


Clinical characteristics of treatment-seeking youth with misophonia

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Funding information

REAM Foundation; Misophonia Research Fund

Abstract

Objective: Misophonia is a psychiatric condition characterized by strong emotional and/or behavioral responses to auditory stimuli, leading to distress and functional impairment. Despite previous attempts to define and categorize this condition, misophonia is not currently included in the *Diagnostic and Statistical Manual of Mental Disorders* or *International Classification of Diseases*. The lack of formal diagnostic consensus presents challenges for research aimed at assessing and treating this clinical presentation.

Methods: The current study presents clinical characteristics of youth ($N = 47$) with misophonia in the largest treatment-seeking sample to date. We examined demographic characteristics of the sample, frequency of comorbid disorders, frequency of specific misophonia symptoms (i.e., triggers, emotional and behavioral responses, and impairments), and caregiver-child symptom agreement. Misophonia symptoms were evaluated using a multimodal assessment including clinician, youth, and caregiver reports on empirically established misophonia measures, and concordance among measures was assessed.

Results: Youth seeking treatment for misophonia presented with marked misophonia symptoms and an array of comorbid conditions. Youth and caregivers identified

various triggers of misophonia symptoms (e.g., chewing sounds, breathing sounds), as well as a wide range of emotional (e.g., anger, annoyance, disgust) and behavioral (e.g., aggression, avoidance) responses to triggers. Youth and caregivers exhibited high agreement on misophonia triggers but lower agreement on symptom severity and associated impairment. Compared to younger children (aged 8–13), older children (aged 14+) appeared to report symptom severity and associated impairment more reliably. **Conclusion:** Misophonia is a heterogenous and impairing clinical condition that warrants future investigation and evidence-based treatment development.

KEYWORDS

assessment, clinical characteristics, misophonia, youth

1 | INTRODUCTION

The term “misophonia” was first coined by audiologist Pawel J. Jastreboff in the early 2000s following his clinical observations of patients' negative reactions to specific auditory stimuli (Jastreboff & Jastreboff, 2000). When triggered by a specific sound or anticipation of a sound, individuals with misophonia typically experience strong emotional and/or behavioral responses (Lewin et al., 2021; Potgieter et al., 2019; Rosenthal et al., 2021; Swedo et al., 2022). Following the initial inception of the term, Schröder et al. (2013) characterized misophonia as a psychiatric disorder and proposed criteria for its diagnosis. These proposed criteria included: (1) a strong adverse reaction to the presence or anticipation of a particular sound produced by another human, (2) immediate feelings of anger and a loss of self-control, (3) recognition of the unreasonableness of this reaction, (4) purposeful avoidance of such sounds or intense discomfort in such situations, and (5) significant distress in daily life. Conceptualizations of misophonia have more recently expanded to include a wider range of auditory triggers (i.e., nonhuman as well as human sounds) and responses (i.e., anxiety and disgust in addition to anger; see Swedo et al., 2022). Diagnostic criteria for misophonia have also been proposed from an audiological perspective, though no formal diagnosis has been established in this frame either (Aazh, 2023; Campbell, 2023). Misophonia is not currently included as a psychiatric disorder in the latest versions of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5-TR; American Psychiatric Association, 2022) and the *International Classification of Diseases* (ICD-11; World Health Organization, 2022), despite previous attempts to categorize the condition and despite the clinical evidence that misophonia is a distinct psychiatric phenomenon not explained by the presence of another disorder, that leads to significant distress and impairment.

While misophonia research has grown considerably in recent years, there is still limited empirical evidence of the prevalence, etiology, phenomenology, and clinical characteristics of this condition. Given the paucity in the literature and the lack of formal nosology for misophonia, guidance, and consensus on the assessment and common clinical presentations of misophonia remains unclear. Numerous clinician- and self-reported measures have been developed to assess misophonia symptom presentation and severity to aid in diagnosis, yet it is unclear the extent to which these tools measure distinct aspects of the disorder versus related characteristics of commonly comorbid psychiatric symptoms (e.g., anxiety, anger/irritability). Researchers examining clinical characteristics of individuals

with misophonia have generally used convenience samples (e.g., undergraduate university students, online crowdsourced individuals; Rouw & Erfanian, 2018; Wu et al., 2014) and variable measurement of misophonia for inclusion criteria given the historical lack of consensus on disorder criteria (Rosenthal et al., 2022; Schröder et al., 2013). Moreover, most existing research on the measurement and clinical presentations of misophonia symptoms has been conducted within adult samples (e.g., Jager et al., 2020; Rosenthal et al., 2022). Recent research has assessed misophonia within an internet-based youth sample (Guzick et al., 2023), yet little is known about the clinical characteristics of treatment-seeking youth with misophonia.

