to situations in a positive, curious way), HP: $p = .047$; SP: $\chi 2$ (1, $n = 289$) = 7.29, $p = .007$. Results remained significant when controlling for covariates (HP: $p = .026$, SP: $p = .002$). Parents of children with HP had significantly higher rates of low persistence relative to parents of controls, $\chi 2$ (1, $n = 270$) = 4.87, $p = .027$, even when controlling for child sex and age, $p = .023$. There were no other significant group differences in parent temperament.

Discussion

The present study examined clinical characteristics of HP and SP in infants and children aged 0–5 years, as well as their relationship to self-soothing, sleep, and temperament. This study is the first to investigate HP and SP in infancy and early childhood relative to a control group. Findings showed (1) preponderance of females in HP, but not SP (2) predominance of scalp pulling for HP and face and finger picking for SP; (3) being awake in bed, bored, upset, and alone as common contextual factors; (4) low rates of treatment seeking for child HP and SP; (5) co-occurrence of HP and SP with other BFRBs; (6) greater sleep disturbance in children with HP, but not SP, relative to controls; and (7) higher rates of sensitivity to stimuli in children with HP, low persistence in children with SP, and serious temperament in both HP and SP groups relative to controls.

Clinical Characteristics

Our results show that the clinical features of HP and SP in this age range are similar to those of older age groups, though some notable differences emerged. First, we note a higher rate of HP among females (12.0%) relative to males (3.7%). Contrary to several prior reports of a more balanced HP sex ratio in this age group (Keren et al., 2006; Snorrason et al., 2021; Santhanam et al., 2008; Wright & Holmes, 2003), we found female preponderance, as has been found in a report on 0-to-5-year-old children with TTM (Walther et al., 2014) and adult samples (Snorrason, Belleau et al., 2012). Interestingly, there were no significant sex differences among children with SP, even after controlling for age. This aligns with the above reports of the more equivalent sex ratio found for HP in infancy and early childhood, but is in contrast to the majority of studies in adults showing SP is skewed towards female predominance (Snorrason, Belleau et al., 2012). Given the divergence in sex differences between HP and SP in our sample, along with previous findings showing fewer sex differences in young children compared to adolescents and adults, further work is needed to clarify these trends and explore the contributions of hormonal differences, patterns in treatment-seeking, and other factors that may impact sex differences in these conditions across the lifespan.

Consistent with older children and adults (Franklin et al., 2008; Woods et al., 2006), the three most common pulling sites in our sample were the scalp, eyelashes, and eyebrows. However, the predominance of scalp pulling (i.e., 90.5%) in our sample aligns with prior studies in this age group showing infants and young children pulled exclusively from the scalp (Walther et al., 2014; Wright & Holmes, 2003). This may be explained by the greater proportion of total body hair on the scalp in this age group (Barth, 1987) relative to older children and adults, along with the likely reduced need for fine-motor control for scalp pulling relative to eyelash and eyebrow pulling. The fingers/cuticles, face, arms, and legs were common picking sites in the present sample, which aligns with findings from adult samples (Snorrason et al. 2023; Tucker et al., 2011). In contrast with adults with SP, among whom the face is the most common picking site (Snorrason et al., 2023; Tucker et al., 2011), the fingers/cuticles were the most common picking site in our sample. This difference may be related to the hormonal changes experienced in adolescence, which prompt formation of facial acne. Findings have implications for monitoring of HP and SP in infants and young children and indicate that the scalp, along with the face, fingers and limbs are high risk body sites for pulling and picking, respectively, in this age range.

