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Misophonia in autism: A systematic review of prevalence, clinical features, and comorbidities

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ABSTRACT

Background: Misophonia, characterized by intense emotional reactions to specific sounds, is increasingly studied in autism spectrum disorder (ASD) and related mental health conditions such as obsessive-compulsive disorder (OCD), anxiety, and depression. Autistic individuals often have sensory sensitivities, which may predispose them to misophonia. However, the relationship between misophonia, sensory sensitivities, and psychiatric comorbidities in autism remains underexplored.

Aims: This systematic review examines the prevalence, clinical characteristics, comorbidities, and treatment outcomes of misophonia in autistic individuals and related conditions. It also explores the neurobiological links between misophonia and sensory sensitivities and their impact on quality of life, aiming to inform diagnostic and intervention strategies.

Methods: A systematic search was conducted across seven databases following PRISMA guidelines. Studies assessing misophonia in autism, using established diagnostic criteria, were included. The risk of bias was evaluated using ROBINS-I, AXIS, Venice criteria, and JBI tools.

Results: Fourteen studies ($n = 89{,}889$ participants) met inclusion criteria. Misophonia prevalence in autism ranged from 12.8 % to 35.5 %, with 79 % of autistic individuals with misophonia also experiencing psychiatric comorbidities such as anxiety, OCD, and depression. Clinical characteristics included intense emotional reactions to specific sound triggers (e.g., eating, breathing) and significant disruptions in daily functioning. Sensory sensitivities were reported in 21.4 % of cases, highlighting the overlap between misophonia and broader sensory processing challenges in autism. There were only two intervention studies: one demonstrating the efficacy of risperidone in reducing misophonia severity, and another suggesting cognitive-behavioral therapy (CBT) and tinnitus retraining therapy (TRT) as potential management strategies. Quality assessment revealed varying levels of bias, particularly in observational studies, which often lacked robust randomization and blinding.

Conclusion: Misophonia is prevalent in autism and frequently co-occurs with psychiatric conditions and sensory hypersensitivities. Standardized diagnostic tools and tailored interventions are needed to improve clinical outcomes. Future research should explore longitudinal trajectories, genetic and environmental influences, and effective management strategies to address the complex interplay between misophonia, sensory sensitivities, and autism.

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1. What this study adds

This study advances the understanding of misophonia by clarifying its relationship with autism and sensory sensitivities, distinguishing it as a discrete sensory condition rather than a mere comorbid feature. It highlights genetic predispositions and environmental influences, such as maternal mental health, as contributing factors to misophonia's development. The review also underscores psychiatric comorbidities associated with misophonia, including anxiety, depression, OCD, and ADHD, emphasizing its impact on quality of life. While behavioral and pharmacological interventions show promise, there are limitations such as small sample sizes and methodological constraints, calling for larger, well-controlled studies. By advocating for a multidisciplinary approach integrating sensory, psychiatric, and environmental perspectives, this study contributes to refining diagnostic protocols, improving intervention strategies, and fostering a deeper understanding of misophonia within neurodevelopmental and psychiatric frameworks.

2. Introduction

Atypical sensory processing is a hallmark of autism, characterized by hyperreactivity or hyporeactivity to sensory stimuli across modalities such as sight, sound, touch, taste, smell, and the vestibular and proprioceptive systems (Morimoto & Miller, 2021). Research indicates that up to 90 % of autistic individuals experience sensory processing difficulties, most commonly in the auditory, tactile, and visual domains, with auditory hypersensitivity being particularly prevalent (Balasco et al., 2020). This heightened sensitivity to sound often triggers negative emotional responses such as anxiety and avoidance behaviors in noisy environments significantly impairing daily functioning and quality of life (Donkers et al., 2020; Schwemmle & Arens, 2022).

Auditory hypersensitivity, a common sensory challenge in autism, manifests in diverse ways, with one particularly distressing form being misophonia, a condition characterized by extreme emotional responses to specific, repetitive sounds like chewing, breathing, or tapping (Hansen et al., 2022), reflecting a complex neurophysiological and behavioral disorder with heightened physiological reactions, as noted by Jastreboff and Jastreboff (2002) and Wu et al. (2014). The term, derived from the Greek "*misos*" (hatred) and "*phonos*" (sound), was introduced in audiology literature as a "hatred of sounds" (Jastreboff & Jastreboff, 2002), with Siepsiak and Dragan (2019) emphasizing its selective aversion and hyper-reactivity to such triggers, often leading to anger, disgust, or fear (Banker et al., 2022) and significant disruptions in daily life, including social withdrawal and anxiety (Rosenthal et al., 2021). First described in the early 2000s (Schröder et al., 2013), misophonia was distinguished from hyperacusis and phonophobia by Edelstein et al. (2013), who provided early physiological insights, paving the way for the Amsterdam University Medical Centers (AMC) to propose the first psychiatric diagnostic criteria in 2013 (Schröder et al., 2013). This perspective, suggesting misophonia as a new mental disorder (Cassiello-Robbins et al., 2021; Daniels et al., 2020), has fueled extensive research (e.g., Brout et al., 2018; Ferrer-Torres & Giménez-Llort, 2021), though Taylor (2017) highlights an ongoing debate about whether it is primarily auditory or psychiatric, given its lack of consistent ties to hearing thresholds across individuals with normal hearing, hearing loss, or auditory pathology (see Møller, 2011), and the specificity of triggers suggesting non-auditory origins (see Duddy & Oeding, 2014).

Typically emerging in childhood or adolescence, misophonia persists as a chronic condition (Pan et al., 2022), with approximately 69 % of affected individuals also reporting hyperacusis, amplifying sensory distress (Jager et al., 2020). Although not yet classified in the DSM-5-TR or ICD-11, recent neurobiological research indicates significant overlaps between misophonia and autism, particularly in brain regions linked to auditory processing, emotional regulation, and salience detection (Aazh et al., 2018; Eijsker et al., 2021; Greenberg et al., 2023; Guzick et al., 2023). Studies suggest a higher prevalence of misophonia among autistic individuals compared to the general population (Smith et al., 2022; Williams et al., 2021), with 3.6 % of adults self-reporting misophonia also diagnosed with autism—a rate exceeding the estimated 1–2 % prevalence broadly (Williams et al., 2021).

Efforts to formalize misophonia's diagnostic criteria continue, supported by tools like the Duke-Vanderbilt Misophonia Screening Questionnaire (Williams et al., 2022) and the Misophonia Symptom Checklist (Vitoratou et al., 2023), which enhance diagnostic reliability in the general population and may be applicable to autistic individuals. Research also highlights overlap with obsessive-compulsive disorder (OCD) and autism spectrum disorder (Cassiello-Robbins et al., 2024; Jager et al., 2020), suggesting shared sensory and emotional processing challenges. Neuroimaging reveals hyperactivity in the anterior insular cortex a hub for salience detection and emotional processing, in individuals with misophonia (Kumar et al., 2017), supporting its classification as an auditory-emotional processing disorder rather than a simple sensory sensitivity (Brout et al., 2018). Genetic studies hint at hereditary susceptibility (Smit et al., 2023), and sensory sensitivity appears a prerequisite, with no cases reported absent auditory processing differences (Andermane et al., 2023; Rosenthal et al., 2021).

