



Misophonia and its Relationship with Other Psychiatric Disorders

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Abstract

Aim: Research show that misophonia accompanies many psychiatric disorders and should be considered a mental disorder. Although there are suggested diagnostic criteria, no clear ones have been defined yet. This study aims to investigate the relationship of misophonia with other mental disorders and to determine its possible category in diagnostic classification systems.

Material and Methods: We included the patients who applied to the outpatient clinics of the XX University Faculty of Medicine, Department of Psychiatry for the first time and healthy volunteers without a history of psychiatric disorder. A sociodemographic data form, Misophonia Interview Scale, Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Barratt Impulsivity Scale (BIS), and Yale-Brown Obsession Compulsion Rating Scale (YBOCS) were administered to the participants.

Results: 60.1% of the participants (n=158) did not have misophonia, 21.3% (n=56) had disorder-level misophonia, and 18.6% (n=49) had symptom-level misophonia. Except for the YBOCS-total and obsession/compulsion scale scores of the group with misophonia, all other mean scale scores were significantly higher than those without misophonia ($p<0.05$ for each). The participants with misophonia were mostly in the group diagnosed with anxiety disorders. There was a moderately positive correlation between the Misophonia Symptom List total score and the BAI score in participants with an anxiety disorder ($p=0.001$).

Conclusion: The higher scale scores of individuals with misophonia support that it may be a mental disorder. The results that misophonia most frequently accompanies anxiety disorders and is associated with the severity of anxiety suggest that it can be classified as an anxiety disorder in the diagnostic classification. Recognition of misophonia by clinicians and the development treatment algorithms will increase patients' quality of life.

Keywords: Misophonia, mental disorders, anxiety disorder, misophonia symptom list

INTRODUCTION

Misophonia is a term derived from the Latin words 'miso,' meaning 'dislike,' and 'phonia,' meaning 'sound,' meaning dislike, aversion to sound (1). It is a pronounced discomfort from various sounds, leading to negative feelings such as irritability, overwhelm, and disgust, and significantly affecting the person's occupational functions, social life, and relationships, leading to impaired functioning. The most commonly disturbing sounds are gum chewing, mouth smacking, breathing, and foot rubbing (2).

Although there is no dysfunction in the pathways related to hearing, it is postulated that misophonia occurs due to heightened or strong connections in the limbic and

sympathetic nervous systems, which cause abnormal processes triggered by sound (3-5). In misophonia, there is inappropriate and severe stimulation of the limbic and autonomic nervous systems due to the association of a harmless sound with a negative or unpleasant situation (6). Although there is still insufficient data on the prevalence of misophonia, studies suggest that it is not uncommon (7). In a study researching the prevalence of misophonia in the healthy population, approximately 80% of the sample had misophonia symptoms, and 10% of the group with misophonia symptoms were diagnosed with misophonia (8). There is no clear information in the literature about the age of onset of misophonia. In most studies, symptoms of misophonic individuals were reported to start before adolescence (9).

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Misophonia is not included in the current diagnostic classification systems (10). For this reason, several diagnostic criteria have been proposed for diagnosing misophonia, and studies have been conducted accordingly. Schröder et al. (11) proposed diagnostic criteria for misophonia and developed the Amsterdam Misophonia Scale using the Yale-Brown Obsession Compulsion Scale (12). Similarly, Öz et al. (8) and Dozier et al. (7,13) developed diagnostic criteria for misophonia.

Various sources have proposed that misophonia may be comorbid with other psychiatric disorders such as Obsessive Compulsive Disorder (OCD), Major Depressive Disorder, Anxiety Disorders, Obsessive Compulsive Personality Disorder (OCPD) and should be included in the spectrum of Obsessive Compulsive and Related Disorders (8,11,14). In previous studies, Post Traumatic Stress Disorder (PTSD) is one of the most common psychiatric disorders diagnosed in patients with misophonia (15). In addition, Attention Deficit Hyperactivity Disorder (ADHD) (14), tic disorders (16), and eating disorders (17) are among the psychiatric disorders that have been presented to be associated with misophonia.

Studies related to misophonia, which has a history of about twenty years, have become widespread today. These studies will help determine the place and importance of misophonia among mental disorders soon. Our study aims to explore the relationship between misophonia and other mental disorders and to contribute to determining its possible place in diagnostic classification systems.