The most commonly endorsed contexts for pulling and picking in the present sample were pre-sleep while awake in bed, boredom, upset, and alone. The pre-sleep period while in bed has been identified as a high-risk setting for both children and adults with BFRBs. In a small sample of 10 children aged 13 to 90 months, nighttime (when falling asleep) was the most commonly endorsed context, reported in 50% (Swedo & Leonard, 1992). Among adults with TTM and SPD, 80% and 82%, respectively, reported that they pulled or picked in bed before falling asleep (Ricketts et al 2017). Cited contributors to BFRB engagement in this adult study were lowered awareness, increased boredom, increased worry, and increased desire to relax when lying in bed before sleep. Though measurement of BFRB cues in infants and young children is hindered by limited language and emotional development, it is plausible that similar drives (i.e., relaxation, alleviation of worrying) as adults may contribute to BFRBs in the pre-sleep context. An additional contributor to increased rates of HP and SP before sleep may be the presence of more natural competing demands on attention and/or parent interception of BFRB engagement during the daytime. Adolescent and adult BFRB studies also point to reductions in boredom and tension over the course of hair pulling and skin picking episodes as common affective cues (Diefenbach, Mouton-Odum, & Stanley, 2002; Snorrason, Smári, & Ólafsson, 2010; Meunier, Tolin, & Franklin, 2009). Being alone, along with sedentary activities, are common hair pulling and skin picking cues among adults (Bohne, Wilhelm, Keuthen, Baer, & Jenike, 2002; Mackenzie, Ristvedt, Christenson, Lebow, & Mitchell, 1995).

Parent/Caregiver Responses to Hair Pulling/Skin Picking Behaviors

The high rate of verbal prompts to stop engaging in BFRBs combined with the low rates of parent consultation with health professionals highlight the need for BFRB treatment guidance in this age group. The low rates of treatment seeking and treatment utilization in our study corroborate the results from a separate study of hair pulling in young children (Walther et al. 2014), which found that children with TTM between the ages of 6–10 years (69.5%) were almost twice as likely to seek treatment than those between ages 0–5 years

(38.5%). This may be related to several factors. Parents may believe or hope that HP and SP are benign and/or transient in the early childhood years, and only seek treatment upon noting persistence of symptoms into later childhood. Additionally, once children begin attending school, the impairment experienced from their BFRB may become more evident, prompting parents to seek treatment at this time. Regardless of the explanation, our study highlights the need for parent education regarding home and clinical management of BFRBs in early childhood.

Self Soothing

It has been hypothesized that HP and SP in infants and young children may serve a self-soothing function (Walther et al. 2014; Wright & Holmes, 2003). Our findings showed that most other aberrant self-soothing behaviors (i.e., thumb, finger, or toe sucking, object sucking, head banging, rocking, self-stroking) were no more common in young children with HP or SP compared to controls. However, we found a significant association between hair twirling and HP, and between nail biting and SP, suggesting hair pulling and skin picking in early childhood are associated with other BFRBs, as found in older children and adults (Selles et al., 2018; Snorrason, Ricketts et al., 2012). These findings suggest that monitoring for the presence of hair twirling or nail biting may be more useful in identifying young children with HP or SP, respectively, than monitoring for other types of self-soothing behaviors (e.g., thumb sucking) that have been commonly linked to BFRBs. Though we did not observe heightened self-soothing behaviors in HP and SP, hair pulling and skin picking may still serve a self-soothing function in this age range. Although speculative, hair pulling and skin picking may predominate for these children due to a proclivity towards self-soothing through these behaviors over other types of behaviors.

Sleep

Consistent with prior literature in older children (Clark et al., in press) and adults (Cavic et al., 2021; Ricketts et al 2017), our results showed that infants and young children with HP, but not SP, had significantly higher sleep disturbance compared to controls, even after accounting for age and sex. The discrepancy between HP and SP aligns with existing adult literature showing that poor sleep quality is associated with higher hair pulling severity but not skin picking severity in adults with TTM and SPD (Cavic et al., 2021). Thus, sleep disturbance may be more relevant for TTM than SPD across the lifespan, though further research is needed to corroborate this hypothesis and explore why this may be the case. This study found a significant association between sleep problems and HP in this age group without finding heightened rates of general self-soothing behaviors in children with HP. Future research should delve into the potential interactions between sleep, self-soothing, and BFRBs.

These findings are important when considering behavioral interventions for HP and SP in this age group, as improving sleep disturbance and monitoring peri-sleep contextual factors may provide a means to supplement existing behavioral interventions for BFRBs. For example, in a case-series, sleep interventions including psychoeducation, bedtime fading, and nap shaping reduced hair pulling in two young children with TTM (Fodstad et al. 2021). A separate case study describing a three-year-old child with comorbid TTM and

ASD utilized melatonin and video-guided caregiver education on sleep hygiene to reduce the frequency of the child's nighttime hair pulling episodes (Lichtblau et al. 2018).

