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Factors associated with misophonia in students, professors, and staff at a Brazilian public university

Fatores associados à misofonia em estudantes, professores, técnicos de uma universidade pública brasileira

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ABSTRACT

Purspose: To investigate the association between misophonia, auditory complaints, and symptoms of anxiety and depression. **Methods:** A quantitative, observational, descriptive, and analytical cross-sectional study was conducted with students, faculty, and staff from a Brazilian public university. Data collection was carried out virtually using a form created on the Google Forms platform, which was made available to participants via email from June to December 2022. The form included questions related to misophonia (using the Misophonia Screening List), auditory complaints, comorbidity, and anxiety and depression (using the Hospital Anxiety and Depression Scale). **Results:** Misophonia was associated with the complaint of hearing loss (p=0.020), tinnitus (p=0.004), discomfort with loud sounds (p=0.010), and anxiety (p=0.011). **Conclusion:** Misophonia is associated with hearing loss, tinnitus, discomfort with loud sounds, and anxiety.

Keywords: Misophonia; Hearing; Anxiety; Depression; Hyperacusis; Tinnitus

RESUMO

Objetivo: investigar a associação da misofonia às queixas auditivas e aos sintomas de ansiedade e depressão. **Métodos:** estudo de caráter quantitativo, observacional, descritivo e analítico, de delineamento seccional, realizado com alunos, professores e técnicos de uma universidade pública brasileira A coleta de dados foi realizada de forma virtual, utilizando formulário confeccionado na plataforma Google Forms, disponibilizado aos participantes via e-mail no período de junho a dezembro de 2022. O formulário apresentou perguntas referentes à misofonia (a partir da Lista de Triagem para Misofonia), queixas auditivas, comorbidades, ansiedade e depressão (por meio da Escala Hospitalar de Ansiedade e Depressão). **Resultados:** a misofonia foi associada à queixa de perda auditiva (p=0,020), ao zumbido (p=0,004), ao incômodo a sons intensos (p=0,010) e à ansiedade (p=0,011). **Conclusão:** a misofonia apresenta associação à hipoacusia, ao zumbido, ao incômodo a sons intensos e à ansiedade.

Palavras-chave: Misofonia; Audição; Ansiedade; Depressão; Hiperacusia; Zumbido

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INTRODUCTION

Misophonia is characterized by an intense and disproportionate aversion to specific sounds, capable of triggering unpleasant emotional experiences due to excitation of the autonomic nervous system[1]. It has been currently investigated as a neurological or psychiatric disorder correlated with mood disorders and anxiety disorders. It is also classified as a sound disorder, a group that also includes tinnitus, hyperacusis, phonophobia, auditory recruitment, and auditory hypersensitivity. Studies suggest the existence of shared pathophysiological mechanisms between these conditions, as they may be associated with hyperconnectivity of the auditory system[2].

Although some authors recommend evaluating the auditory system as part of the diagnostic assessment of misophonia, findings related to auditory complaints and impairments have been little explored[3]. Two studies reported that misophonia can be present in patients with normal hearing as well as in those with peripheral hearing impairment[4]. Furthermore, the possibility of retrocochlear or central problems, such as auditory processing disorders, cannot be ruled out, as it has not been extensively studied, although people with misophonia often have auditory hyperresponsiveness[5].

Regarding auditory complaints, one study suggested that the severity of misophonia may be related to the presence of tinnitus[6]. Thus, the latter is the only auditory complaint studied in this population. In this sense, some treatments currently used, which are not based exclusively on behavioral therapy, adopt principles similar to those employed by speech-language-hearing pathologists in tinnitus habituation therapy[7].

Although authors consider misophonia a mental disorder[5], this condition is not included in official diagnostic systems, such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) or the International Classification of Diseases (ICD-10)[8]. The association between misophonia and depression is unclear, although an association between depression, depressed mood, and the severity of misophonia has been described[9]. On the other hand, individuals report this situation especially when expecting future exposure to trigger sounds, usually perceived as a stressful event[10].