Although misophonia, hyperacusis, and auditory processing disorder (APD) all involve atypical auditory responses, they are distinct conditions with unique characteristics. Hyperacusis refers to an increased sensitivity to loudness, where moderate or even soft sounds are perceived as intolerably loud or painful (Scheerer et al., 2024). Misophonia, on the other hand, is a selective hypersensitivity to specific repetitive sounds such as chewing, breathing, or tapping, often triggering emotional distress rather than physical discomfort (Williams et al., 2022). In contrast, APD is not necessarily about sensitivity to sound but rather difficulties in processing and interpreting auditory information correctly, leading to challenges in speech comprehension, especially in noisy environments (Carson et al., 2024; Guzick et al., 2023). While autistic individuals may experience one or more of these conditions, they do not always co-occur, and their underlying mechanisms remain distinct.

Despite growing recognition of misophonia as an independent sensory condition, its relationship with autism and comorbid mental health conditions remains underexplored. Unlike hyperacusis, which causes general sound intolerance, misophonia involves intense reactions to specific triggers. This distinction raises questions about whether misophonia is a unique condition or part of a broader sensory processing profile in autism, including tinnitus and auditory processing difficulties (Smit et al., 2023; Williams et al., 2021).

Autistic individuals, often exhibiting heightened auditory sensitivity (Balasco et al., 2020; Morimoto & Miller, 2021), may be predisposed to misophonia, yet the precise intersections remain unexamined.

2.1. Aim of the review

This review aims to synthesize the current literature on misophonia's prevalence, clinical characteristics, and neurobiological links to sensory sensitivities in autism, as well as their impact on quality of life, while highlighting promising interventions to inform improved diagnostic and management strategies for this population. It provides a distinct focus compared to prior work, such as the review by Williams et al. (2021), which examined misophonia in general populations, by concentrating on prevalence, clinical characteristics, psychiatric comorbidities, and treatment outcomes specifically among autistic individuals.

This review investigates the specific intersection of misophonia and sensory sensitivity within the autism population and related disorders. Specifically, it explores (a) prevalence of misophonia in autistic individuals, (b) clinical characteristics and comorbidities associated with misophonia in autism and related mental health conditions known to affect misophonia and which are often seen in autism (e.g., anxiety disorders, depression, OCD), (c) potential shared neurobiological mechanisms underlying sensory sensitivities and misophonia, and (d) implications of these findings for diagnosis and intervention.

Given the limited number of studies directly addressing misophonia in autism, a more systematic analysis of existing evidence is essential to advance understanding and guide future research and clinical practice. This review extends the literature by delving into the connection between misophonia and sensory sensitivity in autism. It highlights the importance of distinguishing misophonia as a potential diagnostic consideration within autism and underscores the need for targeted diagnostic and therapeutic strategies to address its impact on daily functioning and quality of life.

3. Methodology

3.1. Design and procedure

This systematic review was developed using the PECOS framework (Population, Exposure, Comparison, Outcomes, Study Design) in accordance with the PRISMA reporting guidelines (Page et al., 2021). Studies were considered that involve autistic individuals based on established diagnostic tools or criteria (e.g., DSM-5 or ICD-11). Studies that included individuals with comorbid mental health conditions (e.g., anxiety disorders, depression, OCD) were eligible if they also included autistic participants. The exposure included clinical assessments and questionnaire-based evaluations of misophonia. As the primary focus of this review was on the prevalence, clinical characteristics, and correlates of misophonia in autism, no formal comparisons (i.e., between autistic individuals and those without autism) were mandatory for inclusion.

3.2. Inclusion and exclusion criteria

To ensure consistency and rigor in the study selection process, the screening was conducted by two researchers (first and second authors). Both participated in preparatory sessions to familiarize themselves with the inclusion and exclusion criteria, supported by detailed guidelines.

3.2.1. Inclusion criteria

The studies to be included had to meet the following criteria: (a) Participants were autistic individuals based on established diagnostic tools or criteria (e.g., DSM-5 or ICD-11). Studies that included individuals with comorbid mental health conditions (e.g., anxiety disorders, depression, OCD) were eligible if some of the participants were autistic. (b) Misophonia was assessed using recognized diagnostic tools, symptom scales, or clinical frameworks. While misophonia is not yet classified in the DSM-5 or ICD-11, it had to be operationally defined in the study through specific clinical frameworks or validated symptom scales. (c) Data were reported on the prevalence, severity, clinical characteristics, or correlates of misophonia in autistic individuals. This included studies exploring the relationship between misophonia and sensory sensitivities, psychiatric comorbidities, and/or quality of life in autistic individuals. Only studies that provided relevant quantitative or qualitative data and were published in English were considered for inclusion, with no restrictions on the year of publication. The review included interventional, observational, cross-sectional, and genome-wide association studies (GWAS), as these designs are particularly effective for identifying population-based prevalence rates and exploring correlation patterns.

3.2.2. Exclusion criteria

The review excluded the following: (a) review articles, opinion pieces, and editorials; (b) studies that did not directly assess misophonia through recognized diagnostic tools, symptom scales, or clinical frameworks (i.e., studies that only mentioned misophonia in passing or did not provide specific data or evaluations on the condition); and (c) studies published in a language other than English.

3.3. Search strategy

The search was conducted across seven databases using Boolean operators and MeSH terms to ensure comprehensive coverage. The databases included PubMed, Embase, PsycINFO, Scopus, Web of Science, CINAHL, and the Cochrane Library. Variants of terms and

their synonyms were utilized to maximize the relevance of the results, including 'Autism Spectrum Disorder,' 'Misophonia,' ' Sensory Sensitivity,' 'Hyperacusis,' 'Tinnitus,' and 'Auditory Processing Disorder,' tailored to each platform's indexing system, as detailed in Table 1. The search terms aims to address the relationships between misophonia and other auditory conditions relevant to autism, such as hyperacusis, which frequently co-occurs with misophonia (Jager et al., 2020); tinnitus, linked to misophonia (Smit et al., 2023); and auditory processing disorder, which overlaps with sensory challenges in autism (Williams et al., 2021).

3.4. Study selection and interrater agreement

A total of 308 records were identified across the databases. After removing 41 duplicates, 267 records remained for screening. During this phase, 29 records were excluded due to the unavailability of full texts. Among the 238 remaining reports, 34 could not be retrieved despite multiple requests to the author(s). For the eligibility assessment, 189 reports were excluded for the following reasons: 30 did not meet the PICO criteria, 28 were off-topic, 26 had different study objectives, 43 were scoping reviews, 33 were literature reviews, and 30 were Ph.D. theses. Ultimately, 204 reports were evaluated for eligibility, with 14 studies included in the final analysis (see Fig. 1).