Temperament

Children with HP were reported to display heightened sensitivity to sensory stimuli, which aligns with research showing increased sensory sensitivity and sensory avoidance, and deficient feed-forward sensory inhibition in adults with pathological BFRBs altered sensitivity (Houghton et al 2018; Houghton et al 2019). Our finding thus aligns with the stimulus regulation model of BFRBs, which posits that hair pulling behavior is driven by an individual's attempt to regulate emotional distress through sensory and motor stimulation provided by the act of pulling hair (Penzel, 2002). It was surprising that the SP group did not exhibit heightened sensitivity to stimuli after controlling for age and sex, as skin picking has been linked to sensory sensitivity (Schienle & Wabnegger, 2022). Perhaps this discrepancy is related to group differences in severity as the prior study showed an association between picking severity and tactile sensitivity (Schienle & Wabnegger, 2022). Future exploration into the role of sensory processing in the neurophysiology of these disorders is warranted, especially given the emerging evidence for the importance of sensory processing across other mental health conditions from autism spectrum disorder to posttraumatic stress disorder (Harrison et al. 2019). This finding also reinforces the utility of sensory-based interventions (i.e., stimulus control, sensory soothing, etc.), with the aim of blocking access to body sites and/or meeting sensory needs in service of decreasing the likelihood of BFRBs have utility in young children. To date, case reports and series in infants and young children have shown success using differential reinforcement of other behavior through modification of parent verbal attention (Watson, Dittmer, & Ray, 2000), treatment of co-occurring thumb sucking (e.g., aversive taste treatment, a thumb-post; Friman & Hove, 1987; Knell & Moore, 1988; Watson & Allen, 1993; Watson et al., 2000), functional assessment with simplified habit reversal training (LaBrot, Dufrene, Ness, & Mitchell, 2014), and differential reinforcement of other behavior over successively increasing time intervals through praise and tangible rewards, combined with stimulus control (Park, Rahman, Murphy, & Storch, 2012). However, larger studies are needed to explore the efficacy of such approaches specifically in infants and young children

Our results also showed that compared to controls, young children with HP and those with SP were more likely to exhibit "serious, observant mood" than "positive, cheerful" mood. Results appear to align with the higher rates of negative mood symptoms (e.g., depression) in adolescents and adults with BFRBs (Alexander et al., 2018; Roberts et al., 2016; Solley & Turner, 2018), though findings regarding the role of negative emotionality in BFRBs have been mixed, with recent evidence for TTM suggesting hair pulling may be less rooted in negative emotionality in adults (Lochner et al., 2021). However, interpreting the nuances of affect in young children is challenging. While it is possible to investigate more granular aspects of mood, like internalization versus externalization and boredom versus depression, in adults with BFRBs, the tools available for infants and young children (such as the IT^3 used in our study) lack the ability to do so. Nevertheless, it would be informative for future research to monitor temperament longitudinally and examine its association with the onset and course of hair pulling and skin picking. Our results also showed that children with

SP, but not HP, and parents of children with HP exhibited higher rates of low persistence (i.e., task switching in the face of obstacles, and easy frustration) relative to controls. Temperament marked by low persistence is frequently associated with ADHD in children and adults (Foley, McClowry, & Castellanos, 2008; Pinzone et al., 2019; Ucuz et al., 2021). Thus, our findings may be attributed to reports of heightened ADHD in children with BFRBs (Sathe et al., 2016; Wilton et al., 2020) and their families (Ricketts et al., in press).