Individuals with misophonia recognize that their reactions and feelings are disproportionate and report that when they produce them, the sounds do not trigger any negative reaction[11]. However, this aversion to sounds can interfere with daily tasks and interpersonal relationships and contribute to social isolation[12]. Knowledge of auditory complaints and aspects related to anxiety and depression in these individuals can favor a better understanding of this pathology, assisting the professionals responsible for diagnosis and rehabilitation.

Given the above, this study aimed to investigate the association of misophonia with auditory complaints and symptoms of anxiety and depression.

METHODS

This is a cross-sectional, quantitative, analytical, exploratory study with a convenience sample of students, professors, and staff from the health institute of a Brazilian public university. Individuals who agreed to participate by signing an informed consent form and answering the questionnaire were included in the research. Those who withdrew at any point in the research or who answered the questionnaire outside the period determined for data collection were excluded.

Data collection procedures and instruments

This research is part of the project entitled "Misophonia in students, professors, and staff at a Brazilian public university". Data were collected online through a form created on Google Forms and made available via email, between June and December 2022. This collection method was adopted due to the COVID-19 pandemic, as in-person research was not possible.

Initially, the researchers contacted the coordinators of two undergraduate programs (Speech-Language-Hearing Sciences and Physiotherapy) and two postgraduate programs linked to the Institute of Health Sciences of the Federal University of Bahia (ICS/UFBA), Brazil, requesting the email addresses of professors and students. They also requested the staff's email addresses from the institute's administration.

Having received the contact, a list was created to send the questionnaire, accompanied by explanations about the research and an invitation to participate. Five mailings were made, with an approximate interval of 1 month, sent to the addresses that had not yet responded. The flowchart of the data collection process is shown in Figure 1.

An informed consent form was presented at the beginning of the form, and its acceptance was the only mandatory question to be answered in the questionnaire. The first section included questions about gender, age, and affiliation with the institution (occupation). The second section included questions about the self-reported presence of hearing loss, tinnitus, otalgia, discomfort with loud sounds, and comorbidities.

The third section included the Misophonia Screening Checklist[7] to investigate misophonia. Although this checklist has been translated into Portuguese by a professional specializing in technical health texts, the instrument has not yet been formally validated for the language and is used in this research only as a screening measure.

The presence of misophonia was defined by a positive response to at least three of the five items on the Misophonia Screening Checklist[7].

Then, participants answered the Hospital Anxiety and Depression Scale (HADS)[13]. This scale, validated for Portuguese, is intended for screening and classifying individuals as having no anxiety or depression, possible anxiety or depression, and probable anxiety and depression, based on their score.

HADS scores between 0 and 7 were considered as absence of depressive or anxiety symptoms; between 8 and 10, classified as a possible case of anxiety and depression; and between 11 and 21, classified as probable cases[13].

The answers were provided by the participants after reading the items independently. Filling out the form took 10 minutes on average.

Online form responses were stored in accordance with the Brazilian General Personal Data Protection Law (LGPD)[14]. In addition to the participants' explicit consent, the storage took place on a platform with encryption and strong passwords, and collection was limited to the minimum data necessary to protect confidentiality.

