

Review Article

Impact of tinnitus on quality of life: a review

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ABSTRACT

Tinnitus is a poorly understood disorder in medicine. Tinnitus is an auditory perception of the sound in the ear or head in the absence of the external or internal stimuli. It is a common medical symptom which can be debilitating to all age group although frequently associated with elderly individuals. Tinnitus may be associated with lower health related quality of life (HRQoL). Tinnitus is a disturbing otological symptoms and often associated with hearing loss. The risk factors for tinnitus are hearing loss, ototoxicity, head injury and depression. It poses a challenge to the quality of the life. Tinnitus is a symptom which can be associated with various diseases of the external, middle or inner ear, brain stem and cerebral cortex. Tinnitus is frequently seen clinical finding and its adversity affects the quality of life in relatively small proportions of the individuals. The quality of the life is often affected in terms of psychological or emotional effects, sleep disturbance, auditory and health effects. Tinnitus can be debilitating to the sufferers. The quality of the life is often affected in terms of psychological or emotional effects, sleep disturbance, auditory and health effects. Hearing assessment and evaluation of quality of life should be advocated in routine assessment of the tinnitus patients. The objective of this study was to discuss the impact of tinnitus on quality of life.

Keywords: Tinnitus, Hearing loss, Quality of life, Tinnitus handicap inventory

INTRODUCTION

Although much advances have been made in the medicine, tinnitus is still considered as a scientific and clinical enigma for a clinician.¹ This clinical condition is not an uncommon entity in routine clinical practice. Tinnitus is the perception of the sound in the ears or head and described as a ringing, buzzing or whistling sound. The word tinnitus is derived from the Latin verb ‘tinnire’ (to ring).² The tinnitus can be classified as objective or subjective types. In case of subjective type of tinnitus, the individual experiences alone whereas less common type, objective where the observer can also hear the sound. The objective type of the tinnitus is caused by sound generated from internal biological activity. The description of the tinnitus by the patients are hissing, sizzling and ringing although in some cases more complex sound heard such as voices or music or both. Chronic tinnitus may be episodic

or continual in nature and is characterized by episodes of tinnitus experienced for five minutes or longer period for at least three months.³ However, the subjective tinnitus is more common and caused by abnormal neural activities which are not generated by sounds.⁴ There are two common types of hearing loss associated with tinnitus which include noise induced hearing loss and presbycusis.⁵ Tinnitus can be found alone or part of the symptom complex in certain otological diseases such as ototoxicity, Meniere’s disease, noise induced sensorineural hearing loss and presbycusis.⁶ There are questionnaires which are used to evaluate the impact of tinnitus and it can represent a big nuisance for the patients and affect their quality of life.⁷ Tinnitus may affect, directly or indirectly, professional, personal and leisure activities, disturb in family and social relationships and in severe cases, even lead to suicides.⁸ The objective of this study was to discuss the impact of tinnitus on quality of life.

METHODS

Research articles regarding tinnitus and its impact on quality of life were searched through multiple approaches. First, we conducted an online search of the Pubmed, scopus, google scholar and medline database with the word tinnitus, impact of tinnitus on quality of life, prevalence of tinnitus, tinnitus and cognition and management of the tinnitus. The abstracts of the published articles were identified by this search method and other articles were identified manually from the citations. This review article reviews the epidemiology/prevalence of tinnitus, impact of tinnitus on quality of life, tinnitus and cognition and evaluation of tinnitus on quality of life and management of tinnitus. This review article presents a baseline from where further research for this clinical entity can be designed and also help as a spur further research in this tinnitus and its impact on quality of life. There are not many studies done for impact of tinnitus on quality of life. The objective of this review article is to provide a precise and brief knowledge regarding the impact of tinnitus on quality of life.

EPIDEMIOLOGY

The prevalence studies of the tinnitus have mostly been conducted in western Europe or the USA and have some drawbacks specifically on the ground of methodological aspect. This methodological drawback is usually associated with unambiguous definition of the tinnitus and phrasing of exact epidemiological questions. Tinnitus is the 3rd worst clinical problem which can affect the human beings and it corresponds to 20% of the cases second only to the pain and dizziness.⁹ The prevalence of the tinnitus is reported to increase with age and is said to be higher than the number of the patients who need treatment.¹⁰ Subjective type of tinnitus is often disturbing with reported prevalence ranging from 7 to 20% in the society and the estimated 20 year incidence rate in adult aged over 48 years of 13%.¹¹ Approximately 5% of the subjects is severely affected by the tinnitus such as experiencing sleep disturbances, concentration problems, anxiety and depression.¹² Among the morbidities in the elderly age group. Tinnitus is a clinically relevant symptom. Tinnitus affects approximately 15% of the general population and approximately 33% of the elderly persons.¹³ Tinnitus is a common clinical entity which affects around 40 million persons in the United States, of whom 10 million are affected severely.¹⁴