To address these gaps in the literature, the current study presents clinical characteristics of youth misophonia in the largest clinical treatment-seeking sample to date. Specifically, we examined demographic characteristics of the sample, frequency of comorbid disorders, frequency of specific misophonia symptoms (i.e., triggers, emotional and behavioral responses, and impairments), and caregiver-child symptom agreement. Misophonia symptoms were evaluated using a multimodal assessment including clinician, youth, and caregiver reports on empirically established misophonia measures, and concordance among measures was assessed.

2 | METHODS

2.1 | Participants

Participants included 47 youth with misophonia (ages 8–17) and their caregivers who were screened for enrollment in a cognitive behavioral therapy treatment study (Lewin et al., 2021). Of these, 46 youth and 45 caregivers completed study measures. Inclusion criteria included: (1) children who exhibited clinical-level misophonia symptoms as defined as a clinical severity rating (CSR) of 4 ("Moderate") or greater on the Misophonia Assessment Interview (MAI) and/or a misophonia symptom severity score of 3 ("Mildly Ill") or greater on the clinical global impression-severity scale (CGI-S), (2) misophonia symptoms were the primary concern for treatment (in the case of comorbidity), and (3) children and caregiver were able to complete informed consent and assessment procedures in English. Exclusion criteria included: (1) children who had previously received treatment for emotional disorders (i.e., Unified Protocols for Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents) or misophonia, (2) children who presented with a psychotic disorder, bipolar disorder, eating disorder, alcohol/substance use, intellectual disability, or active suicidal ideation.

2.2 | Measures

2.2.1 | Clinician-reported measures

Misophonia assessment interview (MAI; Lewin, 2020)

The MAI is a semistructured clinical interview created by Dr. Lewin based on proposed diagnostic criteria from Swedo et al. (2022) and Schröder et al. (2013). The MAI is comprised of 11 items that assess various aspects of misophonia and related symptoms, including sound sensitivities, emotional and behavioral responses to sound triggers, distress caused by having excessive sensitivity of sounds (i.e., misophonia), and avoidance of specific situations. Respondents also rated interference caused by misophonia symptoms on a scale from 0 to 8, where 0 indicates "Not at all," 4 indicates "Some," and 8 indicates "Very, very much." Caregivers and youth were both administered the MAI. Clinicians assigned a misophonia CSR based on data gathered from the MAI. Approximately half ($n = 26$) of participants' CSRs were double-rated to assess interrater reliability. Agreement on misophonia CSR ratings was good (Cohen's $\kappa = 0.79$, $p < .001$). In almost all cases (25 out of 26; 96%), clinicians agreed on whether the presenting misophonia symptoms were above the clinical threshold (CSR ≥ 4).

Anxiety and related disorders interview schedule for the DSM-5, child and parent version: Child interview schedule (ADIS-5; Albano & Silverman, 2014)

The ADIS-5 is a semistructured interview designed to assess for anxiety, mood, trauma and stressor, obsessive-compulsive, and related disorders using criteria from the DSM-5 (American Psychiatric Association, 2022). The ADIS-5 is based on previous versions of the ADIS, which have demonstrated strong psychometric properties (Wood et al., 2002). In this study, the ADIS-5 was used to assess the presence of comorbid clinical conditions. Clinicians assigned a CSR for each presenting comorbidity. A CSR for youth's misophonia diagnosis was assigned based on the MAI. Disorder severity was rated on a scale from 0 to 8 and disorders rated 4 or higher were considered to meet the threshold for clinical diagnosis of a comorbidity.

Clinical global impression-severity scale (CGI-S; Goodman et al., 1989; Guy, 1976)

A modified version of the CGI-S was used to assess youths' overall severity and impairment of presenting symptoms. Clinicians rated overall symptom severity on a 7-point scale, ranging from 1 ("No psychiatric illness") to 7 ("Extremely severe"). In this study, clinicians provided both a CGI-S rating of the youths' overall illness severity and a separate CGI-S rating specific to the youths' overall misophonia symptom severity.

Children's global assessment scale (CGAS; Shaffer et al., 1983)

The CGAS is a measure of a child's overall psychological and social functioning. Overall functioning is rated on a scale from 1 to 100, using 10-point increments, on which 1–10 indicates "Extremely impaired (needing 24 h care)" and 91–100 indicates "Doing very well."