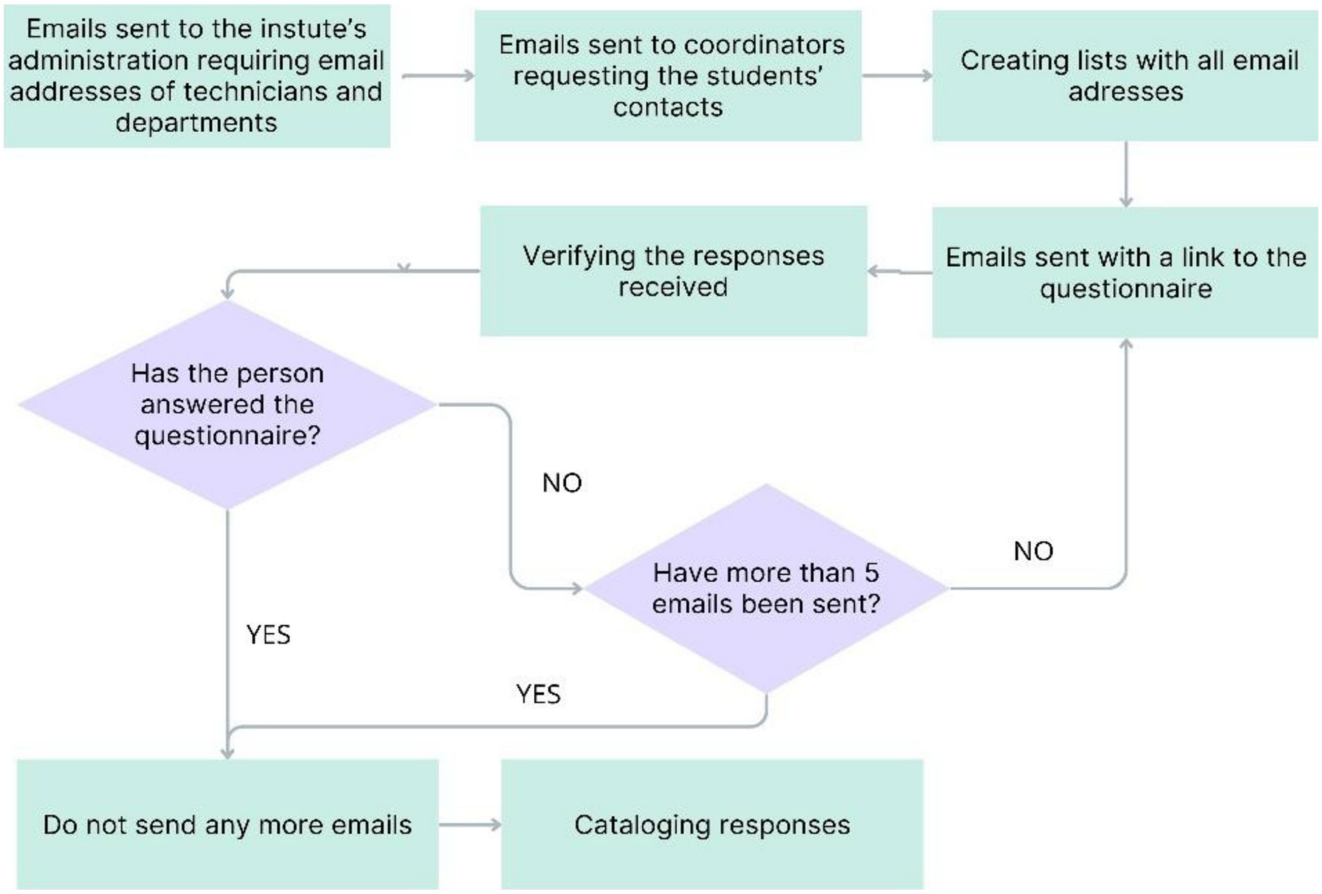

Figure 1. Flowchart of data collection

Data analysis

A descriptive analysis was performed, summarizing the categorical variables with absolute and relative frequencies. Associations between categorical variables were assessed using the chi-square independence test. A 5% statistical significance level ($\alpha = 0.05$) was established for all analyses.

The frequency of possible and probable auditory, anxiety, and depression symptoms was estimated for the groups with and without misophonia. The R software (version 4.2.2) was used for data analysis.

Ethical considerations

The study was submitted to the Research Ethics Committee of the Institute of Health Sciences, Federal University of Bahia (CEP/ICS/UFBA), and approved under approval number 5.227.555 on February 7, 2022, respecting Resolution 466/2012. All participants signed an informed consent form.