The two authors independently screened a random sample of 50 studies based on predefined inclusion and exclusion criteria (see 2.2). The level of agreement between the reviewers was calculated using Cohen's Kappa, a statistical method that accounts for chance agreement. The interrater reliability for study selection yielded a Kappa value of 0.82, indicating excellent agreement.

3.5. Data extraction

Two trained researchers (first and second authors) systematically and independently extracted data from the included studies. A trained external reviewer provided additional support in verifying the data extraction process. In cases of disagreement between the two primary researchers, the first author served as an adjudicator to resolve conflicts.

The data extracted included study characteristics (e.g., title, first author, publication year, country, and study design), sampling strategies, diagnostic tools and criteria used for autism and misophonia, sample sizes, prevalence rates of misophonia in autistic populations, severity levels, specific triggers eliciting misophonia, and any reported psychiatric comorbidities or sensory processing differences.

4. Results

4.1. Study characteristics

This systematic review synthesizes findings from 14 studies examining the intersection of sensory sensitivity, misophonia, and autism or other mental health conditions. A summary of the characteristics of the included studies is presented in Table 2. These studies utilized diverse methodologies, populations, and outcomes. A total of 89,889 participants were included across the 14 studies, representing a broad range of ages, diagnostic profiles, and geographical contexts. Participant ages ranged from 3 to 88 years, with individual studies focusing on specific age groups. For instance, Costa et al. (2022) examined children aged 26–62 months, Herdi and Yıldırım (2023) focused on adolescents aged 12–18 years, and Scheerer et al. (2024) studied adults aged 19 years and older.

Gender differences

Gender representation varied substantially across studies. Females predominated in certain samples, such as 92 % of the sample of adults with misophonia in Rinaldi et al. (2023). Other studies reported more balanced gender distributions, with slightly over 50 % female representation in Scheerer et al. (2024) and Williams et al. (2022). Some studies also included non-binary individuals or did not specify gender distributions, highlighting the diverse demographic contexts represented in the reviewed research.

Also, the diagnostic profiles of the participants varied substantially across the included studies. Many studies specifically focused on

Table 1
Search strings/MeSH phrases utilised across the assessed databases.

Database	Search String
PubMed	"Autism Spectrum Disorder"[MeSH] OR "ASD" AND "Misophonia"[MeSH] OR "Sound Sensitivity" OR "Hyperacusis"[MeSH] OR "Tinnitus"[MeSH] OR "Auditory Processing Disorder" AND "Prevalence"[MeSH] OR "Severity" OR "Correlates"[MeSH]
Embase	'autism spectrum disorder'/exp OR 'ASD' AND 'misophonia'/exp OR 'sound sensitivity' OR 'hyperacusis'/exp OR 'tinnitus'/exp OR 'auditory processing disorder' AND 'prevalence'/exp OR 'severity' OR 'correlates'/exp
PsycINFO	DE "Autism Spectrum Disorder" OR "ASD" AND DE "Misophonia" OR "Sound Sensitivity" OR DE "Hyperacusis" OR DE "Tinnitus" OR DE "Auditory Processing Disorder" AND DE "Prevalence" OR "Severity" OR "Correlates"
Scopus	TITLE-ABS-KEY("Autism Spectrum Disorder" OR "ASD" AND "Misophonia" OR "Sound Sensitivity" OR "Hyperacusis" OR "Tinnitus" OR "Auditory Processing Disorder" AND "Prevalence" OR "Severity" OR "Correlates")
Web of Science	TS= ("Autism Spectrum Disorder" OR "ASD" AND "Misophonia" OR "Sound Sensitivity" OR "Hyperacusis" OR "Tinnitus" OR "Auditory Processing Disorder" AND "Prevalence" OR "Severity" OR "Correlates")
CINAHL	(MH "Autism Spectrum Disorder" OR "ASD") AND (MH "Misophonia" OR "Sound Sensitivity" OR MH "Hyperacusis" OR MH "Tinnitus" OR MH "Auditory Processing Disorder") AND (MH "Prevalence" OR "Severity" OR "Correlates")
Cochrane Library	("Autism Spectrum Disorder" OR "ASD") AND ("Misophonia" OR "Sound Sensitivity" OR "Hyperacusis" OR "Tinnitus" OR "Auditory Processing Disorder") AND ("Prevalence" OR "Severity" OR "Correlates")

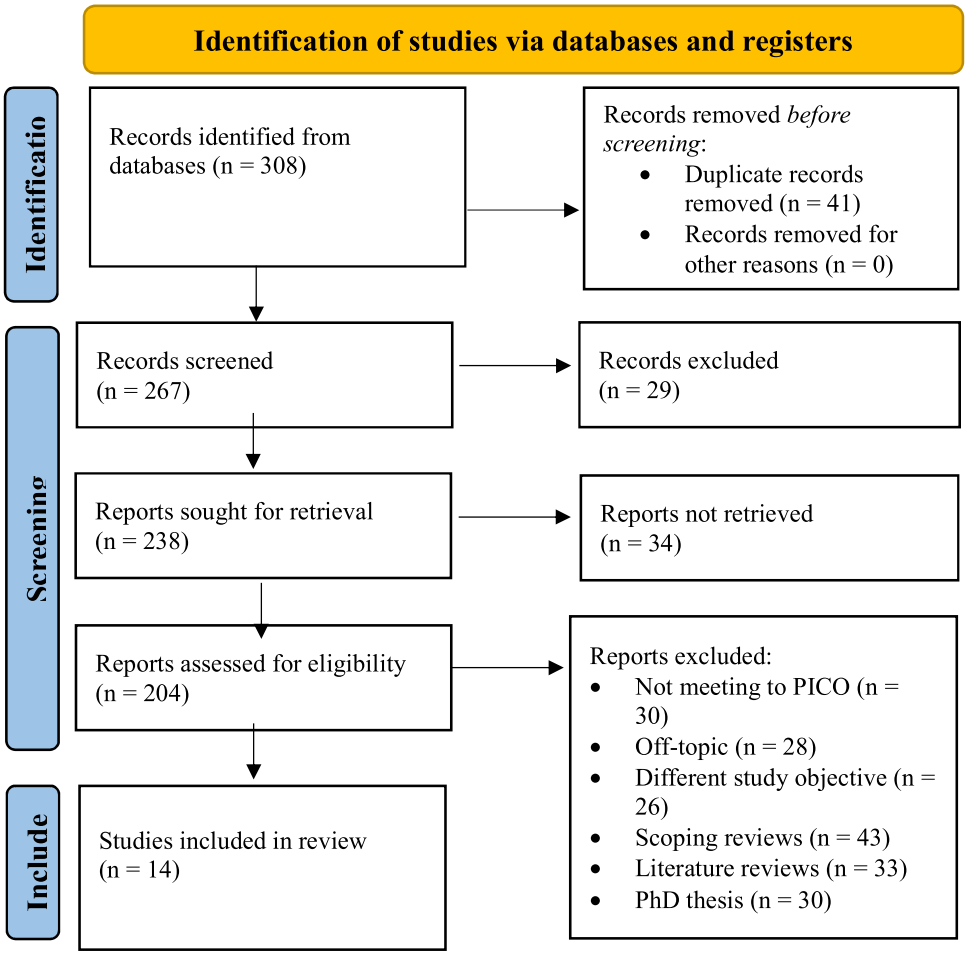

Fig. 1. Article selection process representation of the review using the PRISMA protocol.

individuals with autism and sensory sensitivities, while others examined broader populations with conditions such as ADHD, OCD, mood disorders, or general population controls.

