

Misophonia: A Condition in Search of a Diagnosis: Review of its History, Identification, Differential Diagnoses, Clinical Implications, Treatment and Management

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Abstract

Objective: To review the clinical presentation, evaluation, and management of misophonia.

Methods: Literature searches for articles describing, identifying, diagnosing and treating patients with misophonia

Results: Identifying and managing misophonia is recommended in clinical practice for early recognition and intervention.

Most studies conducted on misophonia have been based on case reports and few systematic studies.

Various psychotherapeutic and social interventions could decrease the intensity and to help restore the daily functioning of those afflicted by misophonia.

There is no scientific evidence or any approved specific medication to treat misophonia.

No pharmacologic interventions have shown beneficial effects in ameliorating the psychological distressing effects of misophonia.

Conclusion: Informative population studies in addition to randomized placebo-controlled double-blind studies are still needed in the context of identifying the main underlying etiology and the appropriate treatment of this potentially devastating condition

Keywords: Misophonia, diagnosis, pharmacology, psychotherapy, intervention, treatment.

INTRODUCTION AND HISTORICAL BACKGROUND

Misophonia derives its origin from the Greek words misos (hate) and phónè (voice), which literally means “hatred of sound” [1]. This clinical condition was first mentioned in the 1990s, as a selective sound sensitivity syndrome (SSSS or 4S) [2] and later as a soft sound sensitivity [3]. An online forum to support people with “4S,” was formed and subsequently misophonia became regularly cited in the popular press [4]. In 2000, the term misophonia first appeared in the peer-reviewed literatures in 2000 as a description

of individuals would display a form of extreme disproportionate emotions, thoughts, and physical reactions when exposed to certain sounds that were perceived as being irritating [5].

It received little notice from researchers until stories about the condition appeared in the popular media in 2011 and 2012 [6].

At the time of writing this review misophonia has not yet been classified as a specific type of medical, audiological, neurological, or psychiatric disorder,

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and remains without any specific standardized diagnostic criteria, or evidence-based treatment recommendations [4,7].

ETIOLOGY

There is no known single etiology for misophonia, and studies have proposed the hypothesis of considering it as a form of reactive behavior that develops as a physical reflex through Pavlovian conditioning in a two-step reaction [5]. Initially the sound would elicit an aversive conditioned physical reflex, and then the aversive conditioned physical reflex elicits the aversion to the sound [6]. The advocates of this hypothesis have suggested to rename misophonia as a Conditioned Aversive Reflex Disorder (CARD), thus focusing attention on the reflexive nature of this condition and the incorporation of multiple stimuli modalities. Although normally functioning auditory systems are usually preserved in misophonia some clinicians consider it a manifestation of a high level of enhanced activation of the functional connections between the auditory system and the limbic and autonomic nervous systems for specific sound patterns [7,8]. Some neuroimaging conducted in individuals with misophonia have shown certain anatomical regions such as the amygdala and the inferior temporal lobe to be activated by highly processed sounds even after auditory information has been subjected to processing and selection in modulating the auditory cortex [9]. Another etiology that was suggested describes misophonia as a part of a general hyperreactivity syndrome to auditory sensory stimuli [10]. Because the intensity of the misophonic reactions seem to be predominantly dependent on individuals' previous experiences with a given sound, or type of sounds, some studies have suggested its onset to be related to early childhood experiences of psychological interpretation of the irritating nature and the emotionally harming consequences of certain sounds [11].

PATHOPHYSIOLOGY

The exact physiological mechanisms of misophonia are still unrecognized and seem to depend on both life circumstances and the various degrees of exposure to sound triggers. The neurobiological substructures of misophonia suggest intrinsic, extrinsic factors and interindividual variability in its clinical presentation due to heterogeneous pathophysiological processes

[12]. It remains unclear which factors contribute to individual differences in the severity of responses to triggering sounds and in the nature of the triggers themselves [8]. In addition, there is an uncertainty regarding the genetic contribution to misophonia [10].

The pathophysiology of misophonia has also been attributed to the subjective reports of specific sounds that evoke intense emotional and physical reactions [13].

