

Original articles

Influence of factors and personal habits on the tinnitus perception

Influência de fatores e hábitos pessoais na percepção do zumbido

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ABSTRACT

Purpose: to investigate the location and to verify the influence of factors and personal habits in the tinnitus perception in patients with the symptom.

Methods: 740 individuals with tinnitus, from an outpatient clinic of a university hospital were investigated. All of them reported the location in response to a questionnaire, also containing information about some factors and daily habits that causes improvement or worsening of tinnitus. The data were statistically analyzed.

Results: The predominant location was in both ears. Most of the investigated factors does not change the perception of tinnitus for researched subjects. The silence, the nighttime and the anxiety were the factors that might be related to worsening of tinnitus perception. Moreover, the noise was referred as a factor that causes decrease of tinnitus perception. There was no influence of age and gender.

Conclusion: more than half of the subjects had bilateral tinnitus and that most situations surveyed do not cause change in the tinnitus perception to the studied people. It is noteworthy, however, that the presence of ambient noise helps to reduce the feeling of tinnitus annoyance, as well as the silence, the period of night and the anxiety contribute to accentuate it.

Keywords: Patient Care; Surveys and Questionnaires; Proprioception; Tinnitus

RESUMO

Objetivo: investigar a localização e verificar a influência de fatores e hábitos na percepção do zumbido em pacientes com tal sintoma.

Métodos: fizeram parte da amostra 740 indivíduos com queixa de zumbido, atendidos em ambulatório especializado de hospital universitário. Todos relataram a localização do zumbido em resposta a questionário, contendo também informações sobre fatores e hábitos causadores de melhora ou piora na percepção do zumbido. Os dados foram analisados estatisticamente.

Resultados: o predomínio da localização foi em ambas as orelhas. A maior parte dos fatores investigados não modifica a percepção do zumbido para os pesquisados. Dentre os fatores que puderam ser relacionados à piora da percepção estão, principalmente, o silêncio e o período da noite, seguidos pela ansiedade. Por outro lado, ruído foi o fator mais referido como causador de diminuição da percepção do zumbido. Não foi verificada influência de idade e gênero.

Conclusão: mais da metade dos sujeitos apresentaram queixa de zumbido bilateral e a maior parte das situações pesquisadas não provocam mudança na percepção do zumbido na população estudada. Destaca-se, contudo, que a presença de ruído ambiental auxilia na diminuição da sensação de incômodo ao zumbido, enquanto o silêncio, período da noite e a ansiedade contribuem para acentuá-la.

Descritores: Assistência ao Paciente; Inquéritos e Questionários; Propriocepção; Zumbido

INTRODUCTION

Tinnitus is defined as the “perception of sound in the ears or head without an external source of stimulation.”¹ It can be characterized as noise that is unique to each person, similar to the sound of rain, whistle, waterfall, hiss, among others, and it may be continuous or intermittent.^{2,3}

The neurophysiological model proposed by Jastreboff suggests that tinnitus would be the result of the interaction of auditory and nonauditory pathways. The limbic and the autonomic nervous systems would act as determinants of the condition called tinnitus.⁴ Thus, the association of tinnitus with unpleasant or dangerous situations, for example, would contribute to the perception of it and to increased annoyance.

The presence of this symptom causes negative repercussions on the patient’s quality of life such as anxiety, depression, emotional instability, sleep disorders and behavioral changes, which in turn reflect on the individual’s performance of daily and professional activities.^{2,6,7}

The annoyance caused by tinnitus is quite variable, with greater or lesser impact on the patients’ quality of life. Therefore, it is important to characterize the intensity of its sign and symptom severity, i.e., the annoyance that it causes.¹ There are some factors that seem to be associated with a higher degree of discomfort, such as the presence of stress, psychiatric disorders and female gender.⁸

Due to tinnitus subjective and variable aspects, as well as reports that many individuals are hampered in their daily activities for the inconvenience that this causes, the objective of this research, besides describing tinnitus perception location and time, is to verify the influence of factors and personal habits on improving and worsening the perception of subjective tinnitus in people who have this symptom.

METHODS

The design of this study is cross-sectional and descriptive. The sample consisted of patients of both genders, who had subjective tinnitus and reported discomfort caused by the symptoms, being treated at a specialized outpatient clinic at Hospital de Clínicas de Porto Alegre (HCPA) from 2002 to 2014.

All patients were in otorhinolaryngology and audiological monitoring and answered a questionnaire on their first visit to the tinnitus clinic. This instrument was developed by the research group from the specialized literature. In this questionnaire, the following was addressed, among other topics: tinnitus awareness amount of time; tinnitus location and history of symptoms, including factors and habits of improving and worsening, such as silence, noise, night time, morning, fasting, diet, exercise, anxiety, rest, alcohol, cigarettes and cervical rotation. For each factor and habit presented, individuals should respond to perceived improvement, worsening or if there was no change in tinnitus perception. Those patients who could not give an opinion on some of the factors (or did not use substances such as alcohol or cigarettes) were not counted in the total number for that variable. The questionnaire was applied as an interview with objective questions and closed answers.