4.2. Cultural and country specific differences

Geographically, the studies were conducted in a range of countries, providing a broad cultural and clinical perspective. These included the United States, United Kingdom, Turkey, Netherlands, Brazil, Kuwait, and Poland. Sample sizes varied widely, ranging from large-scale genome-wide association studies, such as Smit et al. (2023) with 80,607 participants, to small-scale interventions.

4.3. Prevalence of misophonia and its correlates in autism

Misophonia is increasingly recognized as a prevalent condition, with its occurrence varying across different populations. In this systematic review, the prevalence of misophonia among autistic individuals varied across studies and demographic groups, but generally demonstrating a notable overlap between the two conditions. For autistic adults, clinically significant misophonia symptoms were reported in 30 %–35.5 % of participants, as identified using validated tools like the Duke-Vanderbilt Misophonia Screening Questionnaire (DVMSQ) (Scheerer et al., 2024; Williams et al., 2022). Scheerer et al. (2024) reported that 30 % of autistic adults experienced clinically significant misophonia compared to 13 % of non-autistic adults. In autistic participants, misophonia was strongly associated with elevated anxiety and depression levels and poorer quality of life, underscoring its broader psychological impact (Scheerer et al., 2024). Among autistic children, broader auditory sensory over-responsivity, which includes misophonia, hyperacusis, and phonophobia was observed in 60 %–70 % of the cases, indicating the high prevalence of sensory processing challenges in this population (Carson et al., 2024). Furthermore, greater misophonia severity was linked to poorer quality of life (see Jager et al., 2020). Additionally, among individuals with other mental health conditions, such as anxiety disorders and obsessive-compulsive disorder (OCD), misophonia prevalence appears elevated, with studies reporting high comorbidity rates (e.g., 45 % of youth with misophonia also diagnosed with anxiety or OCD; Guzick et al., 2023), though specific prevalence estimates independent of autism

Table 2
Summary of the included studies.

Author(s), year, country	Aim	Sample Size	Age (range, mean)	Gender Distribution	Findings
Carson et al. (2024), USA	To develop and validate the Pediatric Misophonia and Hyperacusis Questionnaire (PMHQ) to differentiate misophonia and hyperacusis in children aged 6–17 years.	N = 200 Children with autism, experiencing auditory sensory over-responsivity. The study involved their parents who provided information about their children's auditory sensory over-responsivity (aSOR).	6–17 years	Not specified	• The PMHQ is a validated screening tool with a two-factor model that distinguishes between hyperacusis and misophonia. • It demonstrates robust psychometric properties, supporting clinicians in assessing distinct Decreased Sound Tolerance (DST) conditions in children. • PMHQ enhanced symptom identification and monitoring, facilitating targeted interventions for misophonia and hyperacusis. Auditory Sensory Over-Responsivity (aSOR): • Found in 60–70 % of autistic children, presenting as a combination of hyperacusis, misophonia, and phonophobia. • Limits engagement in meaningful activities for both children and their families.
Cengiz Kılıç et al. (2021), Turkey	To determine the prevalence of misophonia and its relationship with clinical and demographic variables in a representative population sample	N = 541	15–88 years, 43.5 years	58 % female, 42 % male	• The prevalence of misophonia was 12.8 %, with most cases originating in childhood or adolescence. • Factors associated with misophonia include younger age, family history, and prior contact with mental health services. • Despite its impact, only 5.8 % of individuals sought help for misophonia symptoms. • The relationship between misophonia and other mental health conditions, such as ADHD, OCD, and bipolar disorder, can help build a foundation for understanding potential correlations between misophonia and autism.
Guzick et al. (2023), USA	To evaluate clinical characteristics, psychiatric comorbidity, autistic characteristics and functional impairment in youth with misophonia compared to youth with anxiety disorders.	102 youth with misophonia; comparative group of 94 youth with anxiety disorders.	8–17 years, 13.7 years for the misophonia group; 12.4 years for the anxiety group.	Misophonia group: 68 % female, 28 % male, 4 % other or not specified	• Psychiatric comorbidities were prevalent, with 79 % of individuals meeting the criteria for at least one disorder, including major depressive disorder (47 %), anxiety or obsessive-compulsive disorder (45 %), ADHD (21 %), and tic disorders (13 %). • Emotional responses to triggers predominantly involved anger (95 %) and distress (93 %), accompanied by widespread avoidance behaviors that significantly impacted family life.

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Table 2 (*continued*)

Author(s), year, country	Aim	Sample Size	Age (range, mean)	Gender Distribution	Findings
					• The severity of misophonia was positively correlated with internalizing symptoms, whereas externalizing symptoms were less pronounced. • Compared to individuals in the anxiety group, those with misophonia exhibited slightly lower internalizing symptoms but experienced similar quality-of-life impairments.
Herdi & Yıldırım (2023), Turkey	To explore the associations between misophonic symptoms and traits of ADHD, OCD, and autism in adolescent outpatients, with a focus on sex-specific differences.	348 adolescent outpatients	12–18 years, 14.34	56 % female (195 participants), 44 % male (153 participants)	• The study found that misophonia symptoms, measured by the Misophonia Checklist (MCL; median score: 41, range: 2–124), were positively correlated with obsessive-compulsive traits ($p < 0.001$) and ADHD traits ($p < 0.001$), but negatively correlated with autism-related traits ($p = 0.021$). • Regression analysis revealed that obsessive-compulsive traits ($p < 0.001$), ADHD traits ($p < 0.001$), and autism-related traits ($p < 0.001$) were significant predictors of misophonia symptoms, collectively explaining 23.7 % of the variance. • Females had significantly higher MCL scores than males ($p < 0.001$), and participants with a family history of mental disorders also exhibited higher symptom scores ($p = 0.014$).
Jager et al. (2020), Netherlands	To analyze the phenomenology, comorbidity, and demographics of misophonia and assess its psychiatric and somatic nature.	575 participants diagnosed with misophonia from an initial cohort of 779 referred subjects.	Not explicitly reported; mean age indicates a wide adult range. 34.17 years (SD = 12.22).	69 % female, 31 % male.	• Misophonia Symptom Severity: The mean score on the A-MISO-S was 14.02 (SD = 3.43). • Comorbidity: Among participants, 26 % had obsessive-compulsive personality traits, 10 % had mood disorders, 5 % had ADHD, and 3 % had autism spectrum conditions. • Quality of Life: Misophonia severity was negatively correlated with quality of life ($rs = -0.34$, $p < 0.001$). • Triggers: Eating sounds were a trigger for 96 % of participants, while nasal or breathing sounds triggered 85 %. • Onset: The mean age of onset was 13.17 years (SD = 7.37).
Costa et al. (2022), Brazil	To investigate the occurrence and type of auditory hypersensitivity in children with clinical signs of autism	11 children	26–62 months, 44.8 months.	81.8 % male	• Auditory Hypersensitivity: 63.6 % of children demonstrated results