MATERIAL AND METHOD

Sample

Power analysis of the study was performed with G Power 3.1 program. With a medium effect size (Cohen's $d=0.50$), a power of 0.95, and a margin of error of 0.05 ($p=0.05$), the minimum sample size required to be in a single group was calculated as 105, totaling 210 people. We concluded that the sample of 263 people had sufficient power.

The study included 213 literate patients between the ages of 18 and 65 years, who were admitted to Çukurova University Faculty of Medicine, Department of Mental Health and Disorders for the first time between 15.10.2020 and 15.04.2021, and 50 healthy volunteers from hospital staff and their relatives who agreed to participate in the study, had no history of psychiatric disorders and were not receiving treatment. We did not include the patients with an anatomical defect in the external auditory canal as a finding of physical examination, who reported hearing defects, and who used hearing aids. To prevent possible confounding effects of auditory hallucinations, patients with schizophrenia, bipolar disorder, schizoaffective disorder, major depressive disorder with psychotic features, and schizotypal personality disorder were excluded from the study. In addition, we did not include individuals with neurocognitive disorders and mental retardation, as they could not complete the self-report scales.

Procedure and measures

The Non-Interventional Clinical Research Ethics Committee of Çukurova University Faculty of Medicine approved the study on 02.10.2020 (meeting number 104). The study was conducted by the Principles of the Declaration of Helsinki, and all participants signed an informed consent form.

The mental disorders were diagnosed with the Structured Clinical Interview for DSM-5 Disorders-Clinician version (SCID-5/CV), and the diagnosis of misophonia was determined with the Misophonia Interview Scale. We administered to the participants the sociodemographic/clinical data form developed by us, Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Yale-Brown Obsession Compulsion Rating Scale (YBOCS) and Barratt Impulsiveness Scale (BIS). The first author accompanied the participants who had difficulty completing the forms and scales and explained the points where they had difficulty.

Structured Clinical Interview for DSM-5 Disorders - Clinician version (SCID-5/CV): First et al. developed the Structured Clinical Interview for DSM-5 Disorders (SCID-5) (18). The Turkish validity and reliability study of the SCID-5 was conducted. There are ten modules in the SCID-5: 1) psychotic symptoms, 2) disorders with psychosis, 3) mood disorder, 4) substance use disorder, 5) anxiety disorder, 6) OCD and related disorders, 7) PTSD, 8) ADHD 9) questions about screening for other disorders 10) adjustment disorder (18,19).

Sociodemographic/Clinical Data Form: With this form, data such as age, gender, duration of education, marital status, occupation, place of residence, history of physical illness, and family history of mental disorders were questioned. The patient's or relatives' statements and hospital or national health system records were utilized when questioning additional physical illnesses. This form was completed jointly by the participant and the clinician.

Misophonia Interview Scale: Öz et al. developed the misophonia interview scale (8,20). In our study, the diagnostic criteria recommended by Öz et al. were used, and the form of "Sound Disturbance Problems" was added to the misophonia interview scale.

The Sound Disturbance Problems Form was used to differentiate between hyperacusis, misophonia, phonophobia, and tinnitus. This form, which includes explanations and examples, was applied to the participants with sound sensitivity. The participants who answered hyperacusis, phonophobia, or tinnitus were included in the non-misophonia group.

The Misophonia Symptom List (MSL), another step of the misophonia interview scale, was administered to the participants who gave appropriate answers to the Sound Disturbance Problems Form. The MSL is a form that allows 50 different voices to be questioned and a four-point Likert-type (1=none, 2=somewhat, 3=moderately, 4=very

much) indicating the severity of misophonia. The total score for the severity of the misophonia varies between 50-200. With this form, it is determined how severely the participants are disturbed by which sound. In order to make the distinction between "disorder-level misophonia" and "symptom-level misophonia," participants who answered 'moderate or very' on the MSL were asked to fill out a form that included questions about their physical/emotional reactions and functionality.