PATHOPHYSIOLOGY OF TINNITUS

Tinnitus is also described as auditory hallucination. It is the sensation of ringing sound in the ear or head in the absence of external sounds. Tinnitus has been associated with almost all types of ear disorders, particularly with cochlear conditions.¹⁵ Because of the otological condition, especially high frequency hearing loss act as a major risk factor for tinnitus and the auditory phantom sensations are usually deemed to be a neuroplastic response to the

sensory deprivation.¹⁶ Tinnitus is not only a straightforward association with disturbed firing patterns across the tonotopic array of the abnormal cochlea, as the sound percept may persist even when the input from the ear is eliminated by cutting of the auditory nerve.¹⁷ Increased spontaneous firing rates of the neurons at the central nervous system is an important possibility for generation of the tinnitus. Hearing loss due to cochlear pathology decreases the cochlear nerve activity and it reduces the activity within the affected peripheral auditory area downregulates the inhibitory cortical process. This downregulation causes hyperexcitability in the central auditory components including primary auditory cortex.¹⁸ Whether increasing of the spontaneous firing rate are associated directly to the sensation of the tinnitus is, however, unclear. Hearing loss particularly severe degree of loss may be an added handicap to the tinnitus, produces additional discomfort to the patients rather than affecting the tinnitus directly, which adds to the general health problems which patient face.¹⁹ Tinnitus is usually result by continuous firing of the cochlear fibers to the brain due to hyperactivity of the cochlear hair cells or damage to these cells, which generates a phantom sound transmitted to the brain which is heard as a real sound. Tinnitus may occur due to numerous otological, metabolic, neurological, cardiovascular, orthopedic, pharmacological, dental and psychological conditions, more than one of which may be found in the same person. The tinnitus can be described as whistle, rain and cricket sound are most common (15.79%) followed by buzzing and teapot sounds (10.53%), which differs from a study that showed that wheezing (40%) was the most documented tinnitus sound description.²⁰

Impact of tinnitus

Tinnitus is a noise or unwanted sound perceived in the ears or in the head unrelated to any external source of sound or stimuli. Tinnitus has significant effect on quality of life. Patients with tinnitus may present with varying degrees of annoyance with this symptom with variable effect on the quality of life. There are two important factors related to the tinnitus which should be differentiated: the intensity of the tinnitus signal and severity of this symptom or the annoyance which severely affect the lives of the patient.²¹ The prevalence of the tinnitus and hearing loss increases with age, regardless of past history of noise exposure. As per National hearing study, there is trend of increasing bothersome tinnitus along with age.²² Tinnitus can affect the patient's personal life including their physical, emotional and social functioning and result in higher incidence of anxiety and depression.²³ In case of severe form of tinnitus, it can result in concentration difficulties, insomnia and headache. However, everyone will not experience the same degree of distress and impairment of quality of life. The personality disorders are often associated with tinnitus which include hysteria, hypochondriasis, introversion, withdrawal and emotional isolation.²⁴ The cognitive problems like dysfunctional and catastrophic thoughts can enhances the emotional distress of the patients and the severity of the tinnitus and believed

to be closely associated with personality factors.²⁵ Tinnitus patients with type D personality (tendency towards negative affectivity and social inhibition) have greater tendency towards tinnitus related distress and poorer quality of life in comparison with other personality types.²⁶ The degree of discomfort by tinnitus may be mild when perceived by an individual only in particular situations (seen among approximately 7% of the individuals); moderate when the person is aware of its existence but does not bothered by it; intense when the unpleasant feeling is disturbing and has a negative effect on daily activities and severe when the symptoms become unbearable, ever present and ceaselessly affecting the daily activities.²⁷ The degree of discomfort, intolerance and incapacity to the individuals may not be related to the loudness of the tinnitus. One study reveals female patients gave significantly higher annoyance scores in comparison to males.²⁸ On other hand, another study showed severity (intensity and annoyance) was due to tinnitus in elderly aged male patients.²⁹

Tinnitus and cognition

In clinical settings, documents of cognitive difficulties are common among patients with tinnitus.³⁰ The impact of tinnitus upon cognitive function is usually complicated by the heterogeneity of different studies undertaken at different part of the world. There is negative impact of the tinnitus upon attention. The relationship between impaired cognitive function, tinnitus, anxiety, depression and hearing loss were supported by study which also has implication for successful management of people with tinnitus.³¹ Both anxiety and depression have a compounding effect on quality of life of patients with tinnitus.