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Table 2 (*continued*)

Author(s), year, country	Aim	Sample Size	Age (range, mean)	Gender Distribution	Findings
	through parents' reports during the COVID−19 pandemic.				indicative of auditory hypersensitivity. • Irritability to Specific Sounds: 54.5 % of children scored the maximum on questions related to irritability triggered by specific sounds. • Irritating Sounds: Commonly reported irritating sounds included clapping, fireworks, shouting, construction tools, singing, and cell phone ringtones.
Scheerer et al. (2024), Canada	To investigate the characteristics of decreased sound tolerance (DST) in autistic and non-autistic adults, including its relationship with mental health, quality of life, and autism traits.	205 participants (77 autistic adults, 128 non-autistic adults)	≥ 19 years, Autistic group: 33.00 years (SD = 11.53) Non-autistic group: 32.68 years (SD = 12.78)	Not explicitly reported.	• Misophonia Symptoms: Clinically significant misophonia symptoms were reported by 30 % of autistic adults, compared to 13 % of non-autistic adults. • Hyperacusis Symptoms: Clinically significant hyperacusis symptoms were reported by 56 % of autistic adults, compared to 17 % of non-autistic adults. • Impact on Mental Health and Quality of Life: Both misophonia and hyperacusis symptoms were associated with higher levels of anxiety and depression, as well as poorer quality of life, particularly among autistic participants.
Pan et al. (2022), USA	To document the treatment of severe misophonia in a patient with autism using risperidone and evaluate its effects.	N = 1	32 years	Male	• The patient's misophonia severity decreased significantly, with the Amsterdam Misophonia Scale-Revised (AMISOS-R) score dropping from 31 (severe misophonia) to 5 (subclinical misophonia) following titration of risperidone to 2 mg twice daily. • Symptoms improved dramatically during hospitalization, including reduced irritability, increased tolerance for triggers, and enhanced social interactions. • The observed improvement was attributed specifically to risperidone rather than other medications. • Long-term follow-up revealed sustained, though partial, improvement in misophonia symptoms.
Rinaldi et al. (2023), UK	To investigate whether autistic traits, emotion regulation, and sensory sensitivities are elevated in children and adults with misophonia.	Study 1 (Adults): 126 misophonics and 253 non-misophonic controls. Study 2 (Children): 15 misophonics and 127 controls.	Adults: Mean age = 30.32 years. Children: 10–14 years (Mean age = 11.72 years), Adults: 30.32 years (SD = 17.21).	Adults: Predominantly female (92 female, 25 male, 5 non-binary, 4 preferred not to say). Children: 9 girls and 6 boys in the misophonia group; 56	• Adults with misophonia scored significantly higher on all subscales of autistic traits (social skills, attention switching, attention to detail, communication, and imagination).

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Table 2 (*continued*)

Author(s), year, country	Aim	Sample Size	Age (range, mean)	Gender Distribution	Findings
			Children: 11.72 years (SD = 1.12).	girls and 71 boys in the control group.	• Among adults with misophonia, 21.4 % scored above the clinical threshold for autism, compared to only 2.8 % of controls. • Children with misophonia also scored higher on autistic traits and exhibited greater sensory hypersensitivity across multiple domains (e.g., auditory, visual, and tactile) compared to controls.
Rinaldi & Simner (2023), UK	To examine mental health profiles (ADHD, depression, anxiety) in children who develop misophonia.	4253 adults screened; final childhood data included 333 misophonics and 3920 non-misophonics.	7–16 years.	Misophonics: 77 males, 256 females; Non-misophonics: 1375 males, 2542 females, 3 unknown.	• Misophonics exhibited a higher likelihood of depression and anxiety starting at ages 7–10 years, compared to their peers. • The likelihood of ADHD did not differ significantly between the groups.
Smit et al. (2023), Netherlands	To investigate the genetic etiology of rage-related misophonia symptoms and its associations with audiological, psychiatric, and personality traits.	N = 80,607	Not specified	Not specified	• Genetic Correlations: Misophonia showed significant genetic correlations with tinnitus (rG = 0.15–0.19), major depressive disorder (rG = 0.11), PTSD (rG = 0.25), and anxiety (rG = 0.31). • The strongest correlations were observed with neuroticism (rG = 0.42) and irritability. • Negative Correlation: Educational attainment showed a negative genetic correlation with misophonia (rG = −0.18).
Siepsiak et al. (2023), Poland	To investigate the characteristics of misophonia in children and adolescents, including age differences, risk factors, psychiatric correlates, and maternal factors, with the involvement of mothers.	90 children and adolescents	7–18 years, Misophonia group: 13.1 ± 3 years Control group: 11.9 ± 2.9 years	Misophonia group: 68.2 % female (30 females, 15 males) Control group: 51.4 % female (19 females, 18 males)	Misophonia Characteristics: • Common triggers include oral sounds (e.g., chewing, sniffling). • Younger children often exhibited aggression (verbal and physical), while older children tended to self-harm in response to triggers. • Misophonia typically worsened over time, with 57 % reporting increased reactions and 46 % experiencing more frequent triggers. Psychiatric Correlates: • The misophonia group exhibited a higher prevalence of anxiety, depression, OCD, migraines, and psychosomatic complaints. • No significant differences were found in symptoms of ADHD, ODD, or autism spectrum disorder compared to controls. Maternal Factors: • Mothers of children with misophonia had a higher

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Table 2 (*continued*)