Findings must be considered alongside study limitations. As participants were recruited via an internet survey, our sample is not clinic-referred, which could have resulted in milder severity of clinical symptoms by comparison. HP and SP groups were established based on parent/caregiver reports of infant and child symptoms, and parent distress rather than clinician interview. Thus, we lack clinician confirmation of threshold-level HP and SP symptoms not attributable to a medical condition or other psychiatric condition. Children with SP were significantly older than controls, whereas children with HP did not differ in age to controls. Additionally, the groups differed with respect to the proportion of female and male participants, with the HP group having more females than males relative to controls, but the SP group exhibiting balance in females and males. The older age of children with SP and higher rate of females in children with HP may have influenced clinical characterization, despite statistical control for age and sex. The cross-sectional nature of this survey precludes assessment of the temporal relationship between BFRBs and sleep problems. The advertising of the study on BFRB advocacy and support webpages may have led to a selection bias, whereby the rate of individuals with BFRBs may be higher than that in the general population. However, the study was also advertised on a number of non-BFRB webpages, and the neutral survey topic advertised (e.g., examining health and behavior in children) reduced bias. Nevertheless, it is important to note that due to the limitations of our sampling procedure, findings should not be considered to be representative of the general population of 0–5-year-old children. Further, the Tayside Children's Sleep Questionnaire was not validated for use in children younger than 1 year. Due to the nature of child development, there is not an appropriate sleep measure to capture the full age range of our sample (0–5 years). Further, parents/caregivers may differ in their perceptions of sleep items (e.g., child does not fall asleep in his/her own bed) as indicative of sleep disturbance in their child due depending on the child's age, and differences in parenting approaches (e.g., attachment parenting). Thus, we limited our analyses of sleep patterns to children aged 1 year and older. Moreover, our analytic approach, entailing selection of variables to analyze for ANCOVA and logistic regression based on statistical significance, is an imperfect procedure that often capitalizes on chance.

In sum, HP and SP in infants and young children have many similarities, and some important differences, to their presentation in older children and adults. Results from this study of children aged 0–5 years show female preponderance for HP, but not SP; high rates of scalp pulling, and face and finger picking; HP and SP occurrence while awake in bed, bored, upset, and alone; low HP- and SP-related treatment seeking; association of HP and SP with other BFRBs; heightened sleep disturbance in HP, but not SP, and relatively increased sensory sensitivity in HP and heightened low persistence in SP, and serious mood in both HP and SP. Sleep, sensory processing, persistence, mood, and parent psychoeducation are each important targets for future investigation into BFRBs in infants and young children.

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Conflict of Interest

Dr. Ricketts has received research funding from the TLC Foundation for Body-Focused Repetitive Behaviors, National Institute of Mental Health (NIMH), American Academy of Sleep Medicine, and Brain and Behavior Research Foundation. She has received honoraria and research funding from the Tourette Association of America (TAA). She has received honoraria from the Centers for Disease Control and Prevention, Springer Nature, and Wink Sleep. Dr. Peris has received funding from the NIMH and the TLC Foundation for Body Focused Repetitive Behaviors and royalties from Oxford University Press. Dr. Piacentini has received research funding from NIMH, and the TLC Foundation for Body Focused Repetitive Behaviors. He has received travel support and honoraria from the TAA and the International OCD Foundation and book royalties from Guilford Publications and Oxford University Press. He serves as an advisor to Lumate Health. Dr. Snorrason, Mr. Pendo, Miss Swisher, Miss Leman, and Miss Rissman declare that they have no conflicts of interest.