2.2.2 | Caregiver- and youth-reported measures

Amsterdam misophonia scale (AMISO-S; Schröder et al., 2013)

The A-MISO-S is a 6-item caregiver- and youth-reported measure of misophonia symptom severity. Total scores range from 0 to 24. Scores of 5 and above are considered clinically elevated, and scores of 15 and above indicate severe misophonia symptoms. Previous studies have demonstrated adequate-to-good internal consistency for the A-MISO among youth with misophonia (Cervin et al., 2023; Guzik et al., 2023). In the current study, the AMISO-S caregiver ($\alpha = .71$) and youth ($\alpha = .70$) reports exhibited adequate internal consistency.

Misophonia assessment questionnaire (MAQ; Johnson et al., 2013) is a 21-item caregiver- and youth-reported measure that assesses misophonia-related thoughts and feelings. Items are rated on a scale of 0 (*None of the time*) to 3 (*Almost all the time*). Items are summed to create a total score ranging from 0 to 63. Scores above 22 indicate clinically elevated symptoms, and scores above 43 indicate severe symptoms. The MAQ parent- and child-reported versions have shown strong internal consistency among a sample of youth with misophonia (Cervin et al., 2023). In the current study, the MAQ caregiver ($\alpha = .94$) and youth ($\alpha = .92$) reports exhibited strong internal consistency.

Misophonia questionnaire (MQ; Wu et al., 2014)

The MQ is a three-part youth self-reported scale that evaluates misophonia symptoms, emotional and behavioral responses, and overall condition severity. The MQ has participants respond to several statements on a 4-point scale from 0 (*Not at all true*) to 4 (*Always true*). The MQ offers an overall rating of a respondent's misophonia on a scale of 1–15, with 1 being "Minimal" and 15 being "Very severe." An overall severity score of 7 or above indicates clinically significant misophonia symptoms. The MQ has previously shown good internal consistency among college students (Wu et al., 2014). In the current study, youth report on the MQ symptom scale ($\alpha = .63$), the MQ emotional and behavioral response scale ($\alpha = .68$), and the MQ total score (i.e., the sum of both the misophonia symptoms and emotional/behavioral response scales; $\alpha = .68$) demonstrated questionable internal consistency.

In addition to these questionnaires, youth and their caregivers also completed a demographics questionnaire.

2.3 | Procedure

2.3.1 | Recruitment and enrollment

Potential participants were identified through routine clinic recruitment channels as well as advertising with local mental health professionals, pediatricians, audiologists, and misophonia-based patient organizations. All study activities were approved by the Institutional Review Boards at the two study sites. Caregivers provided informed consent and youth provided assent before any study procedures.

2.3.2 | Participant assessment and compensation

Participants who appeared eligible after initial phone screening completed a semistructured clinical interview using the ADIS-5 and MAI to assess presence and severity of misophonia and comorbid disorders. Assessors were graduate student and post-doctoral clinicians trained to reliability on both assessment measures. Participants also completed caregiver- and youth-reported questionnaires at the time of the clinical interview. Participants were compensated up to \$50 for their completion of study procedures, including the baseline clinical interview, youth- and caregiver-report questionnaires, and follow-up clinical assessments if applicable.

2.3.3 | Data analysis

Descriptive analyses were conducted to characterize (1) the demographics of the sample, (2) frequencies of comorbid disorders, measured using the ADIS-5 and associated CSR ratings, (3) overall symptom severity of the sample, and (4) frequencies of specific misophonia symptoms, measured using the MAI. Rates of agreement on each item of the MAI were calculated between caregiver and youth reports. Statistically significant symptom agreement/disagreement was assessed by calculating Cohen's κ ; p values less than .05 indicate significant agreement, and p values greater than .05 indicate nonsignificant agreement, or significant disagreement. Differential rates of symptom endorsement per reporter were assessed using McNemar's test, which assesses whether one reporter was more likely to endorse a given symptom across the sample (i.e., caregivers consistently endorsing a given symptom more or less frequently than youth; indicated by $p < .05$). A correction for multiple testing was not employed given that the analyses were exploratory in nature. Zero-order correlations were conducted to assess relationships among clinician-rated misophonia severity and the caregiver- and youth-reported misophonia symptom measures. A post hoc analysis was conducted to examine concordance of caregiver- and youth-reported measures between younger (aged 8–13) versus older (aged 14+) children to determine if there were differences in these relationships by age group.

3 | RESULTS

3.1 | Demographic characteristics

The sample was majority female (69.6%), White (87%), and non-Hispanic/Latino (63%), with a mean age of 13.2 years ($SD = 2.0$). Caregiver demographics differed only marginally. See Table 1 for demographic characteristics of the study sample.

TABLE 1 Demographic characteristics of the study sample.