Author(s), year, country	Aim	Sample Size	Age (range, mean)	Gender Distribution	Findings
					rate of postpartum depression (20.5 % vs. 2.7 %). Social and Emotional Competencies: • No significant differences were observed in performance-based measures of emotional or social skills between the misophonia and control groups.
Swonke et al. (2025), USA	To highlight the clinical features and presentations of pediatric misophonia and increase awareness among otolaryngologists about this underdiagnosed condition.	2 pediatric cases	3 and 16 years	Male: 1 Female: 1	• The study describes both hyperacusis-like (Case 1) and misophonia-like (Case 2) symptoms. • It highlights the challenge of diagnosing misophonia vs. hyperacusis, particularly in young children who cannot self-report their experience accurately. • The overlap with other sensory disorders (e.g., autism, psychiatric conditions) complicates classification. • There was no significant medical history or hearing loss. The family history included maternal anxiety and similar sound aversions. • Misophonia remains underdiagnosed in pediatric populations due to reliance on self-reported symptoms and overlaps with other conditions like tinnitus, hyperacusis, and psychiatric disorders. • Management focuses on cognitive-behavioral therapy and variations of tinnitus retraining therapy.
Williams et al. (2022), USA	To validate the Duke-Vanderbilt Misophonia Screening Questionnaire (DVMSQ) as a measure of misophonia symptoms and functional impairment in both general population adults and adults on the autism spectrum.	2339 adults (1403 general population; 936 autistic adults)	18–83 years, General population: 32.27 ± 12.55 years Autistic adults: 37.49 ± 13.28 years	General population: 51.1 % female, 48.9 % male Autistic adults: 63.0 % female, 37.0 % male	• The DVMSQ exhibited strong reliability, validity, and measurement invariance across demographic groups and autism status. • The tool identified clinically significant misophonia in 7.3 % of the general population and 35.5 % of autistic adults. • Emotional triggers (e.g., anger, disgust) and functional impairment were central to the misophonia construct. Population Insights: • Misophonia was more prevalent among females, younger individuals, and autistic adults. • Among those with clinically significant misophonia, oronasal sounds were common triggers.

(*continued on next page*)

Table 2 (*continued*)

Author(s), year, country	Aim	Sample Size	Age (range, mean)	Gender Distribution	Findings
					• Misophonia was associated with lower life satisfaction, greater anxiety, depression, anger, and somatic symptom burden. Utility of the DVMSQ: • The DVMSQ serves as a reliable screening and diagnostic tool for research and clinical applications to identify misophonia and assess symptom severity.

remain less consistently documented in this review (see Section 3.5 for further details).

4.4. Clinical characteristics and triggers of misophonia

Among the included studies, misophonia is characterized by intense emotional reactions to specific sound triggers, which disrupt daily functioning and quality of life. Guzick et al. (2023) reported that among youth with misophonia, common triggers included eating sounds (96 %), breathing (84 %), and throat sounds (66 %). Emotional responses were predominantly anger (95 %) and distress (93 %), leading to a profound impact on family dynamics (Guzick et al., 2023). Similarly, Siepsiak et al. (2023) identified oral sounds as the most common triggers among both children with misophonia (68 % female) and controls. Younger children often responded with aggression, while older children displayed self-harm behaviors, further illustrating the developmental variation in misophonia's manifestations (Siepsiak et al., 2023). Specifically in autistic individuals, misophonia often involves heightened emotional responses such as anger or distress to auditory triggers, as well as associated behavioral patterns like avoidance or agitation.

4.5. Sensory sensitivities in autism and misophonia

Sensory sensitivities, including heightened responses to auditory, visual, or tactile stimuli, are hallmark features of autism and are also commonly observed in individuals with misophonia. Evidence suggests a notable overlap between misophonia and autistic traits. The study by Rinaldi et al. (2023) found that adults with misophonia scored higher on subscales measuring autistic traits, with 21.4 % meeting the clinical threshold for autism compared to 2.8 % of controls. Similar results were found in children with misophonia. These findings highlight a possible intersection between the two conditions, particularly in terms of sensory sensitivities.

Neurobiological and behavioral parallels between autism and misophonia suggest shared underlying mechanisms. Hyperconnectivity in sensory cortices and heightened amygdala activity, both observed in autism and misophonia, may account for the pronounced hypersensitivity to sensory stimuli (Castro et al., 2013; Green & Ben-Sasson, 2010; Kumar et al., 2017; Marco et al., 2011). However, Rinaldi et al. (2023) emphasize that while individuals with misophonia may display elevated autistic traits, their sensory profiles are distinct, with a disproportionate focus on auditory stimuli compared to the broader sensory sensitivities characteristic of autism. This distinction raises critical questions about whether misophonia represents a discrete condition or reflects variations in sensory processing along a continuum associated with autism.

4.6. Psychiatric comorbidities in misophonia

Psychiatric comorbidities are common among individuals with misophonia, complicating its clinical profile and management. Guzick et al. (2023) reported that 79 % of youth with misophonia met the diagnostic criteria for at least one psychiatric disorder. Among these, 47 % were diagnosed with major depressive disorder, 45 % with anxiety or obsessive-compulsive disorder (OCD), and/or 21 % with ADHD, rates that appear notably higher than in youth without misophonia. Similarly, Jager et al. (2020) documented elevated rates of psychiatric comorbidities in a clinical sample of individuals with misophonia. These included obsessive-compulsive personality traits (26 %), mood disorders (10 %), and ADHD (5 %).

4.7. Interventions for misophonia

The number of studies examining interventions for misophonia was limited; only two intervention studies were identified: Pan et al. (2022), a single-case study examining the use of risperidone to treat severe misophonia in a 32-year-old autistic male, showing a significant reduction in AMISOS-R score from 31 (severe) to 5 (subclinical) after titration to 2 mg twice daily, and Swonke et al. (2025), a case series describing two pediatric cases (ages 3 and 16) that outlines cognitive-behavioral therapy (CBT) and tinnitus retraining therapy (TRT) as management approaches, though it does not provide detailed quantitative outcomes for symptom reduction.

4.8. Genetic and environmental factors of misophonia

Emerging evidence suggests a genetic basis for misophonia. For example, Smith et al. (2023) found significant genetic correlations between misophonia and traits such as neuroticism (rG = 0.42) and irritability. They also observed a negative genetic correlation with educational attainment, suggesting that genetic factors associated with misophonia may inversely influence traits related to academic or cognitive performance. These findings highlight the complex interplay between genetic predispositions and behavioural traits in understanding misophonia. Additionally, environmental factors, including maternal mental health, may play a potential role in the development of misophonia. Siepsiak et al. (2023) found significantly higher rates of maternal postpartum depression among mothers of children with misophonia (20.5 %) compared to control groups (2.7 %). This finding may point to the influence of early environmental and familial factors in shaping the risk of developing misophonia.