Patients who participated in this research signed an Informed Consent Form. The study was approved by the Ethics Committee on Research of the Institution (protocol number 06026), fulfilling all the requirements for conducting studies on humans.

Data were analyzed in a statistical quantitative manner using software SPSS version 20.0. ANOVA (Analysis of variance), chi-squared and Student’s t-test tests were used. Values of $p \leq 0.05$ were considered significant.

RESULTS

Seven hundred and forty individuals took part in this study, being 465 (62.84%) females and 275 (37.16%) males. Age ranged from nine to 89, with means of 59.20 ± 13.04 .

As for the tinnitus perception amount of time, it ranged between less than one year to 61 years, with means of 6.3 ± 7.03 years. Tinnitus amount of time was analyzed according to gender and there was no such correlation ($p = 0.81$), since the average time of tinnitus perception for females was 6.37 ± 7.57 years and 6.24 ± 6.00 years for males.

The data on tinnitus location and the individuals’ gender are in Table 1.

Table 1. Tinnitus location according to participants gender

Tinnitus location	Both genders	Female	Male	p
BE	377 (50.9%)	228 (49%)	149 (54.2%)	0.78
RE	132 (17.9%)	84 (18.1%)	48 (17.5%)	
LE	174 (23.6%)	114 (24.5%)	60 (21.8%)	
BE and head	4 (0.5%)	3 (0.6%)	1 (0.4%)	
RE and head	1 (0.1%)	1 (0.2%)	0 (0%)	
LE and head	1 (0.1%)	1 (0.2%)	0 (0%)	
Head	51 (6.9%)	34 (7.3%)	17 (60.2%)	
Total	740 (100%)	465 (100%)	275 (100%)	

* $p \leq 0.05$ by chi-squared test

Legend: BE=both ears; RE=right ear; LE=left ear.

Like gender, age has not shown a relationship with tinnitus location either ($p = 0.532$).

Among the most cited factors as related to worsening tinnitus perception are silence (63.5%) and nighttime (60.1%). Regarding improvement factors, the most cited was noise (35.4%). It is noteworthy, however, that a similar number of people reported not

observing changes in tinnitus regarding this factor. Full details are in Table 2 and allow to define that the majority of individuals reported no change in tinnitus regarding most of the situations presented.

Data analysis showed that improvement and worsening factors were not influenced by sample components' age and gender ($p \geq 0.05$).

Table 2. Factors and habits of improving or worsening in tinnitus perception

Factor	Improving	Worsening	No change	Total	p
Silence	74 (10.2%)	471 (64.87%)	181 (24.93%)	726 (100%)	0.00*
Noise	263 (36.43%)	214 (29.64%)	245 (33.93%)	722 (100%)	0.00*
Nighttime	35 (4.84%)	446 (61.69%)	242 (33.47%)	723 (100%)	0.00*
Morning	136 (19.35%)	105 (14.93%)	462 (65.72%)	703 (100%)	0.00*
Fasting	5 (0.73%)	52 (7.61%)	626 (91.66%)	683 (100%)	0.00*
Diet	22 (3.18%)	23 (3.32%)	647 (93.5%)	692 (100%)	0.00*
Exercise	63 (9.49%)	90 (13.55%)	511 (76.96%)	664 (100%)	0.00*
Anxiety	5 (0.71%)	364 (51.63%)	336 (47.66%)	705 (100%)	0.00*
Rest	126 (17.70%)	172 (24.16%)	414 (58.14%)	712 (100%)	0.00*
Alcohol	10 (4.13%)	30 (12.4%)	202 (83.47%)	242 (100%)	0.00*
Cigarettes	8 (5.16%)	4 (2.58%)	143 (92.25%)	155 (100%)	0.00*
Ipsilateral cervical rotation	12 (1.64%)	58 (7.95%)	659 (90.39%)	729 (100%)	0.00*
Contralateral cervical rotation	17 (2.33%)	38 (5.21%)	673 (92.44%)	728 (100%)	0.00*

* $p \leq 0.05$ by t-Student test

DISCUSSION

In this study there was a predominance of female patients. This fact was also observed in other studies about tinnitus.^{1, 9, 10} Currently women have longer life expectancy and live on average eight years longer than men.¹¹ Moreover, they often seek more medical care than men, which explains the higher prevalence of women in this study.¹²

As to tinnitus perception amount of time, all patients reported a significant period, as they go to the outpatient clinic due to presenting chronic tinnitus. The average of 6.3 years is consistent with another study in which the authors have reported that most of their investigated individuals reported between five and 10 years of complaint¹³. Another research has found mean time higher than 8 years.¹⁴

With regard to tinnitus laterality, there was a predominance of bilateral tinnitus in agreement with several studies.^{3,9,15} In those subjects in which the symptom was unilateral, there was a predominance of the left ear in both genders, in agreement with previous studies.^{10,11} Other authors, however, found more patients with unilateral tinnitus on the right than on the left.¹³