RESULTS

A response rate of 25% was obtained from the 809 emails sent. The final sample consisted of 206 individuals. Females predominated (51.3%) among the participants with misophonia. The most frequent occupation was that of university students (54.2%), followed by administrative staff (31.0%) and professors (6.2%).

The following comorbidities were identified in the group with misophonia, according to the Misophonia Screening List: five cases of asthma, four of hypothyroidism, three of depression, three of anxiety, three of hypertension, two of migraine, and one case of attention-deficit/hyperactivity disorder.

Table 1 presents the auditory complaints of the participants in relation to the presence or absence of misophonia. Auditory complaints were more frequent in individuals with misophonia, which was statistically significantly associated with hearing loss, tinnitus, and discomfort with loud sounds. The main trigger sounds reported by participants with misophonia and hearing complaints were high-intensity noises, such as loud sounds in general, shouting, and horns. In the case of tinnitus, most individuals with misophonia reported perceiving unilateral high-frequency tinnitus (53.8%).

Table 2 presents the frequencies of anxiety and depression in individuals with and without misophonia. The latter was statistically significantly associated with possible anxiety. However, no such association was observed for depression.

Table 1. Association between misophonia and hearing complaints

	Misophonia		
	Yes (%) N = 47	No (%) N = 159	*p-value
At least one hearing complaint	34 (72.3)	90 (56.6)	0.063
Self-reported hearing loss	22 (46.8)	44 (27.6)	**0.020
Otalgia	34 (72.3)	98 (61.3)	0.226
Tinnitus	26 (55.3)	50 (31.4)	**0.004
Discomfort with loud sounds	34 (72.3)	38 (23.9)	**0.010

*Pearson's chi-square **p < 0.05
Caption: N = number of participants; % = percentage

Table 2. Association between misophonia and anxiety and depression

	Misophonia		
	Yes (%) N = 47	No (%) N = 159	*p-value
Anxiety			
Unlikely	16 (34.0)	89 (56.0)	0.081
Possible	19 (40.5)	53 (33.3)	**0.011
Probable	12 (25.5)	17 (10.7)	0.071
Depression			
Unlikely	30 (63.2)	100 (62.9)	0.101
Possible	15 (31.9)	58 (34.4)	0.061
Probable	02 (04.9)	01 (0.7)	0.068

*Pearson's chi-square **p < 0.05
Caption: N = number of participants; % = percentage

DISCUSSION

The results of this research showed that misophonia was associated with self-reported hearing loss, tinnitus, and discomfort with loud sounds. Misophonia was also related to probable and possible anxiety.

The identified association between misophonia, self-reported hearing loss, and tinnitus confirms previous findings described in the literature[6]. Despite this association between hearing loss and misophonia, a study that used audiological assessments did not identify auditory impairments in individuals with misophonia[15]. This discrepancy possibly stems from methodological differences, given that the perception of hearing loss may be associated with various factors, not necessarily related to organic auditory dysfunctions[15].

Furthermore, self-reported hearing loss may reflect impairments in the central auditory system. The literature points to evidence of modifications in this system through medium- and long-latency electrophysiological examinations, neuroimaging examinations, and central auditory processing assessments[16].

Otalgia was the only auditory complaint evaluated that was not statistically significantly associated with misophonia. This finding can be explained by the high prevalence of otalgia in the general population, frequently related to extra-auditory conditions, such as temporomandibular disorders[17], dental problems, pharyngitis, and tonsillitis[18]. Therefore, the use of otalgia as a possible diagnostic criterion for misophonia demands caution and should be accompanied by other clinical indicators.

The literature widely reports the association between tinnitus and misophonia, reinforcing the findings of the present study[19]. The relationship between these conditions is frequently explained by shared mechanisms, especially regarding auditory hyperresponsiveness and the participation of structures of the limbic system. The main distinction between them is that misophonia requires a specific external stimulus, while tinnitus involves sound perception without an external source[20].