Participants who responded "moderate or very" to at least one of the emotional/physical responses to sound (fear, disgust, anger, overwhelm/depression, blurred vision, blood pressure, sweating, shortness of breath, dry mouth), in addition to marking "moderate or very" in the question: "How much does your discomfort (or avoidance) with sound affect your life?", answering "yes" to one of these questions: "Are there things you cannot do because of sound?", "Are there any places you cannot enter because of the voices?", "Have these voices caused any deterioration in your relationships?" or answering "more than one hour" to the question: "How much of your day is affected by problems related to this condition?" were defined as having "**disorder-level misophonia.**" Participants who did not meet this condition at any level (physical/emotional response or functionality questions) and who answered "moderate or very" to at least one sound in the MSL were defined as having "**symptom-level misophonia.**" (8,20).

Beck Anxiety Inventory (BAI): It is a scale consisting of 21 questions to measure the frequency of anxiety symptoms. BAI consists of four Likert-type questions scored from 0 to 3. The total score ranges from 0 to 63. An increase in the total score indicates an increase in the frequency of anxiety. In the Turkish validity and reliability study, Cronbach's alpha value was 0.93 (21,22).

Beck Depression Inventory (BDI): BDI is a self-report scale comprising 21 questions developed to measure the emotion, cognition, behavior, and somatic components of depression. The scale consists of four Likert-type questions scored from 0 to 3, and the scale's total score varies between 0 and 63. In the Turkish validity and reliability study, Cronbach's alpha value was 0.80 (23,24).

Barratt Impulsiveness Scale (BIS): It is a self-report scale consisting of 30 items designed to assess impulsivity, and each item provides a four-point Likert-type measurement (1=never/rarely, 2=sometimes, 3=often, 4=almost always). BIS includes three components: attentional impulsivity, motor impulsivity, and non-planning. An increase in the scale's total score means a higher level of impulsivity. In the Turkish reliability and validity study, Cronbach's alpha value was 0.81 (25,26).

Yale-Brown Obsession Compulsion Rating Scale (YBOCS): YBOCS is developed to measure the severity of obsessions and compulsions and is evaluated by the interviewer according to the patient's symptoms. Although there are 19 items on the scale, the obsessions and compulsions scores (5 items each) are used to calculate the total

score. Each item is scored between 0 and 4 points, and the scale's total score varies between 0 and 40 points. In the Turkish validity and reliability study, Cronbach's alpha value was 0.81 (12,27).

Statistical Analysis

IBM SPSS 25 program was used for data analysis. When the skewness and kurtosis values of the variables were between -1.5 and +1.5, they were considered normally distributed, and histogram graphs were analyzed (28). Whether the variables with normal distribution differed between groups in terms of their means was examined by independent groups t-test and shown as mean and standard deviation (mean±SD). The Mann-Whitney U test was used to examine whether the variables that did not show normal distribution differed between groups regarding their medians and were shown as medians and quartiles. Pearson Correlation analysis was used to examine the correlation between numerical variables since they were normally distributed. In the analysis of categorical variables, the Fisher Exact test was used if the expected number of observations was less than 5, the Yates statistic was used if the expected number of observations was between 5 and 25, and the Chi-square test was used in other possibilities. A value of $p < 0.05$ was accepted as significant in the analyses.

RESULTS

According to the Sound Disturbance Problems form, 48.7% of the participants (n=128) stated that they had no sound sensitivity. 39.9% (n=105) stated that they were disturbed by sound in line with misophonia. 5.3% (n=14) stated that they had hyperacusis, 4.6% (n=12) had tinnitus, and 1.5% (n=4) had phonophobia.

According to the Sound Disturbance Problems form, no significant difference was found between the groups with (n=105) and without (n=158) misophonia in terms of mean age, duration of education, gender distribution, marital status, employment status, and place of residence ($p=0.78$, $p=0.17$, $p=0.14$, $p=0.67$, $p=0.15$, $p=0.22$, respectively). 39% (n=41) of the participants reported that their relatives also had misophonia symptoms. The sociodemographic characteristics of the participants are presented in Table 1.