The analysis of the situations that promote symptoms improvement or worsening has shown that silence and nighttime are the ones that most accentuate tinnitus perception. It is believed that this account given by patients can be assessed together. Nighttime is usually more silent, allowing the individual greater tinnitus perception. Moreover, according to the specialized literature, many individuals report sleep problems, which can cause them to give greater attention to the symptom, causing tinnitus to have a more intense and disturbing effect during the nighttime.^{9,16} Also, when in a completely quiet environment, even individuals who do not have tinnitus report perceiving it.¹⁷

With regard to environmental noise, we believed that, contrary to a silence situation, this would promote a vast majority of improvement reports in the perception of tinnitus. Although 35.73% of the individuals investigated have reported improvement, there was a similar number of patients who do not realize change in auditory sensation regarding environmental noise. A researcher reports that environmental sounds can mask tinnitus perception.¹⁸ It is believed that there was not an even greater predominance of subjects who perceive tinnitus improvement in the presence of noise due to the characteristics of the patients in the sample. As already reported, all patients evaluated have care in an outpatient clinic specializing in patients with chronic tinnitus and only those who report tinnitus for more than six months and intense discomfort caused by it are referred to such outpatient clinic. Moreover, the average time of symptom presence is high. Thus, it is believed that the characteristics of the patients evaluated have an influence on the results obtained, especially as regards to the improvement of the symptoms perception.

The data obtained also allow us to notice that anxiety was another factor that can promote tinnitus worsening, although a similar number of individuals reported that they do not notice changes when anxious. The connection between tinnitus and anxiety has been studied, as it seems that there is a relationship between these two factors¹⁹ and an association between this emotional factor and an increased severity of tinnitus.²⁰

The other factors surveyed, according to the individuals evaluated, do not promote improvement or worsening in tinnitus perception. Most of the patients evaluated reported no change in tinnitus with fasting or eating, for example. This data differs from the specialized literature because some studies indicate that reducing sugars and fats can promote positive changes in the inner ear and improvement of tinnitus, either by nutritional counseling or bariatric surgery.^{22,23}

Rest was not reported by patients as a factor for tinnitus improvement or worsening. As for previous studies, they have reported that stress can accentuate tinnitus²⁴ and relaxation and meditation techniques may be used in the treatment, with improvement in the discomfort caused by it.¹⁴ What happens is that such techniques were not used in the group evaluated, questioning only the effect of daily rest on tinnitus perception. Thus, it is believed that only rest period, without an active intervention, does not promote changes that are perceptible by most individuals.

Specifically with regard to physical exercises, results differ from the literature, as recent studies indicate that physical activity can help reduce tinnitus.^{25,26} In a study with elderly, it was found that tinnitus impact on elderly practitioners of physical exercise is less than for those not practicing.²⁵ Other authors have noted that higher levels of physical activity were significantly associated with lower levels of tinnitus severity, improved health and quality of life.²⁶ In this research, increased physical activity was strongly correlated with increased sense of control of tinnitus perception because exercises can distract patients, making them unaware of tinnitus.²⁶

Regarding cigarettes, 155 (20.89%) sample subjects reported smoking and from these 143 (92.25%) said that smoking would not change tinnitus perception. These findings differ from previous research conducted with adult smokers and nonsmokers, where it was noted that the smoking group had more complaints of tinnitus.²⁷ Moreover, doctors believe that 50% of tinnitus patients significantly improve when they stop smoking.²⁸ However, it is possible to think that for smoking subjects this brings a sense of comfort and relief from negative feelings.²⁹ Therefore, perhaps they do not associate a worsening of symptoms with its consumption.

Alcohol intake can also bring inconvenience to the inner ear and be one of the causes of tinnitus.³⁰ A study has investigated the effects of alcohol on tinnitus and found that 84% of the patients had worsening with alcohol and 49% reported worsening on the day after

drinking alcohol.³¹ The findings of such research are against with the present study, since the majority of patients interviewed said that alcohol would not change their tinnitus perception. These results were similar to another research with an elderly population that found that smoking and alcohol consumption were not significantly associated with tinnitus.³²

Finally, cervical rotation to the contralateral or ipsilateral sides to tinnitus has not promoted tinnitus improvement or worsening in most of the individuals. The maneuver can promote changes when tinnitus has a somatosensory origin³³, which does not occur in most patients evaluated in the outpatient clinic, as the main causes of tinnitus in the sample studied are presbycusis, hearing loss induced by noise and metabolic causes. Thus, in most cases there is an inner ear injury and there is no tinnitus improvement or worsening with head and neck movements.

CONCLUSION

In this study, there was a predominance of bilateral perception of tinnitus and the average time of perception was about six years in the study population. With the results obtained, the aspects of silence and nighttime were highlighted as the main factors worsening tinnitus perception, followed by anxiety, which proved to be a worsening factor for part of the sample. Environmental noise was the main factor of improvement in the subjects investigated.

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