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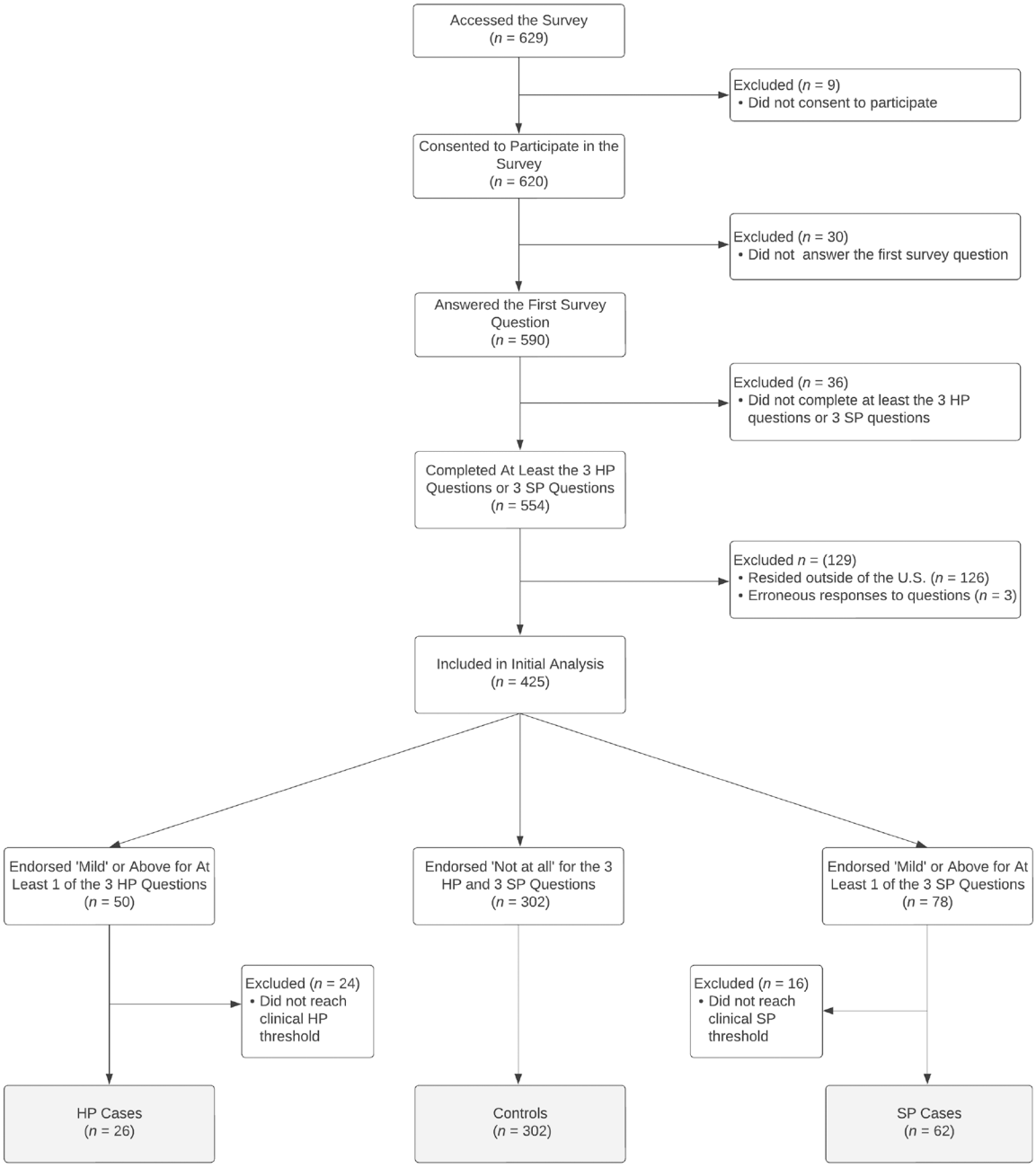

Fig. 1.

Participant Flow through the Survey

Note. The final sample for analysis included 384 participants (302 controls, 26 HP cases, and 62 SP cases with 6 cases overlapping between the HP and SP groups)

Table 1

Demographic Characteristics in Samples of Children Aged 0–5 Years with Hair Pulling, Skin Picking, and Controls

	Hair Pulling n = 26[a]		Skin Picking n = 62[a]		Controls n = 302		Hair Pulling vs Controls		Skin Picking vs Controls	
	M	***SD***	***M***	***SD***	***M***	***SD***	***p***	**ES**	***p***	**ES**
Child Age	25.2	18.1	34.9	18.9	25.5	17.7	.932	−.02	<.001	.52
	n	%	*n*	%	*n*	%				
Child Gender (Female)	20	76.9	30	48.4	147	48.7	.010	−.15	>.999	.002
Living Situation	*n*	%	*n*	%	*n*	%				
Both parents (married)	22	84.6	56	90.3	273	90.4				
Both parents (unmarried)	3	11.5	3	4.8	21	7.0				
Mother only	0	0	1	1.6	2	0.7				
Father only	0	0	0	0	0	0				
Other	1	3.8	2	3.2	6	2.0	.721	.06	.736	.06
Highest Parent Education	*n*	%	*n*	%	*n*	%				
Less than high school	0	0	0	0	0	0				
Some high school	0	0	0	0	0	0				
High school diploma or equivalent (GED)	0	0	3	4.8	12	4.0				
Technical/trade school or some college	3	11.5	5	8.1	18	6.0				
Junior/community college graduate (AA)	1	3.8	1	1.6	21	7.0				
College graduate or equivalent (BA, BS)	8	30.8	28	45.2	116	38.4				
Post-graduate/ professional degree (MA, PhD, MD, JD)	14	53.8	25	40.3	135	44.7	.501	.10	.448	.10

Note. Valid percentages are reported.