	Caregiver report N = 45	Youth report N = 46
Age M (SD)	13.1 (2.1)	13.2 (2.0)
Sex N (%)		
Male	12 (26.7)	13 (28.3)
Female	32 (71.1)	32 (69.6)
Other	1 (2.2)	1 (2.2)
Gender N (%)		
Male	13 (28.9)	14 (30.4)
Female	30 (66.7)	30 (65.2)
Other	2 (4.4)	2 (4.3)
Race N (%)		
Black or African American	1 (2.2)	1 (2.2)
White	39 (86.7)	40 (87.0)
Other	2 (4.4)	2 (4.3)
Did not respond	3 (6.6)	3 (6.5)
Ethnicity N (%)		
Hispanic	15 (33.3)	15 (32.6)
Not Hispanic	28 (62.2)	29 (63.0)
Did not respond	2 (4.4)	2 (4.3)

3.2 | Clinical characteristics

3.2.1 | Comorbidities

Many participants had comorbid conditions along with their misophonia. The most common comorbid clinical diagnoses included generalized anxiety disorder (36.2%), social anxiety (29.8%), and attention-deficit/hyperactivity disorder (14.9%). See Table 2 for frequencies of comorbid diagnoses among youth with misophonia.

3.2.2 | Misophonia symptoms

Overall, youth presented with moderate to severe misophonia symptoms and reported marked distress and functional impairment. See Table 3 for descriptive statistics for all symptom measures.

Symptom onset

All participants reported that their child's sensitivity of certain sounds had been happening for at least 4 weeks, with 35 youth (92.1%) and 35 caregivers (87.5%) indicating that their child has had this sensitivity of certain sounds for at least 1 year. Youth reported a mean age of onset of 9.2 years (SD = 2.7), while caregivers reported a mean age of onset of 8.7 (SD = 3.8). Caregivers also more frequently indicated that their child had experienced specific sound sensitivity (i.e., misophonia-related symptoms) from birth.

TABLE 2 Frequency of comorbid diagnoses among youth with misophonia.

	Clinical (CSR 4+)*	Subclinical (CSR 1–3)*
Separation anxiety	1 (2.1)	0
Social anxiety	14 (29.8)	0
Generalized anxiety disorder	17 (36.2)	6 (12.8)
Specific phobia—animals	2 (4.3)	1 (2.1)
Specific phobia—blood/injury/infection	2 (4.3)	1 (2.1)
Specific phobia—other	2 (4.3)	0
Other specified anxiety disorder	0	1 (2.1)
Any anxiety disorder	28 (59.6)	9 (19.1)
Major depressive disorder	4 (8.5)	7 (14.9)
Persistent depressive disorder	2 (4.3)	1 (2.1)
Obsessive-compulsive disorder	1 (2.1)	1 (2.1)
Obsessive-compulsive spectrum disorder	0	1 (2.1)
Posttraumatic stress disorder	3 (6.4)	0
Autism spectrum disorder	2 (4.3)	0
Attention deficit hyperactivity disorder	7 (14.9)	1 (2.1)
Oppositional defiant disorder	4 (8.5)	0
Tic disorder	3 (6.4)	3 (6.4)
Other disorder	2 (4.3)	0

*Numbers in parentheses are percent of the sample with diagnosis.

Triggers

Caregivers of youth with misophonia reported that eating sounds were the most common sound sensitivity ($n = 44$, 98%), followed by breathing sounds ($n = 32$, 71%), throat sounds ($n = 25$, 56%), and tapping sounds ($n = 23$, 51%). Additional trigger sounds reported included environmental sounds (e.g., clock ticking, refrigerator humming, etc.; $n = 8$, 18%), rustling/clattering ($n = 10$, 22%), specific language sounds/tones (e.g., “k” sounds, etc.; $n = 10$, 22%), and sounds from silverware/dishes ($n = 8$, 18%). Youth reports were consistent with caregiver reports of individual sound triggers (see Table 4).

Emotional and behavioral responses

Caregivers most commonly reported their child experiencing anger ($n = 40$, 89%) in response to hearing or anticipating a trigger sound, followed by annoyance/irritation ($n = 36$, 80%), distress ($n = 32$, 71%), and disgust ($n = 28$, 62%). However, youth reported annoyance/irritation ($n = 42$, 91%), followed by anger ($n = 41$, 89%), worry/anxiety ($n = 29$, 63%), and distress ($n = 29$, 63%) as emotional responses to sound triggers. Caregivers also reported several behavioral responses to hearing or anticipating a trigger sound. About one-third of caregivers reported that their child had become verbally aggressive in the past ($n = 30$, 67%), and a little over 40% reported that their child had lost self-control ($n = 19$). Youth more frequently reported no previous behavioral response ($n = 12$, 26%) compared to their caregivers ($n = 8$, 18%). Both youth ($n = 31$, 89%) and caregivers ($n = 28$, 78%) in this sample reported awareness that their emotional response (e.g., anger, fear, irritation) was unreasonable or excessive.