EPIDEMIOLOGY

The prevalence of misophonia is not yet fully known [14]. Both men and women can develop misophonia at any age, although people typically start showing symptoms in their late childhood or early teenage years. It seems to be more common in women and most often starts around age 9-13[15]. Some studies suggest high rates among youth with Obsessive compulsive disorder (OCD) and in those with anxiety disorders [11,16]. Some independent findings show misophonia to affect approximately 15% of adults [17]. Although the incidence of misophonia in nonclinical samples is currently unknown, some estimates suggest that it may affect between 10%-60% in patients with tinnitus with an estimated 10% of the general population affected by tinnitus [17,18]. Additionally, some epidemiological studies found that 81% of individuals with misophonia are triggered eating sounds, 64.3% are triggered by loud breathing or nose sounds, and 59.5 % are triggered by finger or hand sounds [15].

CLINICAL PRESENTATION

The key characteristic of misophonia is an extreme reaction, such as anger or aggression, to people making certain sounds. In general humans make most of the sounds that trigger misophonia. For instance, a dog slurping down a bowl of food or similar sounds do not usually provoke a misophonic reaction. Some of the sounds may be common such as smacking of the lips, eating, shewing, chomping of the teeth, and breathing [19]. Other specific sounds could also provoke the intense reactions such as gum popping, food crunching, nose sniffing, pen clicking, clock ticking, blackboard scratching, whistling, and finger or foot tapping. Some individuals with misophonia would also react to selective sounds such as marking with a pencil, clacking a keyboard, crinkling paper, or

squeaking Styrofoam [4]. Sometimes the reactions to sounds are associated with visual stimuli, such as seeing someone putting their hands into their own mouth which is also known as misokinesia [4,18]. Some individuals with misophonia may feel compelled to mimic or reproduce the sounds upon hearing them [20]. The magnitude and the degree of the reaction significantly varies among the individuals. Some would exhibit a strong and immediate negative emotional reaction of anger, "rage," disgust, and/or anxiety and at times impulsive urges to engage in aggressive behavior towards the person producing the sounds. Then there is an emergence of an uncontrolled strong desire to escape or avoid situations where the sounds could be encountered. Efforts to anticipate and avoid these sounds lead to limited interpersonal interaction and could result in social isolation and occupational dysfunctions [21]. The intensity of the misophonic reactions do not appear to be influenced by the decibel level of the sound [22]. Trigger sounds can be idiosyncratic and specific to certain persons and situations. For example, one person chewing chips may trigger a misophonic response while another person chewing chips does not. Descriptive and qualitative studies of the disorder suggest that the relationship that one has with the person producing the sound can modulate the intensity of the response [7]. Because family members, friends, classmates, coworkers, and intimate partners can evoke the most aversive responses, many individuals with misophonia report that their symptoms have resulted in relationship conflicts, unemployment, school failures and social isolation [19]. With the progression of time, the individuals realize that their reactions to sounds are excessive, and the intensity of their feelings make them think they are losing control with misophonia becoming the dominant factor in directing their lifestyle, social interactions, personal and occupational choices [15,19]. Consequently, misophonia would then lead to devastating effects on patients and their families [22,23]. Individuals with misophonia may experience physiological "fight or flight" stress responses which could include increased heart rate and blood pressure, tensed muscles, and sweating [20,22]. Due to the absence of specific diagnostic work-up, some rating scales could help clinicians identify misophonia and its severity as summarized in the next section.

MISOPHONIA RATING SCALES

Amsterdam Misophonia Scale (A-MISO-S)

The A-MISO-S is a semi-structured interview which is not validated. It includes 6-item scale with a range from 0 to 24 [24]. The patients are asked about the (1) time they spend on misophonia, (2) interference with social functioning, (3) level of anger, (4) resistance against the impulse, (5) control they had over their thoughts and anger, and (6) time they spend avoiding misophonic situations. Scores from 0 to 4 are considered subclinical misophonic symptoms, 5–9 mild, 10–14 moderate, 15–19 severe and 20–24 extreme.

Misophonia Questionnaire (MQ)

The MQ is a three-part self-report questionnaire that assesses Misophonia Symptoms Scale, Coping Emotions and Behaviors Scale, and Overall Severity of Sound Sensitivity Scale [17].