In the group with misophonia, 53.3% (n=56) had an anxiety disorder, 16.2% (n=17) had major depressive disorder, 11.4% (n=12) had OCD, 5.7% (n=6) had ADHD, 1.9% (n=2) were diagnosed with somatic symptom disorder, 1.9% (n=2) with tic disorder, 1% (n=1) with PTSD and 8.6% (n=9) had no diagnosis of mental disorder (healthy individuals). In the group without misophonia, 41.1% (n=65) had an anxiety disorder, 15.2% (n=24) had major depressive disorder, 10.8% (n=17) had OCD, 2.5% (n=4) had ADHD, 1.3% (n=2) had PTSD, 1.3% (n=2) were diagnosed with eating disorders, 1.3% (n=2) with sleep disorders, 0.6% (n=1) with somatic symptom disorder and 25.9% (n=41) had no diagnosis of mental disorder (Table 2).

Compared to the participants' illness duration, excluding healthy individuals, the median duration of illness of the group with misophonia was significantly higher than that of the group without misophonia ($p=0.004$). Compared to the presence of comorbid physical illness, the rate of physical illness diagnosis was significantly higher in the group with misophonia than in the group without (42.9% & 30.4%, respectively, $p=0.04$). The frequency of a family history of mental disorder was significantly higher in the group with misophonia than in the group without (51.4% & 31.8%, respectively, $p=0.002$). There was no significant difference in the rates of suicide attempts between the groups with and without misophonia.

When the diagnosis of comorbid personality disorder (PD) was evaluated, 85.7% of the group with misophonia had no PD diagnosis. 4.8% ($n=5$) had OCPD, 3.8% ($n=4$) had borderline PD, 3.8% ($n=4$) had antisocial PD, 1.9% ($n=2$) had narcissistic BP. Whereas 94.9% of the group without misophonia had no PD diagnosis, 2.5% ($n=4$) had antisocial PD, 1.3% ($n=2$) had borderline PD, 0.6% ($n=1$) had OCPD, and 0.6% ($n=1$) had narcissistic PD. Table 2 presents the comparison of the participants according to clinical variables.

When the participants with and without misophonia were compared in terms of BDI, BAI, BIS, and YBOCS scores, all mean scale scores of the group with misophonia were significantly higher than the group without misophonia except for the YBOCS-total and obsession/compulsion scale scores ($p<0.05$, for each). There was no significant difference between the groups regarding YBOCS-compulsion/obsession and total scores. Scale scores of the groups with and without misophonia are shown in Table 3.

When the diagnostic criteria by the Sound Disturbance Problems Form and MSL were evaluated, 60.1% ($n=158$) of the participants did not have any misophonia. 21.3% ($n=56$) of the participants had disorder-level misophonia, and 18.6% ($n=49$) had symptom-level misophonia.

Among the participants with anxiety disorder, 25.6% ($n=31$) had disorder-level misophonia, and 20.7% ($n=25$) had symptom-level misophonia. 9.8% ($n=4$) of the individuals diagnosed with major depressive disorder had disorder-level misophonia, and 31.7% ($n=13$) had symptom-level misophonia. 27.6% ($n=8$) of individuals diagnosed with OCD had disorder-level misophonia, and 13.8% ($n=4$) had symptom-level misophonia. 16% ($n=8$) of healthy individuals were diagnosed with disorder-level misophonia, and 2% ($n=1$) with symptom-level misophonia. Due to insufficient sample size, significant data for ADHD, PTSD, eating disorders, sleep disorders, somatic symptom disorder, and tic disorder could not be obtained. According to the data, disorder, and symptom-level misophonia were mainly accompanied by the diagnosis of anxiety disorder. When examined separately, symptom-level misophonia

is mainly seen in participants diagnosed with depressive disorder, while disorder-level misophonia is primarily seen in participants diagnosed with OCD.

According to the Yates statistic, there was a significant difference between the misophonia and diagnosis groups ($p<0.001$). In individuals not diagnosed with misophonia, the difference was between healthy individuals and individuals diagnosed with anxiety disorder. Also, in individuals with symptom-level misophonia, the difference was between healthy individuals and individuals diagnosed with anxiety disorder and between healthy individuals and individuals diagnosed with depressive disorder (Table 4).