TABLE 3 Descriptive statistics for all symptom measures.

Measure	Mean (SD)	Interpretation
Clinician report		
Clinical global impression–severity (CGI-S) overall	5.3 (1.0)	Moderate to severe
Children's global assessment scale (CGAS)	53.7 (10.9)	Moderate functioning ^a
Clinical global impression–severity (CGI-S) misophonia	4.9 (0.8)	Moderate to severe
Clinical severity rating (CSR) for misophonia	4.8 (1.0)	Moderate
Caregiver report		
Misophonia assessment interview–interference rating	5.8 (1.3)	Moderate to marked
Amsterdam misophonia scale (AMISO-S)	12.2 (3.0)	Clinically elevated
Misophonia assessment questionnaire (MAQ)	34.7 (12.9)	Clinically elevated
Youth report		
Misophonia assessment interview–interference rating	5.4 (1.8)	Moderate to marked
Amsterdam misophonia scale (AMISO-S)	11.9 (3.0)	Clinically elevated
Misophonia assessment questionnaire (MAQ)	34.0 (12.8)	Clinically elevated
Misophonia questionnaire (MQ)	8.6 (2.7)	Clinically elevated

^aVariable functioning with sporadic difficulties or symptoms in several but not all social areas. Disturbance would be apparent to those who encounter the child in a dysfunctional setting or time but not to those who see the child in other settings.

Distress and impairment

Only 46% of youth ($n = 21$) reported that having misophonia bothered or caused them distress (in contrast to 63% of youth who reported that experiencing or expecting to hear *trigger sounds caused them distress*). Caregivers agreed, with 44% ($n = 20$) reporting that their child was distressed by having misophonia symptoms and 71% ($n = 32$) reporting that experiencing or expecting to hear *trigger sounds caused their child distress*. Nevertheless, a majority of youth participants reported purposely avoiding specific people or places as a result of their misophonia, with family members ($n = 31$, 67%) and meals ($n = 28$, 61%) being the most common. Additionally, many reported using various protective measures such as wearing protective equipment, headphones, or ear plugs ($n = 33$, 72%); covering ears with hands ($n = 29$, 63%); or eating privately ($n = 29$, 63%). For both caregiver and youth reports, only one respondent (2%) expressed using no protective measures. Interference was reported by youth in a variety of domains, including family life/relationships ($n = 35$, 76%), interacting with people ($n = 13$, 28%), and learning/homework ($n = 13$, 28%). Similarly, caregivers reported that family life/relationships were the most frequently impacted ($n = 37$, 82%) and additionally indicated their child experienced interference with being in public ($n = 11$, 24%) and attending classes ($n = 11$, 24%). Youth reported a mean interference rating of 5.4 (SD = 1.8) on a scale from 0, meaning “Not at all,” to 8, meaning “Very much.” Caregivers of youth with misophonia reported an average interference rating of 5.76 (SD = 1.3) on the same scale. While overall interference ratings were not significantly different between caregiver and youth reports, we had five youth give a rating of 0–2, whereas no caregiver reported interference less than 3.

3.2.3 | Caregiver-child misophonia symptom agreement

Most items on the MAI were similarly reported across caregiver- and youth-reports. Frequencies of caregiver and youth endorsement per item and percent agreement is presented in Table 4. Caregivers and youth disagreed on

TABLE 4 Youth- and caregiver-report misophonia symptoms and agreement, measured using the MAI.