The first section, examines the presence of specific sound sensitivities such as eating, tapping, and throat sounds. The second section, the Misophonia Coping Emotions and Behaviors Scale, examines the emotional and behavioral reactions associated with misophonia such as "leaving the environment to a place where the sound(s) cannot be heard anymore" and "become anxious or distressed." The first two parts are rated on a scale ranging from 0 (not at all true) to 4 (always true). These two sections are summed to create a Misophonia Questionnaire Total score, with possible values ranging from 0 to 68. The third section of the questionnaire, the Misophonia Severity of Sound Sensitivity Scale, was adapted from the National Institute of Mental Health Global Obsessive-Compulsive Scale (NIMH GOCS) to be specific to misophonia [25]. Respondents rate their sound sensitivity on a scale from 1 to 15, ranging from "minimal" to "very severe," respectively. A score greater than or equal to 7 indicates clinically "moderate sound sensitivities" that cause "significant interference" with daily activities.

The Counseling Center Assessment of Psychological Symptoms-62 (CCAPS-62)

The CCAPS-62 has eight factor-derived subscales that include Depression, Eating Concerns, Substance Use, Generalized Anxiety, Hostility, Social Anxiety, Family Distress, and Academic Distress. It can be used as an

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initial measure of psychological symptoms in college counseling centers [26], however, it is not designed to discriminate psychiatric from non-psychiatric samples. Although the CCAPS-62 is likely to yield false positive results, due to its low negative predictive power it could confer a degree of confidence in reaching an accurate diagnosis [27].

DIAGNOSIS MISOPHONIA

Misophonia is not formally recognized as a psychiatric

or neurological disorder in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [28]; or the Tenth Edition of the International Statistical Classification of Diseases and Related Health Problems [29]. Most of the available literature on misophonia remains descriptive, with limited empirical, clinical, or theoretical research. The following table propose a DSM -V appendix for diagnosing mesophonia [24].

Table: Criteria Required for a Misophonia Diagnosis [24]

Criterion	Description
A	The presence or anticipation of a specific sound, produced by a human being (e.g., eating sounds, breathing sounds), provokes an impulsive aversive physical reaction, which starts with irritation or disgust that instantaneously becomes anger).
B	This anger initiates a profound sense of loss of self-control with rare but potentially aggressive outbursts.
C	The person recognizes that the anger or disgust is excessive, unreasonable, or out of proportion to the circumstances or the provoking stressor.
D	The person tends to avoid the misophonic situation, or if he/she does not avoid it, endures encounters with the misophonic sound situation with intense discomfort, anger, or disgust.
E	The person's anger, disgust, or avoidance causes significant distress (i.e., it bothers the person for whom he or she has the anger or disgust) or significant interference in the person's day-to-day life (e.g., the anger or disgust may make it difficult for the person to perform important tasks at work, meet new friends, attend classes, or interact with others).
F	The person's anger, disgust, and avoidance are not better explained by another disorder, such as obsessive-compulsive disorder (e.g., disgust in someone with an obsession about contamination) or posttraumatic stress disorder (e.g., avoidance of stimuli associated with a trauma related to threatened death, serious injury, or threat to the physical integrity of self or others).

DIFFERENTIAL DIAGNOSIS

Most clinicians consider misophonia to be a rare phenomenon that shares features and overlaps with other physiologic, neurologic, and psychiatric conditions [10,24]. It is often missed, overlooked, or misdiagnosed [4]. Because most individuals with misophonia could experience general emotional reactions to a range of many familiar annoying sounds such as the noises that are produced by train wheels on rail tracks, fingernails on glass, or chalk on blackboard, clinicians need to become familiar with the various audiological, neurological and psychiatric disorders that should be considered in the differential diagnosis of mesophonia [5,30-33], and are reviewed in the following section .

Decreased Sound Tolerance (DST)

As an audiological condition, DST is usually defined as a disproportioned reaction to sounds that would not

evoke the same reactions in the average of listeners. Some reported reactions in patients with DST include discomfort, distress, annoyance, anxiety, various emotional reactions, pain, fear and other stressful responses. These reactions have profound impact on patients' lives, leading to restrictions of everyday activities, and prevention of interpersonal and social interactions. Some clinicians and authors have linked misophonia to DST and prefer to describe misophonia as a type of DST rather than being a distinct clinical diagnosis [12].