When the correlations between the MSL total score and the BDI, BAI, BIS, and subscale scores were evaluated in participants diagnosed with anxiety disorder, there was a moderate positive relationship between the MSL total score and BAI ($p=0.001$). In participants diagnosed with depressive disorder, there was no correlation between MSL total score and BDI, BAI, BIS, and subscale scores. In participants diagnosed with OCD, there was no correlation between MSL total score and BDI, BAI, BIS, subscale scores, and YBOCS and subscale scores. Table 5 presents the correlations between MSL total score and other scale scores in participants diagnosed with anxiety disorder, depressive disorder, and OCD.

Table 1. Sociodemographic features of the participants

	Misophonia groups				t	p
	Misophonia (+) (n=105)		Misophonia (-) (n=158)			
	Mean	SD	Mean	SD		
Age, years	35.66	11.48	36.05	11.29	-0.28	0.78
Education period, years	12.29	4.22	11.56	4.08	1.39	0.17
	n	%	n	%		
Gender					$\chi^2=2.23$	$p=0.14a$
Female	72	68.6	94	59.5		
Male	33	31.4	64	40.5		
Marital status					$\chi^2=0.18$	$p=0.67a$
Single	50	47.6	71	44.9		
Married	55	52.4	87	55.1		
Occupational status					$\chi^2=2.09$	$p=0.15a$
Unemployed	64	61	82	51.9		
Employed	41	39	76	48.1		
Place of residence					$\chi^2=1.50$	$p=0.22a$
Urban	84	80	116	73.4		
Rural	21	20	42	26.6		

a. Chi-square test, SD. Standart deviation

Table 2. Clinical characteristics of the participants

	Misophonia groups					
	Misophonia (+) (n=105)		Misophonia (-) (n=158)			
	n	%	n	%		
Diagnoses						
Anxiety Disorders	56	53.3	65	41.1		
Depressive Disorder	17	16.2	24	15.2		
OCD	12	11.4	17	10.8		
Healthy	9	8.6	41	25.9		
ADHD	6	5.7	4	2.5		
Somatic Symptom Disorders	2	1.9	1	0.6		
Tic Disorders	2	1.9	0	0		
PTSD	1	1	2	1.3		
Eating Disorders	0	0	2	1.3		
Sleep Disorders	0	0	2	1.3		
Disorder duration, year (median)	3 (1-8.5)		1 (0-5)		U=6588.5 Z=-2.87	p=0.004
Physical illness						
No	60	57.1	110	69.6		
Yes	45	42.9	48	30.4		
Family history of mental disorders					x ² =10.08	p=0.002a
No	51	48.6	107	68.2		
Yes	54	51.4	50	31.8		
Suicide attempts						
No	101	96.2	152	96.2		
Yes	4	3.8	6	3.8		
Personality disorders						
No	90	85.7	150	94.9		
Borderline PD	4	3.8	2	1.3		
Antisocial PD	4	3.8	4	2.5		
Narcissistic PD	2	1.9	1	0.6		
OCPD	5	4.8	1	0.6		

a. Chi-square test, OCD: Obsessive-compulsive disorder; ADHD: Attention Deficit Hyperactivity Disorder; PTSD: Post Traumatic Stress Disorder; PD: Personality Disorder; OCPD: Obsessive-compulsive Personality Disorder

Table 3. Scale scores of the participants

	Misophonia groups					
	Misophonia (+)		Misophonia (-)			
	mean ±SD		mean ±SD			
BDI	23.02±14.23		17.93±12.65		t=3.04	p=0.003
BAI	25.31±15.58		17.59±13.78		t=4.23	p<0.001
BIS-attentional	17.97±5.03		15.17±4.49		t=4.72	p<0.001
BIS-motor	20.54±5.64		17.22±4.75		t=5.15	p<0.001
BIS-non-planning	26.37±5.96		22.85±7.26		t=4.30	p<0.001
BIS-total	64.89±14.23		55.24±14.82		t=5.25	p<0.001
YBOCS-compulsion	12.75±3.31		11,88±3.37		t=0.69	p=0.50
	Median		Median			
YBOCS-obsession	14.5(12-16.75)		14(11.5-15)		U=88 Z=-0.62	p=0.56
YBOCS-total	26.5(22.5-31.5)		26(21.5-28.5)		U=86 Z=-0.71	p=0.50