4.9. Quality assessment protocol

The quality of the included studies was assessed using a comprehensive, design-specific approach. Four categories of study designs were evaluated as follows: (a) observational studies were evaluated using the ROBINS-I tool (Sterne et al., 2016). This tool addresses potential risks, including confounding, selection bias, and missing data, ensuring a robust assessment of non-randomized studies; (b) as a subset of observational studies, cross-sectional studies were assessed using the AXIS tool (Downes et al., 2016). This evaluation focused on sampling methods, reliability of measures, and the overall quality of reporting within these studies; (c) the quality of GWAS was appraised using the Venice criteria Ioannidis et al., 2008). These criteria evaluate the strength of evidence, consistency of replication, and protection against bias in genetic association studies; (d) case reports and case series were reviewed using the Joanna Briggs Institute (JBI) tool (Munn et al., 2019). This assessment ensured methodological rigor and evaluated their clinical relevance and contribution to the broader research field.

4.10. Risk of bias assessment (ROB)

For the observational studies included in this review, the risk of bias was evaluated across six key domains: selection, performance, detection, attrition, reporting, and other sources of bias (see Fig. 2). Detection and attrition domains consistently exhibited low risks of bias (green), indicating that the studies generally provided clear and reliable outcome measurements with minimal participant loss. However, the selection and performance domains were frequently rated as unclear (yellow), highlighting potential issues related to recruitment transparency, randomization, and blinding protocols. Additionally, reporting biases (D5) were noted in several studies, pointing to inconsistencies or gaps in the documentation of methods and findings. These findings underscore the need for more robust methodological transparency and adherence to reporting guidelines to enhance the reliability of future research.

Regarding observational studies, the Risk of Bias (ROB) assessment using the ROBINS-I framework identified varying levels of bias across different types of studies. The ROBINS-I tool is specifically designed for non-randomized studies that aim to assess the effects of interventions or exposures, such as cohort or case studies, where the goal is to draw causal inferences. Rinaldi & Simner (2023), a non-randomized mixed method study examining mental health profiles in children with misophonia, were found to have a serious overall risk of bias. Rinaldi & Simner faced issues with the classification of interventions (Domain 3, D3). Jager et al. (2020) and

Fig. 2. Bias assessment using the AXIS tool.

Siepsiak et al. (2023), both non-randomized observational studies, demonstrated moderate overall risks of bias, with specific concerns in confounding (D1) and missing data (D5). Despite these concerns, low risks of bias were consistently observed in domains such as deviations from intended interventions (D4) and measurement of outcomes (D6) across most studies (Fig. 3).

The risk of bias assessment for Smit et al. indicated an overall low risk of bias. The study demonstrated low risks in the domains of amount of evidence (D1) and replication (D2), while there was an unclear risk in the domain of protection from bias (D3). This suggests a strong overall methodological quality with minor concerns regarding bias protection (Fig. 4).

In addition, the ROB assessment for the included case reports highlighted several strengths and limitations. The case report by Pan et al. (2022) provided detailed descriptions of the patient's demographics, clinical history, intervention (risperidone), and outcomes, meeting most JBI criteria. However, the case series by Swonke et al. (2025) provided valuable insights into pediatric misophonia, with clear descriptions of clinical presentations and family history, but it lacked explicit inclusion criteria, standardized diagnostic methods, consistent recruitment processes, and follow-up information, leading to moderate-to-high risk of bias.

5. Discussion

The findings of this systematic review provide critical insights into the interplay between misophonia, sensory sensitivities, and autism, emphasizing its complex and multifaceted nature. Despite growing awareness, misophonia remains both underrecognized and underreported, as evidenced by the significant discrepancy between its estimated prevalence and the proportion of individuals actively seeking help (Jager et al., 2020). Prevalence rates vary widely across populations, with younger individuals and autistic individuals exhibiting notably higher rates of clinically significant misophonia, as highlighted in the studies by Williams et al. (2022) and Cengiz Kılıç et al. (2021). These findings suggest that misophonia is not merely a sensory condition but strongly associated with developmental, cultural, and demographic factors.

The clinical profile of misophonia is marked by intense emotional responses, such as anger and distress, triggered by specific sounds, including eating, breathing, and throat noises. These triggers, often consistent across age groups, can severely disrupt daily functioning, interpersonal relationships, and overall quality of life. Responses can differ across age groups, such as aggression in younger children and self-harming behaviors in older individuals, underscoring the importance of tailoring interventions to specific age groups. The results of this review align with previous research by Schröder et al. (2013) and Guzick et al. (2023) and Williams et al. (2021) reinforcing the need for further exploration of these developmental patterns.

The heightened sensory sensitivities observed in individuals with misophonia, particularly in the auditory, visual, and tactile domains, highlight potential overlap with autism. Studies by Rinaldi et al. (2023) and Scheerer et al. (2024) suggest that sensory hypersensitivity is a common feature in both conditions. However, it remains uncertain whether this overlap indicates a distinct sensory phenotype, as shared symptoms across different disorders do not necessarily imply a unified sensory profile. This shared sensory sensitivity, coupled with higher rates of anxiety, depression, and reduced quality of life, underscores the need for clinical interventions that address both sensory and psychological impacts

Additionally, psychiatric comorbidities significantly complicate the clinical profile of misophonia, with high rates of depression, anxiety, OCD, and ADHD documented across studies. Guzick et al. (2023) and Jager et al. (2020) highlighted the profound impact of these comorbidities on quality of life, a finding consistent with earlier research by Dozier (2015) and Kumar et al. (2017). While misophonia frequently co-occurs with autism, current evidence does not support its use as a unique marker for autism diagnosis. Instead, it is a distinct sensory condition that can also present in neurotypical individuals and those with other psychiatric conditions. However, given its significant impact, misophonia should be carefully considered in the management of autistic individuals, ensuring that interventions address both sensory sensitivities and associated emotional distress.

Treatment outcomes for misophonia show promising, though varied, results. Non-pharmacological interventions, including cognitive-behavioral therapy (CBT) and tinnitus retraining therapy (TRT) as described by Swonke et al. (2025), and pharmacological

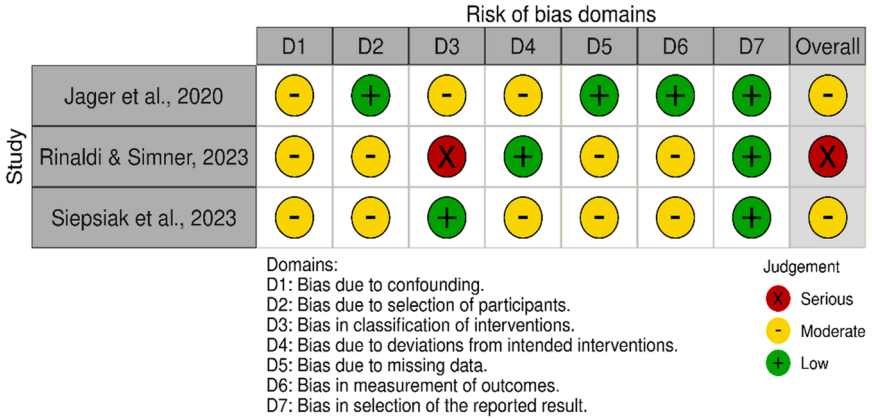

Fig. 3. Bias assessment using ROBINS-I tool.