Tinnitus also occurs more frequently in individuals with mental disorders, such as anxiety and depression, which are also associated with misophonia[21]. No studies were found in the literature relating the type or laterality of tinnitus to misophonia, although the intensity of tinnitus has been related to misophonia[22]. An additional factor that may reinforce the association between tinnitus and misophonia is the positive results of Tinnitus Habituation Therapy in the treatment of misophonia, as suggested by authors[23], indicating that both disorders may share pathophysiological mechanisms.

Discomfort with loud sounds is not a common report in previous studies on misophonia. However, it is believed that this result may be influenced by the report of sensitivity to loud sounds as a trigger sound, since people who had discomfort with loud sounds reported high-intensity sounds as a trigger. This premise is reinforced by another study in which half of the students (557 participants) reported feeling irritated by provocative sounds, but only 10% stated that they felt a loss of self-control when exposed to provocative sounds[24].

Moreover, complaints of auditory sensitivity have been previously observed in individuals with misophonia who presented a lower discomfort threshold[25]. Therefore, discomfort with intense sounds must be thoroughly investigated to diagnose misophonia. Likewise, the aversion to certain sounds, present in misophonia, must be carefully differentiated from the greater individual auditory sensitivity in order to distinguish between auditory sensitivity and aversion to sound, which is a characteristic of misophonia.

The presence of misophonia was assessed through self-reported questionnaires, which may have contributed to the higher frequency of symptoms. Considering that many individuals are

unaware of concepts such as auditory recruitment, hyperacusis, and auditory hypersensitivity, there is a risk of confusion between these conditions and misophonia.

The presence of signs of anxiety was statistically significantly associated with misophonia, consistent with the results of a previous study[26]. The prevalence of signs of anxiety in this study(61.7%) was similar to the results of another study (56%). The literature suggests that anticipatory anxiety, triggered by the possibility of exposure to trigger sounds, plays a central role in this relationship[27]. Furthermore, studies have shown that anxiety plays a mediating role in anger outbursts related to trigger sounds, so that the worsening of misophonia tends to also intensify anxiety, negatively impacting quality of life[28].

Although the present study did not associate misophonia with signs of depression, this relationship has already been described in other works, albeit less intensely than anxiety[29]. Chronic stress would be the explanation for the occurrence of depression in individuals with misophonia, since it is one of the main causes of depression[30].

The varied association of misophonia with signs of anxiety and depression may be due to the lack of standardized diagnostic instruments for anxiety and depression, or because the study used a screening instrument. Research that diagnosed anxiety and depression did not investigate these symptoms in individuals with misophonia, but rather the existence of misophonia in populations already diagnosed with anxiety and depression[10], making it impossible to compare those findings with the present study.

The findings of this research contribute to a better understanding of the relationship between misophonia and auditory and emotional aspects. It found a statistically significant association between misophonia and complaints of hearing loss, tinnitus, and discomfort with loud sounds, although the latter relationship should be carefully evaluated. Misophonia was also associated with anxiety.

This study has some limitations. It did not diagnose anxiety or depression; rather, it screened them to indicate whether they were probable or possible. It also used self-reported hearing loss, without performing auditory evaluation exams. The cross-sectional design of the study did not allow for monitoring the evolution of misophonia symptoms or determining the relationship between cause and outcome.

Furthermore, the Misophonia Screening Checklist was not validated for Portuguese because misophonia is a condition not yet consolidated in the health field, and the validation of a scale that approximates the object of the study is not indicated. The intention was to use the scale as a screening tool for misophonia, surveying the existence of a knowledge gap; therefore, it used the instrument available at the time.

Further studies are needed to improve diagnostic tools for misophonia, considering its rehabilitation. Future investigations should use different study designs and methods to better understand misophonia and fill gaps in knowledge about misophonia and its relationships with auditory and emotional issues.

CONCLUSION

Misophonia is associated with self-reported hearing loss, tinnitus, discomfort from loud sounds, and signs of anxiety.

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