BDI: Beck Depression Inventory; BAI: Beck Anxiety Inventory; BIS: Barratt Impulsiveness Scale; YBOCS: Yale-Brown Obsession Compulsion Rating Scale

Table 4. Mental disorder diagnoses of the misophonia groups

		Misophonia			$\chi^2=25.70$ $p<0.001$
		Misophonia (-)	Disorder-level misophonia	Symptom-level misophonia	
		n (%)	n (%)	n (%)	
Diagnoses	Healthy	41(27.9)	8(15.7)	1(2.3)	
	Anxiety Disorders	65(44.2)	31(60.8)	25(58.2)	
	Depressive Disorder	24(16.3)	4(7.8)	13(30.2)	
	Obsessive- compulsive Disorder	17(11.6)	8(15.7)	4(9.3)	

DISCUSSION

Misophonia is a condition of being disturbed by certain sounds that have become increasingly important in the last 20 years. One of the reasons for its becoming increasingly important is that it is not rare in society, contrary to popular belief. For this reason, the number of studies on misophonia is increasing rapidly. Although it was initially considered a physical disorder, recent studies have increased evidence that it may be a mental disorder. Although many diagnostic criteria have been proposed for misophonia, no clear decision has yet been reached on its classification and diagnostic criteria. In our study, most of the participants who had misophonia symptoms were diagnosed with an anxiety disorder, and as the total score of the BAI increased, the total score of the MSL also increased. Anxiety disorders and anxiety severity are related to misophonia, suggesting that misophonia could be classified as an anxiety disorder.

In Schröder et al.'s study (11), 48% of 42 misophonic participants and 73.9% of 69 misophonic participants in Öz et al.'s (20) were women. In Erfanian et al.'s study (17), 57.7% of 52 misophonic participants, whereas in Vitoratou et al.'s study (29), 78.2% of 613 misophonic participants were women. Studies also have revealed that misophonia is more common in women and that the gender distribution is equal (30). Our result that there was no relationship between misophonia and gender may be related to the fact that different disorder groups were evaluated together and the prevalence of mental disorders varies according to gender.

The fact that the current psychiatric disorder duration was longer in individuals with misophonia than in individuals without may indicate that the predisposition to misophonia increases as the psychiatric disorder becomes chronic. There is not enough data in the literature on this issue. In contrast, more than half of the individuals without misophonia stated that they did not have a mental disorder history in their family. More than half of the individuals with misophonia stated that they had a mental disorder history in their family. These data may indicate that those with a family history of mental disorders may be more prone to misophonia and that there is a relationship in terms of genetic predisposition. In the literature, studies suggest that misophonia may also have a genetic origin.

These studies have shown that 50-85% of the family members also have misophonia symptoms (9,31-33). In our study, 39% of the individuals with misophonia reported that their families also had misophonia. The presence of misophonia in the family suggests that there may be a genetic origin of misophonia or that this condition can be learned from the family by modeling this condition.

We found that 21.3% of the participants had disorder-level misophonia, and 18.6% had symptom-level misophonia. Jastreboff et al. (34) stated that 3% of the general population might have misophonia. Wu et al. (2) reported that 19.9% of the participants had clinically significant misophonia, and Zhou et al. (35) reported this rate as 6% in their study. This difference may be since the majority of the participants in our study had a psychiatric disorder, and this psychiatric disorder might lead to a predisposition to misophonia. Norris et al. identified two potential subgroups in misophonia: one with a more "pure form" of misophonia, defined by severe misophonia symptoms but with few concurrent conditions, and one with an increasing number of concurrent conditions, which may represent misophonia as an epiphenomenon of increased risk for neuropsychiatric conditions. These data suggest that misophonia has an etiology that is multidimensionally complicated and related to a variety of neuropsychiatric disorders (36).

In our study, the levels of depression, anxiety, and impulsivity were higher in individuals with misophonia than in those without misophonia. Similarly, previous studies revealed that the severity of anxiety, depression, and impulsivity increased as the misophonia score increased (15,37). Our study is consistent with the data in the literature, and the data suggest that misophonia is associated with psychiatric symptoms and should be considered a psychiatric disorder.