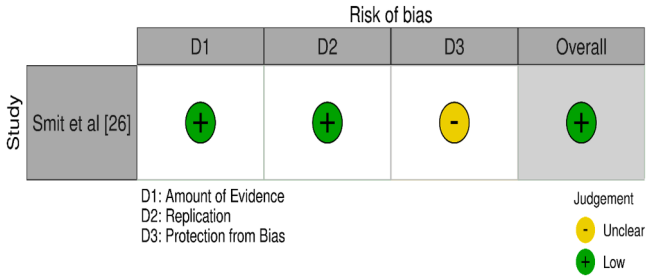

Fig. 4. Bias assessment using the Venice criteria.

treatments like low-dose risperidone as reported by Pan et al. (2022), have demonstrated efficacy in reducing symptoms and improving quality of life. For instance, risperidone significantly lowered misophonia severity in a single case, while CBT and TRT are noted as management strategies, though specific outcome data remain limited. Side effects such as weight gain with risperidone warrant caution, and further studies are needed to substantiate these approaches. These findings align with Schröder et al. (2013), emphasizing the value of tailored, combined therapeutic strategies. Both intervention studies were single-case or small case-series designs, which limits the generalizability of the conclusions. Future research should prioritize larger, well-controlled studies to confirm efficacy and broaden applicability.

Emerging evidence of genetic influences, as reported by Smit et al. (2023), adds a new layer to understanding misophonia, suggesting a biological basis linked to traits such as neuroticism and irritability. This perspective is supported by Kumar et al. (2017), who identified neural hyperconnectivity in the anterior insular cortex as a potential mechanism. Moreover, advancements in psychometric tools, including the Pediatric Misophonia and Hyperacusis Questionnaire (PMHQ) validated by Carson et al. (2024), enhance diagnostic precision and aid in distinguishing misophonia from related sensory conditions.

Lastly, environmental factors, particularly maternal mental health, may play a crucial role in the development of misophonia. Siepsiak et al. (2023) found that higher rates of postpartum depression among mothers of children with misophonia suggest early familial and environmental influences. This highlights the importance of incorporating family-centered approaches in both research and intervention strategies. In summary, these findings emphasize the necessity for a holistic, multidisciplinary approach to misophonia, one that integrates sensory, psychiatric, genetic, and environmental perspectives.

Quality Assessment Outcomes

In evaluating the quality of the studies included in this review, a thorough quality assessment was conducted using tools tailored to specific study designs (as described in Section 3.8). The findings from this assessment underscore the need for caution in interpreting results, particularly due to the varying levels of risk of bias across studies. Observational studies exhibited moderate-to-high risks of bias, particularly related to confounding factors and methodological transparency. Notably, the majority of studies lacked robust randomization, blinding, and sample sizes large enough to ensure generalizability, which introduces potential biases in the interpretation of treatment outcomes. The risk of bias was further compounded in case studies and single-case designs, which, while valuable, have limited applicability to broader populations. These concerns emphasize the importance of future research employing more rigorous, large-scale studies with transparent methodologies and consistent reporting standards to validate findings and support clinical applications

5.1. Limitations

This review has several limitations that should be considered. First, the heterogeneity of the included studies in terms of methodology, population demographics, and diagnostic criteria presents challenges in synthesizing findings. Variations in sample sizes, ranging from large-scale genetic studies to individual case reports, limit the generalizability of the conclusions. Second, many studies relied on self-reported measures, which may introduce recall bias or inaccuracies in assessing misophonia symptoms and related outcomes. Additionally, the cross-sectional design of most studies prevents drawing causal inferences regarding the relationships between misophonia, sensory sensitivities, and psychiatric comorbidities. Geographic and cultural differences across studies further complicate the extrapolation of findings to broader populations. Lastly, the underrepresentation of certain demographic groups, such as non-binary individuals and older adults, limits the inclusivity of the conclusions. In terms of study quality, the risk of bias across the included studies was notable. Many observational studies exhibited moderate-to-high risks of bias, particularly in areas such as confounding, selection bias, and transparency in reporting. The case reports and case series, though valuable for offering clinical insights, were limited by small sample sizes and a high risk of bias due to methodological constraints. Despite these limitations, the consistency of findings across various studies indicates some level of reliability, though the overall quality of evidence remains mixed. Therefore, future research should prioritize larger, well-controlled studies with more consistent methodologies to reduce bias and enhance the robustness of findings.

5.2. Clinical recommendations

Future research should focus on standardizing diagnostic criteria and assessment tools for autistic populations, enabling more

reliable and comparable studies. Longitudinal studies are essential to uncover the causal relationships between misophonia symptoms and psychiatric comorbidities in autistic individuals, offering insights for future interventions and management strategies. Additionally, further investigation into the genetic contributions to misophonia is necessary to assess heritability patterns and the biological predisposition in autistic individuals.

The inclusion of a comprehensive assessment protocol in the evaluation of autistic patients is recommended to identify those at higher risk for misophonia. This would allow for the development of targeted therapeutic strategies aimed at managing sensory triggers and improving the quality of life for these patients. Clinicians should adopt a multidisciplinary approach when managing misophonia, incorporating validated diagnostic tools, such as the Pediatric Misophonia and Hyperacusis Questionnaire, to inform comprehensive assessments. Interventions should be individualized and may include behavioral therapy, pharmacological options, and family-centered care. Early identification and intervention, especially in autistic populations or those with a family history of mental health issues, are vital for mitigating the impact of misophonia. Furthermore, integrated care models that address psychiatric comorbidities, along with increased education and awareness to reduce stigma and improve access to care, are crucial for enhancing treatment outcomes and overall quality of life.

6. Conclusion

This systematic review highlights the complex relationship between misophonia, sensory sensitivities, and autism, emphasizing its multifactorial nature. It calls for a holistic approach that integrates sensory, psychiatric, genetic, and environmental factors to improve diagnosis, intervention, and quality of life. Despite growing research, significant gaps remain in understanding misophonia's etiology, development, and treatment. Future studies should focus on longitudinal designs, diverse populations, and standardized diagnostic criteria to advance the field, ultimately improving outcomes for autistic individuals with misophonia and related conditions.

Ethical considerations

Not applicable.

Consent to participate

Not applicable.

Consent for publication

Not applicable.

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CRediT authorship contribution statement

Aldakhil Ali F: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Conceptualization. **Shaik Riyaz Ahamed:** Software, Formal analysis, Data curation.

Author's contributions

Ali Fahad designed the study, took part in analyzing and interpreting the data, wrote the manuscript, and provided critical revisions. **Riyaz Ahamed** was responsible for collecting, and analyzing, the data were performed. All authors read and approved the final manuscript for submission.

Declaration of Competing Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Data availability

All data generated during the review is presented as tables and figures in the manuscript.

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