[a]Six participants are in both the hair pulling and skin pulling groups. The total $n = 384$. ES = effect size. Cohen's d is reported for age differences, and Cramer's V (φ_C) is reported for differences in gender, living situation, and highest parent education.

Table 2

Co-occurring Psychiatric and Medical Conditions in Samples of Children Aged 0–5 Years with Hair Pulling, Skin Picking, and Controls

	Hair Pulling n = 26[a]		Skin Picking n = 62[a]		Controls n = 302		Hair Pulling vs Controls		Skin Picking vs Controls	
	n	%	*n*	%	*n*	%	*p*	φ_c	*p*	φ_c
Tourette syndrome	0	0	0	0	0	0	---	---	---	---
Anxiety problem	1	3.8	5	8.1	6	2.0	.442[c]	.04	.025[b,c]	.13
Depression	0	0	0	0	0	0	---	---	---	---
Down syndrome	0	0	0	0	0	0	---	---	---	---
Behavioral or conduct problems	1	3.8	2	3.2	7	2.3	.487[c]	.03	.654[c]	.02
Developmental delay	0	0	5	8.1	15	5.0	.619[c]	.06	.356[c]	.05
Intellectual disability	0	0	0	0	0	0	---	---	---	---
Speech or other language disorder	2	7.7	7	11.3	20	6.6	.690[c]	.01	.192[c]	.07
Learning disability	0	0	0	0	1	0.3	>.999[c]	.02	>.999[c]	.02
Autism spectrum disorder	0	0	1	1.6	7	2.3	>.999[c]	.04	>.999[c]	.02
ADD/ADHD	1	3.8	3	4.8	5	1.7	.393[c]	.04	.140[c]	.08
Iron deficiency anemia	0	0	4	6.5	12	4.0	.609[c]	.06	.492[c]	.05
Eczema	9	34.6	21	33.9	79	26.2	.482	.05	.279	.07
Asthma	0	0	3	4.8	6	2.0	>.999[c]	.04	.185[c]	.07
Prader-Willis syndrome	0	0	0	0	0	0	---	---	---	---
Premature birth (< 37 weeks)	1	3.8	3	4.8%	34	11.3	.335[c]	.07	.196	.08

Note. Valid percentages are reported. ADD = attention deficit disorder; ADHD = attention-deficit/hyperactivity disorder.

The total $n = 384$.

[a] Six participants are in both the hair pulling and skin pulling groups.

[b] The group difference in anxiety problem between skin picking and control groups did not survive statistical control for age and gender.

[c] Fisher's exact test was used due to 1 or more cells having expected count less than 5. φc = Cramer's V.

Table 3

Clinical Characteristics in Samples of Children Aged 0–5 Years with Hair Pulling, and Skin Picking

	Hair Pulling n = 26[a]		Skin Picking n = 62[a]	
	n	**%**	***n***	**%**
Body Sites				
Face	---	---	13	21.0
Scalp	19	73.1	6	9.7
Arms	0	0	12	19.4
Legs	0	0	13	21.0
Eyelash	3	11.5	---	---
Eyebrows	1	3.8	---	---
Chest/Abdomen/Stomach	---	---	8	12.9
Back	---	---	2	3.2
Fingers/cuticles	---	---	14	22.6
Hands	---	---	7	11.3
Shoulders	---	---	2	3.2
Neck	---	---	4	6.5
Pubic area(s)	---	---	1	1.6
Feet/toes	---	---	7	11.3
Buttocks	---	---	5	8.1
Other	0	0	10	16.1
BFRB Episodes *				
# Parents endorsing ‘per day’ as episode time frame	7	33.3	26	56.5
M, SD # episodes ‘per day’	3.4	1.8	6.2	5.3
# Parents endorsing ‘per week’ as episode time frame	5	23.8	13	28.3
M, SD # episodes ‘per week’	4.2	1.2	3.5	1.3
# Parents endorsing ‘per month’ as episode time frame	9	42.9	7	15.2
M, SD # episodes ‘per month’	3.6	1.2	5.3	4.0
M, SD Episode duration (min)	5.7	7.5	5.9	6.4
Contextual Factors				
Happy or excited				
Never	19	90.5	36	78.4
Mild or above	2	9.5	10	21.7
Upset				
Never	9	42.9	16	34.8
Mild or above	13	61.9	30	65.2
Bored				
Never	8	38.1	11	23.9
Mild or above	13	61.9	35	76.1
Alone				
Never	10	47.6	11	23.9