	Caregiver report N = 45	Youth report N = 46	Percent agreement	Caregiver/youth agreement (Cohen's κ)	Differential rates of endorsement (McNemar test)
Trigger sounds					
Eating, chewing, swallowing, lip smacking, slurping, teeth tapping	44 (97.8)	44 (95.7)	97.7%	Agree ($p < .001$)	No differences
Breathing, sniffing, exhaling, inhaling, yawning	32 (71.1)	34 (73.9)	86.4%	Agree ($p < .001$)	No differences
Throat clearing sounds, coughing	25 (55.6)	26 (56.5)	70.5%	Agree ($p = .008$)	No differences
Tapping with hands, feet, objects	23 (51.1)	20 (43.5)	92.5%	Agree ($p < .001$)	No differences
Environmental sounds (clocks, engines, appliances, A/C, refrigerator)	8 (17.8)	13 (28.3)	79.5%	Agree ($p = .002$)	No differences
Rustling/clattering of paper, plastic, aluminum foil	10 (22.2)	15 (32.6)	70.5%	Agree ($p = .049$)	No differences
Specific language sounds/tones	10 (22.2)	15 (32.6)	68.2%	Disagree ($p = .128$)	No differences
Other sounds	24 (53.3)	25 (54.3)	59.1%	Disagree ($p = .232$)	No differences
Emotional responses					
Anger	40 (88.9)	41 (89.1)	90.9%	Agree ($p < .001$)	No differences
Worry/anxiety	25 (55.6)	29 (63.0)	63.6%	Disagree ($p = .086$)	No differences
Distress	32 (71.1)	29 (63.0)	81.8%	Agree ($p < .001$)	No differences
Disgust	28 (62.2)	24 (52.2)	70.5%	Agree ($p = .005$)	No differences
Sadness/depression	13 (28.9)	17 (37)	63.6%	Disagree ($p = .180$)	No differences
Annoyance/irritation	36 (80.0)	42 (91.3)	81.8%	Agree ($p = .005$)	No differences
Other emotion	8 (17.8)	8 (17.4)	81.8%	Agree ($p = .010$)	No differences

(Continues)

TABLE 4 (Continued)

	Caregiver report N = 45	Youth report N = 46	Percent agreement	Caregiver/youth agreement (Cohen's <i>k</i>)	Differential rates of endorsement (McNemar test)
Behavioral responses					
Become verbally aggressive	30 (66.7)	26 (56.5)	75.0%	Agree ($p < .001$)	No differences
Become physically aggressive, had aggressive outbursts, or destroyed objects/property	15 (33.3)	14 (30.4)	77.3%	Agree ($p = .002$)	No differences
Expressed violent thoughts	14 (31.1)	14 (30.4)	70.5%	Agree ($p = .042$)	No differences
Lost self-control	19 (42.2)	21 (45.7)	77.3%	Agree ($p < .001$)	No differences
Protective actions					
Worn protective equipment, headphones, or ear plugs	31 (68.9)	33 (71.7)	79.5%	Agree ($p < .001$)	No differences
Covered ears with hands	19 (42.2)	29 (63)	68.2%	Agree ($p = .004$)	Caregivers > youth ($p = .013$)
Ate privately or used other arrangements (e.g., away from siblings)	29 (64.4)	29 (63)	81.8%	Agree ($p < .001$)	No differences
Used classroom modifications	8 (17.8)	5 (10.9)	84.1%	Agree ($p = .010$)	No differences
Other special considerations	8 (17.8)	6 (13)	79.5%	Disagree ($p = .209$)	No differences

Note: Percent agreement is calculated as the percentage of caregiver/child dyads who agreed on a particular item (both yes or both no).
Abbreviation: MAI, misophonia assessment interview.

"Specific language sounds/tones" (Cohen's $\kappa = 0.22$, $SE = 0.15$, $t = 1.52$, $p = .128$) and "Other sounds" (Cohen's $\kappa = 0.18$, $SE = 0.15$, $t = 1.20$, $p = .232$) as triggers of misophonia symptoms. Caregivers and youth disagreed on worry/anxiety (Cohen's $\kappa = 0.25$, $SE = 0.15$, $t = 1.71$, $p = .086$) and sadness/depression (Cohen's $\kappa = 0.20$, $SE = 0.15$, $t = 1.34$, $p = .180$) as emotional responses to misophonia triggers. Caregivers and youth also disagreed on "Other special considerations" (Cohen's $\kappa = 0.19$, $SE = 0.19$, $t = 1.26$, $p = .209$) for preventative actions in response to misophonia triggers. Notably, disagreement on these items appeared to be at "random" rather than in a particular direction; caregivers did not consistently endorse these items more or less frequently than youth, as indicated by nonsignificant McNemar tests for these items. Examining differential rates of endorsement, youth were significantly more likely to report covering their ears ($n = 29$, 62%) than caregivers ($n = 19$, 40%; McNemar's test $p = .013$). All other items were endorsed at similar rates by caregivers and youth across the sample (i.e., McNemar's test $p > .05$) ($p > .05$).