Tinnitus

Clinically misophonia and tinnitus share a pattern of heightened reactions to sounds. In tinnitus there is a perception of a sound when no actual external noise is present, commonly referred to as "ringing in the ears," it is usually manifested by many different perceptions

of sound, including buzzing, hissing, whistling, swooshing, and clicking and, in some rare cases, tinnitus patients report hearing music [34]. Tinnitus can be both an acute and temporary condition or a chronic ongoing condition. In general, there are three types of tinnitus, a subjective, objective and somatic types [35]. In subjective tinnitus, there are head or ear sounds that are only perceivable to the specific patient and in most cases, it is usually traceable to auditory and neurological reactions to hearing loss. The objective type of tinnitus is very rare and is manifested by head or ear sounds that are audible to other people, as well as the patient. The somatic tinnitus also referred to as conductive tinnitus is a type of tinnitus that is typically related to physical movement and touch is, meaning it is tinnitus caused by more outer functions, rather than sensory/neurological causes. It can be generated by muscle spasms in the ear or neck, and by other mechanical sources that cause the neck to twist, such as a pillow or for instance turning the neck to look into a microscope. The presence of an impacted wisdom teeth and popping of the jaw could also cause somatic tinnitus.

Hyperacusis

In contrast to misophonia where there is a noise-induced rage, instantaneous reaction, unrelated to the loudness or frequency of a sound, where even a soft sound could cause anger, rage or panic reactions, the individuals with hyperacusis, would react proportionally to all “louder sounds” without associating any meaning or emotional component to the sound [21]. Hyperacusis has also been described as a condition with noise-induced pain, usually developing from an injury caused by excessive noise exposure. Even ordinary sounds could be perceived in hyperacusis as being so loud as to be felt as pain and is often accompanied by other results of trauma such as the pressure feeling called aural fullness, and in some instances constant burning pain in the ear canal [30].

Misophonia also shares several features with other psychiatric diagnoses including specific phobia, posttraumatic stress disorder, social phobia, obsessive compulsive disorder, Tourette’s disorder, intermittent explosive disorder, borderline personality disorder, antisocial personality disorder, obsessive compulsive personality disorder, autism spectrum disorders and sensory processing disorders.

Specific Phobia

Specific phobia is a type of anxiety disorder where the person exhibits excessive or unreasonable, persistent and intense fear triggered by a specific object or situation [28]. This fear reaction is out of proportion to the actual danger and appears almost instantaneously when presented with the object or situation that trigger the fear. The person exerts extra efforts to avoid the object or situation or endures it with distress. The phobia significantly impacts the sufferer’s school, work, or personal life. In children and adults, the duration of symptoms must last for at least six months. Although specific phobia has similarity with misophonia if the specific phobia was related to external auditory stimuli that could trigger negative emotional reactions when this stimulus is directly related to undesirable sounds [18]. In misophonia the prevalent feelings are irritability, anger and even aggression [24]. A type of specific phobia related to fear of or aversion to loud sounds, that is often termed as ligyrophobia or sonophobia and occasionally called acoustic phobia and also be described as a fear of voices, or a fear of one’s own voice. It is a very rare condition and can be a symptom of hyperacusis [30]. Although there have also been suggestions that phonophobia is an extreme form of misophonia From a clinical perspective they are distinct and separate conditions since the main component of phonophobia is fear of specific sound or even one’s own voice, while in misophonia the prevailing pattern is anger and irritability that her triggered by specific rather than loud sounds [11]. Sinophobia is another type of specific phobia that illustrates sound hypersensitivity that can be a component of migraine [36].

Posttraumatic Stress Disorder (PTSD)

As in misophonia and specific phobia, in PTSD auditory stimuli can cause intense reactions with subsequent avoidant behaviors. PTSD-related reactions to auditory stimuli could trigger a sudden recollection and/or re-enactment of the trauma, or of the original reaction to it, and may trigger associated features of mood and cognitive disturbances [28]. However, in misophonia there is an absence of traumatic events that have been experienced and associated with PTSD [6,18].