	Hair Pulling n = 26[a]		Skin Picking n = 62[a]	
	n	%	*n*	%
Mild or above	11	52.4	35	76.1
Sleeping				
Never	12	57.1	35	76.1
Mild or above	9	42.9	11	23.9
Awake in bed				
Never	7	33.3	10	21.7
Mild or above	14	66.7	36	78.4
Plays with skin/hair after pulling/picking				
Never	15	71.4	37	80.4
Mild or above	6	28.6	9	19.6
Eats skin/hair after pulling/picking				
Never	18	85.7	38	82.6
Mild or above	3	14.3	8	17.4
Pulls/picks due to skin disease /other dermatological problem				
Never	21	100	34	73.9
Mild or above	0	0	12	26.1
Pulls/picks from other people				
Never	10	47.6	35	76.1
Mild or above	11	52.4	11	23.9
Parental Response				
None	0	0	1	2.2
Distract them	15	57.7	31	50.0
Soothe	12	46.2	15	24.2
Wrap them up, dress them so they cannot pull/pick	1	3.8	11	17.7
Move their hand away from pulling/picking site	12	46.2	28	45.2
Tell them to stop	11	42.3	30	48.4
Discipline them	0	0	1	1.6
Give them a medication	0	0	6	9.7
Other	3	11.5	8	12.9
Professional help sought for hair pulling or skin picking (% Yes)	1	3.8	8	12.9

Note. Valid percentages are reported.

[*] Per day/week/month represents the number of people who endorsed having a pull/pick episode either daily, weekly, or monthly, and *M*, *SD* represents the mean and standard deviation of pull/pick episodes individuals endorsed having per day/week/month.

[a] Six participants are in both the hair pulling and skin pulling groups.

Table 4

Self-Soothing Behaviors in Samples of Children Aged 0–5 years with Hair Pulling, Skin Picking, and Controls

	Hair Pulling n = 26[a]		Skin Picking n = 62[a]		Controls n = 302		Hair Pulling vs Controls		Skin Picking vs Controls	
	n	%	*n*	%	*n*	%	*p*	φ_c	*p*	φ_c
Thumb, finger, or toe sucking	10	55.6	9	23.7	127	51.0	.897	.02	.003[b]	.19
Sucking on clothing or other objects	11	61.1	14	36.8	132	53.0	.674	.04	.092	.11
Nail biting or picking	5	27.8	18	47.4	39	15.7	.190[c]	.08	<.001	.27
Favorite doll, blanket, or other item	14	77.8	29	76.3	176	70.7	.710	.04	.601	.04
Self-stroking	6	33.3	8	21.1	53	21.3	.244[c]	.07	>.999	.002
Self-talking	14	77.8	25	65.8	143	57.4	.148	.10	.425	.06
Rocking	2	11.1	3	7.9	50	20.1	.540[c]	.06	.114	.11
Knuckle cracking	0	0	0	0	0	0	---	---	---	---
Head banging	2	11.1	2	5.3	37	14.9	>.999[c]	.03	.176	.10
Biting the ends of pencils or other objects	7	38.9	6	15.8	46	18.5	.060[c]	.13	.862	.02
Hair twirling	13	72.2	10	26.3	29	11.6	<.001[c]	.42	.028[b]	.15

Note. Valid percentages are reported. Hair pulling and skin picking were not statistically compared.

[a]Six participants are in both the hair pulling and skin pulling groups. The total n = 384.

[b]The group differences between skin picking and controls on thumb, finger, or toe sucking, and hair twirling did not survive statistical control for age and gender.

[c]Fisher's exact test was used due to 1 or more cells having expected count less than 5. φc = Cramer's V.