CLINICAL EVALUATION OF TINNITUS

There is no specific or standard diagnostic criterion for tinnitus, although some clinical instruments do exist for proper identification of the patient complaint. Therefore, the clinical and audiological evaluations are imperative to rule out middle, external or inner ear pathologies. Pure tone audiometry and evaluation of the quality of life are often utilized for used for patients with tinnitus. The conductive type of hearing loss found in patients with tinnitus may be attributed to some middle ear diseases like eustachian tube dysfunction. The patients with tinnitus need middle ear analysis when associated conductive hearing loss. However, the sensorineural hearing loss is commonest type of hearing loss associated with tinnitus.³² The Tinnitus Handicap Inventory (THI) is a self-reported measurement of impact of tinnitus, consisting of 25 items classified into 3 subscales such as: functional (11 items measures the functional aspects of tinnitus like mental, social/occupational and physical functioning), catastrophic (5 items reflecting catastrophic responses to tinnitus such as depression and sleep disturbances) and emotional (9 items representing affective responses to tinnitus).³³ There are 3 possible responses to each item

(and 25 items in total): yes (four points), sometimes (two points) and no (zero points). The scores are estimated for the three subscales: functional (THIf), catastrophic (THIc) and emotional (THIe)-ranges 0-44,0-20 and 0-36 points respectively. Patients then are allowed to fill in the Indian/country wise version of the Tinnitus handicap inventory (THI), a 25-item questionnaire answered with “yes” (4 points), “no” (0 points) or “sometimes” (2 points). The scores are added to yield a classification of the tinnitus handicap, from negligible (0 to 16), mild (18 to 36), moderate (38 to 56), severe (58 to 76) or catastrophic (78 to 100). It ranged from 0 to 250. The Tinnitus functional index (TFI) is optimized as a diagnostic tool for quantifying the functional impact of tinnitus. The TFI is a reliable and valid measure of tinnitus severity in the population tested and is responsive to treatment related changes. But it needs more research for responsiveness of TFI across different population. The 25 TFI items were rated over the maximum value of 10. The TFI scores were also based on percentage. This provides the respondent's overall score within 0-100 range. The medical outcomes study (MOS) short form health survey is questionnaire used to evaluate the physical and mental aspects of quality of life.³⁴ The participants were asked about tinnitus lasting for 5 minutes or longer. The tinnitus is classified into three groups such as 1: no tinnitus; 2: tinnitus some of the time; 3: tinnitus most of the time.

Management

There is no effective treatment available for tinnitus although much research work is underway into the pathophysiology and treatment of the tinnitus. There are several treatment modalities are available because a fully satisfactory treatment still remains elusive. Different treatment modalities include pharmacotherapy, tinnitus masking, cognitive behavior therapy, tinnitus retraining therapy and transcranial electric or magnetic stimulation.³⁵ Surgical intervention for any specific otological disease associated with tinnitus might be effective for such condition, but the tinnitus may persist. There is different pharmacotherapy available for patients with tinnitus such as cortisone, vasodilators, lidocaine, benzodiazepines, spasmolytic drugs, tricyclic antidepressants and Ginkgo biloba.³⁶ Hyperbaric oxygen therapy is thought to be beneficial in patients with tinnitus by enhancing oxygen supply to the inner ear and improve the tinnitus.³⁷ Out of different treatment modalities, there two important treatment approaches for tinnitus are practiced widely for patients with tinnitus. These two treatment modalities include sound-based therapy like tinnitus retraining therapy and cognitive behavior therapy.³⁸ Tinnitus retraining therapy includes masking of the tinnitus at the sound perception level along with structured counselling sessions.³⁹ Tinnitus retraining therapy is a type of habituation therapy designed to help patients with tinnitus. However, the tinnitus retraining therapy is a not a curative treatment for the patient, as it does not remove the tinnitus. It aims to minimize the perception of the tinnitus by inducing the habituation of tinnitus induced reactions.⁴⁰

Tinnitus patients those hear multiple sounds tend to get higher score of THI and subscale scores. treatment of the tinnitus patients should address the common areas of concern and also include counselling. The THI is a potential screening tool which determine is the patients need counselling. A series of evaluations can be done to chart the progress of the treatment. Tinnitus with impaired cognitive function require counselling and cognitive behavioral therapy. Cognitive behavioral therapy and mindfulness can be used to help individual with invasive tinnitus.⁴¹ More than 80% of the patients bilateral profound sensorineural hearing loss present with tinnitus. Cochlear implant eliminates tinnitus in up to 86% of these patients, although approximately 9% shows worst postoperative tinnitus. Patient who does not have tinnitus in initial part, up to 4% develop it after surgery/cochlear implant.⁴²

CONCLUSION

Tinnitus is a common clinical entity which appears to increase with age. Tinnitus is frequently associated with co-existing hearing loss. Quality of life is severely affected by the tinnitus. Hearing evaluation with pure tone audiometry and measurement of quality of life are important assessment during dealing with tinnitus patient. The prevalence of the tinnitus seems to increase with increasing age. There are several studies are revealing that statistically significant between associations of tinnitus and associated hearing loss as well as between the degree of hearing loss and health related quality of life measure with tinnitus handicap inventory (THI) among adult patients with tinnitus. So, tinnitus has significant burden to health of an individual which increases with co-existing hearing loss.

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