Social Phobia

Patients with social phobia and misophonia experience stress or anxiety in social settings and will

avoid them. In social phobia the core driving reaction is a hypersensitivity to negative evaluation by others [28]. In misophonia the fear of social situations is due to concerns of being exposed to irritating sounds that could trigger anger, irritability and aggressive reactions [18].

Obsessive Compulsive Disorder (OCD)

In misophonia there is always a constant underlying preoccupation with specific sounds, which could be like the obsessive component of OCD [16]. Although avoidance is present in both misophonia and OCD, patients with OCD would perform compulsive acts to counteract the obsession induced stressors and these acts are not commonly associated with either aggression or rage toward others [18,37].

Tourette's Syndrome (TS)

This condition is distinguished by the presence of tics, which are abrupt, or jerky, rapid and non-suppressible movements that are mainly in the muscles of the face and at time accompanied by repeated vocal sounds. There are usually two types of tics in TS, motor and vocal tics [28]. The motor tics, or movements include eye blinking, jaw movements, facial grimacing, bobbing or jerking of the head, shrugging the shoulders, stretching the neck and lurching of the arms. The vocal tics may include sniffing, grunting, shouting, clearing the throat and hooting. When there are a group of words (phrases) that are also known as complex vocal tics, they may or may not be discernible, and they are repeatedly said out of context and are not fully understood. In some patients with Tourette's disorder, the words may be improper, such as curse words, ethnic slurs and other unsuitable phrases or words. Sound sensitivity can be common among individuals with TS, who report heightened sensitivity to auditory, tactile, and/or visual stimuli, including noise from the television, electrical appliances, and loud settings such as parties [38]. This co-occurrence has led clinicians and researchers to look into whether misophonia is related to TS, given the phenomenological similarity with other subjective aversion to sounds that are reported by patients with TS, there is the possibility that systematic screening for misophonia in TS might reveal some pathophysiological association between these 2 conditions [23].

Intermittent Explosive Disorder

Intermittent explosive disorder is characterized by impulsive and aggressive outbursts [28]. These outbursts can be in the form of verbal tirades or physical aggression that are impulsive, not premeditated and extremely difficult to predict. Additionally, the outbursts happen without trigger or are not proportionate to the preceding trigger or stressor. To qualify for diagnosis, outbursts must occur about twice a week for at least three months [28]. Individuals with this diagnosis would have various documentations of several episodes of an inability to refrain from aggressive impulses that could result in serious physical assaults against others or property destruction. In contrast patients misophonia would report impulsive aggression toward people who are producing the irritated sounds but very rarely would lose control of their aggressive impulses due to their insightful awareness of the of the unacceptable nature of such impulses and would exert concentrated efforts in avoiding and preventing physical assaults toward others and destruction of properties [18].

Borderline Personality Disorder BPD

Some patients report that their misophonia is only triggered by certain individuals, such as relatives or close friends, while it is not present if the same sound is produced by themselves or by animals or children [7]. Also, in some cases, the individuals think that other people do not pay attention to them and do not give value to their needs, thus reporting feelings of being abandoned or neglect. These features are like some attribute of BPD where the individuals think that other people are insensitive to their needs and do not provide them with constant sympathy and care [39]. In misophonia the reactions are predominantly due to certain sounds that are considered irritating, while in BPD most of the reactions occur in the context of frustration and anger toward interpersonal relationships and interactions [18,28].

Antisocial Personality Disorder

In antisocial personality disorder there is frequent impulsivity, difficulty with controlling anger, and hostility toward others who they subjugate, criticize, dominate, exploit, deceive, disregard and humiliate [28]. These attributes and attitudes toward others are not generally related to their production of specific sounds or noises, in contrast individuals with

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misophonia rare aggressive outbursts and are almost always a reaction to the specific triggering sounds [18].