3.2.4 | Associations among clinician-, caregiver-, and youth-reported misophonia symptom measures

Zero-order correlations among clinician-, caregiver-, and youth-reported symptom measures are presented in Table 5. Clinician-rated misophonia severity (measured by the CSR) was positively correlated with overall clinician-rated symptom severity (measured by the CGI-S), $r(43) = .59$, $p < .001$. Clinician-rated misophonia severity (measured by the CSR) was also positively associated with caregiver-reported misophonia severity (measured by the AMISO-S parent), $r(41) = .35$, $p = .022$. Clinician-rated misophonia severity (measured by the CSR) was negatively associated with clinician ratings of youth's overall functioning (measured by the CGAS), $r(39) = -.55$, $p < .001$. A closer examination of associations among measures by age group (children aged 8–13 vs. children aged 14+) indicated that, among older children, clinician-rated misophonia severity (measured by the CSR) was still positively associated with clinician-rated symptom severity (measured by the CGI-S), $r(20) = .71$, $p < .001$ and negatively associated with clinician ratings of youths' overall functioning (measured by the CGAS), $r(19) = -.74$, $p < .001$, and also positively correlated with youth-reported misophonia symptoms measured by the MQ ($r(16) = .47$, $p = .049$) and AMISO-S ($r(18) = .46$, $p = .042$). Alternatively, among younger children, clinician-rated

TABLE 5 Correlations between clinician-reported misophonia severity and child- and caregiver-report misophonia symptom measures.

	CGI-S Clinician	CGAS Clinician	MQ Child	AMISO-S Child	AMISO-S Parent
CSR-all ages ($n = 45$)	0.587	−0.55	0.12	0.22	0.34
<i>p</i> Value	<.001	<.001	.48	.17	.02
<i>N</i>	45	41	35	40	43
CSR-adolescents (14+; $n = 22$)	0.707	−0.74	0.47	0.46	0.37
<i>p</i> Value	<.001	<.001	.04	.04	.10
<i>N</i>	22	21	18	20	20
CSR-children (8–13, $n = 23$)	0.59	−0.37	−0.14	−0.07	0.33
<i>p</i> Value	.003	.11	.60	.77	.13
<i>N</i>	23	20	17	20	23

Abbreviations: AMISO-S, Amsterdam misophonia scale; CGAS, children's global assessment scale; CGI-S, clinical global impressions–severity scale; CSR, clinician-rated clinical severity rating of misophonia; MQ, misophonia questionnaire.

misophonia severity (measured by the CSR) was only associated with overall clinician-rated symptom severity (measured by the CGI-S), $r(21) = .59$, $p = .003$, but was not associated with clinician ratings of youths' overall functioning (measured by the CGAS), nor with caregiver (AMISO-S) or youth (AMISO-S; MQ) reports of misophonia symptoms.

4 | DISCUSSION

This study examined the clinical characteristics of 47 youth with misophonia in the largest clinical treatment-seeking sample to date. The sample was predominantly female, White, and non-Hispanic, which is fairly consistent with previously studied samples of youth with misophonia symptoms (Guzick et al., 2023; Wu et al., 2014). Most youth presented with moderate to severe misophonia symptoms. A majority of youth presented with at least one clinical comorbid condition, with the most common being generalized anxiety disorder, social anxiety, and attention-deficit/hyperactivity disorder. The finding of high comorbidity in this sample is consistent with findings in other samples (e.g., Guzick et al., 2023; Siepsiak et al., 2023).

Participants reported a variety of misophonia triggers, including but not limited to eating sounds, breathing-related sounds, throat clearing and coughing sounds, and tapping, each of which has been identified as misophonia triggers in prior studies (Rouw & Erfanian, 2018). Surprisingly, only half of youth were reported to be distressed about having misophonia (despite a high rate of reported distress associated with trigger stimuli, more specifically). This lower-than-expected rate of "distress with having misophonia" by youth may reflect the range of compensatory behaviors (including avoidance/accommodation) participants used to cope with misophonia-related distress. Participants reported a range of emotional responses to hearing or anticipating a trigger sound, including annoyance, irritation, anger, worry/anxiety, and distress, as well as behavioral responses such as becoming physically or verbally aggressive and losing self-control. A majority of youth were aware of the unreasonableness of their emotional response to the sound triggers. Avoidance of people and locations was also commonly reported, with family members and meals being the most frequently avoided settings. Over two-thirds of participants reported using protective measures in anticipation of trigger sounds, including wearing headphones, covering their ears, or eating separately from others. Participants reported that their family life and relationships were impacted significantly by misophonia symptoms. Findings are largely consistent with prior studies indicating that misophonia symptoms lead to a range of responses and impairments. However, compared to a recent study examining clinical characteristics of youth misophonia in an internet-based sample (Guzick et al., 2023), participants in the current treatment-seeking sample less frequently endorsed experiencing distress related to misophonia triggers (63% of youth and 71% of caregivers reported distress caused by triggers sounds in this sample compared to 93% of youth within the internet-based sample). Participants in this sample also less frequently reported engaging in emotional and behavioral responses to triggers (e.g., 63% of youth and 56% of caregivers in this sample reported worry/anxiety as an emotional response compared to 79% of youth within the internet-based sample). While many individual symptoms were reported more frequently within the internet-based sample, there were not any noteworthy differences in the respective rates of symptoms (i.e., the more common and lesser common symptoms remained the same). Differences between these two samples may be related to sampling bias as the current study required consent for participation in exposure-based treatment after baseline assessment whereas the internet-based study did not. It is possible that particularly severe youth may have self-selected out of participation in the current study. The sample of youth included in the current study nonetheless reported a range of clinically significant symptoms and impairments distinct from those explained by comorbid disorders, without any one sole consistent comorbid disorder across the sample, providing further evidence of misophonia as a distinct clinical symptom presentation warranting evidence-based treatment.