Table 5

Comparison of Parent and Child Temperament Traits in Samples of Children Aged 0–5 years with Hair Pulling, Skin Picking, and Controls

	Child										Parent									
	Hair Pulling n = 26[a]		Skin Picking n = 62[a]		Controls n = 302		Hair Pulling vs Controls		Skin Picking vs Controls		Hair Pulling n = 26[a]		Skin Picking n = 62[a]		Controls n = 302		Hair Pulling vs Controls		Skin Picking vs Controls	
	n	%	*n*	%	*n*	%	*p*	φ_c	*p*	φ_c	*n*	%	*n*	%	*n*	%	*p*	φ_c	*p*	φ_c
Activity Level																				
High	15	83.3	31	79.5	229	85.8					7	38.9	17	43.6	84	31.5				
Low	3	16.7	8	20.5	38	14.2	.731[c]	.02	.432	.06	11	61.1	22	56.4	183	68.5	.694	.04	.186	.09
Distractibility																				
High	9	50.0	18	46.2	99	38.1					10	55.6	21	53.8	118	45.4				
Low	9	50.0	21	53.8	161	61.9	.451	.06	.431	.06	8	44.4	18	46.2	142	54.6	.553	.05	.415	.06
Intensity																				
High	18	100.0	33	84.6	236	90.8					12	66.7	24	61.5	171	65.8				
Low	0	0	6	15.4	24	9.2	.381[c]	.08	.251[c]	.07	6	33.3	15	38.5	89	34.2	>.999	.01	.736	.03
Regularity																				
Highly Regular	14	77.8	31	79.5	230	88.5					14	77.8	30	76.9	211	81.2				
Irregular	4	22.2	8	20.5	30	11.5	.252[c]	.08	.125	.13	4	22.2	9	23.1	49	18.8	.757[c]	.02	.685	.04
Sensitivity																				
High	11	61.1	22	56.4	89	34.6					7	38.9	14	35.9	98	38.1				
Low	7	38.9	17	43.6	168	65.4	.045	.14	.015[b]	.15	11	61.1	25	64.1	159	61.9	>.999	.004	.928	.02
Approachability																				
High	9	50.0	16	42.1	148	57.8					8	44.4	11	28.9	87	34.0				
Low	9	50.0	22	57.9	108	42.2	.688	.04	.100	.11	10	55.6	27	71.1	169	66.0	.519	.05	.667	.04
Adaptability																				
High	12	66.7	22	57.9	154	60.6					8	44.4	20	52.6	136	53.5				
Low	6	33.3	16	42.1	100	39.4	.797	.03	.886	.02	10	55.6	18	47.4	118	46.5	.615	.05	>.999	.01
Persistence																				
High	6	33.3	13	34.2	142	56.3					7	38.9	29	76.3	170	67.5				
Low	12	66.7	25	65.8	110	43.7	.099	.12	.018	.15	11	61.1	9	23.7	82	32.5	.027	.15	.363	.06
Mood																				

	Child										Parent									
	Hair Pulling n = 26[a]		**Skin Picking n = 62[a]**		**Controls n = 302**		**Hair Pulling vs Controls**		**Skin Picking vs Controls**		**Hair Pulling n = 26[a]**		**Skin Picking n = 62[a]**		**Controls n = 302**		**Hair Pulling vs Controls**		**Skin Picking vs Controls**	
	n	**%**	***n***	**%**	***n***	**%**	***p***	**φ_c**	***p***	**φ_c**	***n***	**%**	***n***	**%**	***n***	**%**	***p***	**φ_c**	***p***	**φ_c**
Positive	10	55.6	21	55.3	194	77.3					7	38.9	15	39.5	127	50.6				
Serious	8	44.4	17	44.7	57	22.7	.047[c]	.13	.007	.17	11	61.1	23	60.5	124	49.4	.474	.06	.270	.08

Note. Valid percentages are reported. The total $n = 384$.

[a]Six participants are in both the hair pulling and skin pulling groups.

[b]The group difference between Skin Picking and Control groups on sensitivity to stimuli did not survive statistical control for age and gender.

[c]Fisher's exact test was used due to 1 or more cells having expected count less than 5. φ_C = Cramer's V.