Obsessive Compulsive Personality Disorder (OCPD)

Patients with OCPD usually exhibit a pervasive pattern of stubbornness and rigidity, that leads to a preoccupation with details, organization, schedules, lists, and rules, often to the extent that the original purpose of the task is forgotten, and often remains incomplete. The obsession with rules often overflows into inflexibility in matters of ethics and morality, much more so than can be accounted for by the individual's cultural or religious affiliation [28]. These characteristics may be present in misophonia when it is related to the extreme rigidity and inflexibility of accepting certain sounds and constantly avoiding them to the extent of not performing or completing other needed daily tasks, however there is no obsessions with rules and regulations and the detriment of relationships that are predominant in OCPD [18].

Autism Spectrum Disorders (ASD)

Auditory hyper-responsivity has been observed and documented in many patients with ASD [40,41]. The auditory sensitivity in ASD usually occur as a reaction to unexpected and loud noises, such as burst car tires, an ambulance siren explosion or a dog barking [40]. This pattern of auditory hypersensitivity is clearly different from the specific sounds that trigger the various irritable and angry responses in patients with misophonia [7,19].

Sensory Processing Disorder (SPD)

In this neurological condition, the brain misinterprets sensory auditory inputs information. Although the disorder is commonly seen in individuals with ASD, it is also seen in clinical settings in individuals without ASD. The presence of SPD can affect one or more of the senses, including hearing, smell, vision, touch, balance, sense of space, sense of time and movement, and as a result, individuals with SPD can be hypersensitive to auditory stimuli and would avoid these stimuli and thus should be differentiated from misophonia [18].

Misophonia Psychiatric Comorbidities

General clinical observations suggest that OCD and TS share certain characteristics with misophonia,

specifically related to the degree of distress and negative reactions triggered by a specific auditory stimuli. When misophonia co-occur with OCD or TS, the behavioral measures that are undertaken to avoid the sound triggering situations are very extreme and are usually accompanied by compulsive actions to counteract the triggering sounds [18,20]. The co-occurrence of misophonia and either OD or TS have also prompted speculation in regard to treating misophonia using similar modalities [7,20,42].

TREATMENT AND MANAGEMENT

Currently, there are no established and empirically supported psychosocial or pharmacological treatments for misophonia [43,44]. The following section summarize some of the treatment modalities that have been used by clinicians for the treatment and management of misophonia.

Cognitive Behavioral Therapy (CBT)

This form of therapy focuses on a person's thoughts, feelings, and behaviors to identify unhealthy patterns and attempts to alter the negative thoughts and maladaptive schemas that play an integral role in the development and maintenance of misophonia by pairing triggering sounds with positive experiences [43,45]. The psychotherapists devise a treatment plan that adapt the various CBT techniques to address each person -specific needs in modifying their extreme reactions to the triggering sounds and that would include: (a) a cognitive component to challenge dysfunctional automatic thoughts, (b) a behavioral component to interrupt maladaptive and avoidant coping strategies and practice helpful ones, and (c) a physiological component to help recalibrate the autonomic reactivity toward those who are identified as producers of the triggering sounds [45].

Cognitive Processing Therapy (CPT)

This type of CBT uses techniques of monitoring automatic thoughts, identifying patterns of distorted thinking and reframing or challenging of one's negative thoughts and beliefs and verbal interventions of questioning and challenging distorted thoughts to identify intermediate and core beliefs that underlie the automatic thoughts that evoke the person with misophonia to react toward the triggering sounds [46].

Motivational Interviewing (MI)

This style of interviewing explores the use of non-judgmental and non-confrontational approach to explore a client's ambivalence to change [47]. It is directed at resolving ambivalence and the therapists facilitate the building of interpersonal relationship in order to explore behavior rather than self-awareness. The therapists use open-ended questions to engage the individuals with m in reflecting on a typical day, reporting past attempts at change, anticipating future change, and evaluating confidence to implement new behavior. Incorporating MI into the treatment of misophonia as a part of an inhibitory learning model [43].