We also examined concordance among a range of empirically established clinician-, caregiver-, and youth-report measures of misophonia symptoms. Overall, findings suggest that caregivers and youth exhibit high

agreement on specific misophonia symptoms (e.g., triggers) but lower agreement on symptom severity and associated impairment. A closer examination of concordance among measures within younger children (8–13 years) versus older children (14+ years) subsamples suggests that adolescents are more reliable reporters (i.e., exhibit greater concordance with clinician- and caregiver-report measures) of misophonia symptoms than young children. This finding suggests that clinician and caregiver reports may be the most reliable reports of misophonia symptoms for younger children. This finding could inform guidance for clinicians conducting clinical interviews of misophonia symptoms with youth and families.

This study presents several limitations that should be noted when considering the results. The sample was predominantly female, White, and non-Hispanic, and participants were recruited from mostly urban/suburban areas. Clinical characteristics of youth with misophonia may differ slightly across racial, ethnic and cultural populations. As misophonia is still an understudied condition, further validation of assessment measures is needed, particularly among racially, ethnically, and geographically representative samples. Finally, and as discussed above, certain aspects of this study's recruitment and enrollment procedures may have impacted characteristics of the sample. Youth were only included if they had not previously received treatment for misophonia, were willing to enroll in an exposure-based treatment, and identified misophonia as the primary treatment target, and thus, it is likely that youth with more complex clinical presentations (e.g., nonresponse to prior treatment, treatment refusal, severe comorbid disorders) are not reflected in this study's results.

Future research should continue to examine misophonia as a distinct clinical condition needing further investigation. Studies of misophonia prevalence and clinical characteristics should aim to recruit a diverse array of participants from geographically representative locations to capture the full range of possible symptom presentations. While various measures have been developed, as described in the current study, future research is nonetheless needed to further establish the psychometric properties of these measures in diverse populations and settings. Future etiological research should aim to identify factors (e.g., specific misophonia symptoms, comorbid disorders) associated with greater misophonia symptom severity and poorer outcomes. Finally, as scientific understanding of misophonia as a distinct clinical condition increases, efforts should be made to design and empirically test clinical interventions for this symptom presentation. Transdiagnostic treatment approaches may be well-suited for the treatment of misophonia given the apparent high rates of comorbid psychiatric disorders. In particular, transdiagnostic cognitive-behavioral interventions such as the Unified Protocols for Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents (Ehrenreich-May et al., 2017) may improve emotion regulation skills as to reduce the strong emotional responses that characterize misophonia. For individuals who respond with anxiety and avoidance to sound triggers, exposure-based cognitive behavioral interventions may be effective (Mattson et al., 2023), although more research is needed in this area, as exposure alone may not be sufficient for some youth with misophonia. As misophonia is a heterogenous clinical condition with a range of triggers and emotional and behavioral responses, evidence-based treatment approaches will need to be tailored to the unique symptoms of the individual to maximize likelihood of response. Further research will elucidate particular interventions that are effective to treat differing patterns of misophonia symptom presentations.

ACKNOWLEDGMENTS

This study was funded by a grant to Dr. Adam B. Lewin from the Misophonia Research Fund/Ream Foundation.

DATA AVAILABILITY STATEMENT

Data may be made available upon request from the corresponding author.

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PEER REVIEW

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/jclp.23672>.

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How to cite this article: Lewin, A. B., Milgram, L., Cepeda, S. L., Dickinson, S., Bolen, M., Kudryk, K., Bolton, C., Karlovich, A. R., Grassie, H. L., Kangavary, A., Harmon, S. L., Guzick, A., & Ehrenreich-May, J. (2024). Clinical characteristics of treatment-seeking youth with misophonia. *Journal of Clinical Psychology*, 1–15. <https://doi.org/10.1002/jclp.23672>