We found that individuals diagnosed with anxiety disorders and OCD had a higher prevalence of misophonia than healthy individuals. Individuals diagnosed with anxiety disorders and depressive disorder were diagnosed with more symptom-level misophonia than healthy individuals. In individuals with anxiety disorders, the symptom level and the disorder level-misophonia were higher than in healthy individuals. These results suggest that anxiety disorders and misophonia are more

closely related than other mental disorders and should be considered in diagnostic classification. In a study in which 18 misophonic patients were evaluated, the fact that a diagnosis of anxiety disorder accompanied ten individuals with misophonia supports the relationship between anxiety disorders and misophonia, as seen in our study (38). Especially the fact that anxiety leads to anger reaction in misophonia suggests the prominence of anxiety in misophonia (2,35,39).

We found a significant relationship between MSL total score and anxiety severity in participants diagnosed with anxiety disorder. No significant relationship was between other diagnoses and symptom severity. Studies have shown a correlation between increased anxiety levels, misophonia severity, and emotional response (40), and there has been a strong relationship between anxiety sensitivity and anxiety disorders (41). Increased anxiety sensitivity also increases the severity of misophonia symptoms (42). It can be interpreted that an increased anxiety level causes the person to become more sensitive to the sounds in the environment, and intolerance to sounds increases.

In our study, 2.4% (n=6) of all participants and 4.8% (n=5) of the individuals with misophonia were diagnosed with OCPD. In other words, 83.3% of the individuals with OCPD have been diagnosed with misophonia. In a study by Jager et al. (14) with 575 participants diagnosed with misophonia, 26% had traits of OCPD. In Schröder et al.'s (11) study, 22 of the 42 misophonic participants were diagnosed with OCPD. In a study investigating the relationship between misophonia and personality disorders, three misophonic individuals were also diagnosed with OCPD (43). Jager et al. determined the rate of OCPD diagnosis to be only 2.4% but demonstrated that individuals with misophonia have clinical perfectionism (14). The underlying cause of the discomfort or intolerance to noise may be that the individual with OCPD creates one's truths due to a perfectionist personality. Perfectionism is a personality trait that was found to be associated with misophonia (44). In line with the study by Jager et al. (14), our result of low rates of OCPD diagnosis compared to previous studies suggests that perfectionism in individuals with misophonia should not be evaluated only based on OCPD. According to our results, although misophonia is not associated with the severity of obsessions-compulsions, it is associated with obsessive-compulsive personality traits and impulsivity. Future studies in which more personality dimensions, especially perfectionism, are evaluated are needed to confirm the relationship between misophonia and personality traits.

Our findings support the notion that misophonia is not uncommon in psychiatric outpatient clinics, implying that clinicians should be more aware of misophonia. Previous research has revealed that misophonia reduces a patient's quality of life, and some researchers have emphasized the importance of standardizing misophonia criteria using validated scales and the DSM-5 (45). Assume

that misophonia research expands; the information gathered will lead to misophonia classification and the development of diagnostic criteria. Setting diagnostic criteria and identifying comorbid mental disorders may aid in identifying, treating, and improving life quality in people suffering from misophonia.

The strength of our study is that misophonia was investigated in both psychiatric disorders and healthy individuals in a relatively large sample. Our research has some limitations. We used the diagnostic criteria proposed by Oz et al. (8,20) as misophonia diagnostic criteria. Although many diagnostic criteria have been proposed in the literature, the lack of a standardized diagnostic method may have resulted in some participants being misdiagnosed or missed. The absence of a hearing test is the second limitation. Misophonia has been associated with diseases such as hyperacusis and tinnitus (1). In our study, we considered the statements of the participants and relatives, and we directly included the participants with these diagnoses in the group without misophonia. This may have resulted in overlooking participants with hyperacusis or tinnitus who also had misophonia. Although our study's sample was large, the low number of participants with diagnoses such as tic disorder, ADHD, PTSD, and eating disorders may have affected the results. Researchers have suggested that misophonia-related symptoms occur in populations such as autism spectrum disorder (ASD) (46). Therefore, not evaluating ASD and similar neurodevelopmental disorders is the last limitation of our study. Future studies to be conducted with a large sample in which the types of anxiety disorders are evaluated separately and the diagnoses of mental disorders are distributed balanced would clarify the relationship between misophonia and mental disorders.

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