Exposure and Response Prevention (Ex/RP)

This therapy is based the two-factor model of avoidance that is based in classical and operant conditioning [48]. In Ex/RP, the therapists identify the intrusive thoughts, emotions, and bodily arousal that accompany the distress-inducing auditory stimulus, then engage the person to break avoidant behavioral patterns by gradual exposure to the irritating sounds until the extreme avoidant behaviors subside. When using Ex/RP in the treatment of misophonia, therapists use a number of inhibitory strategies including expectancy violation by pairing the stimulus with odd, ridiculous, or humorous responses, the removal of safety signals by performing task concentration exercises, and engaging in stimulus variability, by proceeding through tasks nonlinearly during the exposure sessions [43,49].

Mindfulness

This therapeutic intervention is based on being present-centered, and awareness of one's thoughts, emotions, and other experiences in the moment they occur [50]. Mindfulness training involves two basic components: attentional awareness and perspective shifting [51]. Attentional awareness is the ability to focus on present experience by inhibiting elaborative processing. While perspective shifting is accepting automatic thoughts and reactions without attempts to judge, evaluate, or change them. Aspects of mindfulness have been incorporated in misophonia treatment by encouraging thought acceptance, opposite action to anger, and a non-judgmental attitude toward those who are producing the irritating sounds [52].

Dialectical Behavior Therapy DBT

This type of therapy is form of CBT that places specific focus on a person's arousal response to certain emotional situations and helps the individuals identify their strengths and build on them, while also recognizing the thoughts, beliefs, and assumptions that make the triggering sounds so difficult to cope with in everyday living. DBT may be especially indicated for individuals who do not respond to CBT as it focuses on acceptance of one's anger rather than intense rage responses toward others [53].

Tinnitus Retraining Therapy (TRT)

This type of therapy is primarily used to treat patients with tinnitus and hyperacusis, it has also been beneficial in treating misophonia (3,5). In TRT the therapists use education as a mean to teach individuals improve their ability to tolerate trigger sounds by introducing pleasant sounds into the ear canal, and then the individuals are taught to create positive associations with trigger sounds through practice and intentional rethinking [54].

Pharmacological Treatment for Misophonia

Most clinicians prefer the use non pharmacological interventions to help reduce the effects of misophonia such as lifestyle changes that may include daily exercise, a healthy diet, a regular sleep schedule, support groups, and family therapy .However in certain extreme cases medications could be used as an adjunctive intervention in combination with psychotherapy and lifestyle changes. To date there have not been any Food and Drug Administration (FDA) approved medications to treat misophonia (55). Some medications such as antianxiety or antidepressants would be prescribed to treat co-occurring psychiatric conditions and that could alleviate the intensity of the mesophonia symptoms of anxiety, irritability anger and avoidance.

CONCLUSION

Misophonia sometimes referred to as a selective sound sensitivity syndrome, is a clinical condition that is characterized by the dislike or hatred (miso) of specific sounds (phonia) that is manifested by aversive reactions ranging from irritability, anxiety, social withdrawal, and anger. Individuals with misophonia may also experience a profound sense of loss of self-control over their extreme emotional responses which

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are rarely accompanied by aggressive outbursts. The triggering and irritating sounds are usually produced by human beings but others, such as a clock ticking or pen clicking, have been reported. Most people with mesophonia can identify their reactions as being unreasonable or out of proportion with the sounds. They will then avoid the settings and the interpersonal situation where the sounds are produced which will ultimately lead to social isolation and withdrawal from human relationships. The psychiatric assessments of individuals with misophonia may show some symptomatic overlap with other audiological and psychiatric disorders, these disorders however, could not account for all the symptoms of the misophonia. Currently misophonia is not formally recognized as a psychiatric or neurological disorder in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [28]; or the Tenth Edition of the International Statistical Classification of Diseases and Related Health Problems [29]. Additionally no evidence based treatment modalities have been specifically recommended for misophonia. As a result there is a clinical impetus to identify misophonia as a separate diagnostic entity that would require specialized treatment interventions, such a suggestion may be materialized in a foreseeable future. Extensive research is needed, to confirm the diagnostic validity of mesophonia and its required appropriate treatment intervention, before its consideration as a separate clinical entity in future DSM or ICD editions. In the meantime it is hoped that this review would provide clinicians with some tools that can be used to identify, differentiate, manage, and treat the individuals suffering from mesophonia and to minimize the devastating effects of this condition on their quality of life.

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