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Social distance due to the Covid-19 pandemic: impacts on the perception of chronic tinnitus, anxiety, depression and relations

Distanciamento social pela pandemia de Covid-19: impactos na percepção do zumbido crônico, ansiedade, depressão e suas relações

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ABSTRACT

Purpose: To analyze the impact of social distancing, due to the COVID-19 pandemic, on the perception and nuisance with chronic tinnitus and the relationship of the findings with anxiety and depression. **Methods:** The sample was composed by convenience, including subjects aged 21 to 78 years. The evaluation was conducted in two periods: pre-distancing (late 2019) and during distancing (2020). The second evaluation was conducted online via Google Forms, consisting of the following procedures: Semistructured questionnaire, Tinnitus Handicap Inventory (THI), Beck Anxiety Inventory (BAI), and the Beck Depression Inventory (BDI). **Results:** In the comparison of the results of the procedures performed pre-social distancing and during social-distancing, a statistically significant difference was evidenced for the THI and the BAI, but not for the BDI. In the correlation of the perception of chronic tinnitus with anxiety, a statistically significant difference was observed, positive and strong, but not significant with depression. **Conclusion:** Social distancing, due to the COVID-19 pandemic, worsened the perception of and annoyance with chronic tinnitus and was correlated with an increase in anxiety symptoms.

Keywords: Tinnitus; Anxiety; Depression; Social isolation; Covid-19

RESUMO

Objetivo: analisar o impacto do distanciamento social devido à pandemia de COVID-19, sob a percepção e o incômodo com o zumbido crônico e a relação dos achados com a ansiedade e a depressão. **Métodos:** a amostra foi composta por conveniência, incluindo sujeitos com idades de 21 a 78 anos. A avaliação foi realizada em dois períodos: pré-distanciamento (final de 2019) e durante o distanciamento (2020). A segunda avaliação foi realizada de forma *online*, via *Google Forms*, consistindo nos seguintes procedimentos: questionário semiestruturado, *Tinnitus Handicap Inventory* (THI), Inventário de Ansiedade de Beck (BAI) e Inventário de Depressão de Beck (BDI). **Resultados:** nas comparações dos procedimentos entre os períodos pré e pós-distanciamento social, foi evidenciada diferença estatisticamente significativa para o THI e o BAI, mas não para o BDI. Na correlação da percepção do zumbido crônico com a ansiedade, foi observada diferença estatisticamente significativa, positiva e forte, mas não significativa com a depressão. **Conclusão**: o distanciamento social devido à pandemia de COVID-19 piorou a percepção e o incômodo com o zumbido crônico, estando correlacionado com aumento nos sintomas de ansiedade.

Palavras-chave: Zumbido; Ansiedade; Depressão; Isolamento social; COVID-19

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INTRODUCTION

Since December 2019, the world has been experiencing a delicate situation regarding the health of the population. The new Coronavirus (COVID-19), with the first cases reported in China, quickly spread to other countries, claiming thousands of victims and leading the World Health Organization (WHO) to declare a pandemic in March 2020[1].

It is known that the lethality of the new Coronavirus is lower than that observed in other viral conditions, however, the high transmission rate has led to an increase in the number of cases worldwide[2]. For this reason and because, at the beginning of the pandemic, there was no vaccination of the entire population or effective drug treatment to combat COVID-19, non-pharmacological measures, such as social distancing, were implemented[3]. Although social distancing measures demonstrate effectiveness in containing the spread of COVID-19[4], some impacts on the mental health of the population, mainly involving anxiety and depression, have been reported in the literature[5,6]. This fact becomes important, given that in addition to the direct impact of these psychological aspects on the well-being of individuals, they can also be aggravating or triggering factors for numerous symptoms, one of which is chronic tinnitus[7]. Tinnitus is a subjective symptom described in the literature as the perception of a "phantom" sound, which has negative consequences on the quality of life of individuals[8,9]. Among the triggering factors associated with the symptom, the emotional aspects have been investigated, with greater recurrence of anxiety and depression being evidenced in subjects who suffer from tinnitus than in the general population[10].

As mentioned above, COVID-19 has changed the world scenario in several ways, impacting the lives of the population. In that regard, understanding the consequences of such changes in symptoms such as chronic tinnitus becomes necessary, for the professionals in the field to be prepared to meet the post-pandemic demand. Given the above, the objectives of the present study were to analyze the impact of social distancing, due to the COVID-19 pandemic, on the perception and discomfort of chronic tinnitus and the relationship between symptoms and anxiety and depression.

METHODS

The casuistry of the present study was composed of adults and elderly people with complaints of chronic tinnitus, unilateral or bilateral, who had been treated at an Audiology Clinic. The sample calculation was performed taking into account an effect value of 0.3, significance of 0.5 and a power of 0.8. Based on these parameters, a value of 17 subjects was reached.

The participants were captured through a database of a survey carried out in 2019, in which at the end of the same year, before the Covid-19 pandemic period, were contacted to answer the Tinnitus Handicap Inventory (THI), Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) questionnaires. Then, in June 2020, the same individuals were contacted, during the period of social distancing, to answer the aforementioned questionnaires (THI, BAI and BDI), that were adapted to Google Forms due to the need for social isolation and, consequently, the restriction of attendance.

This study complied with all the guidelines contained in Resolution No. 466/12, being approved by the Research Ethics Committee of the institution of origin, under project number 96740718.4.0000.5346. Initially, all participants who agreed to participate in the study were informed about the risks, benefits and confidentiality of the data, signing the Free and Informed Consent Form (FICF), online.

As eligibility criteria, individuals should have answered the THI, BAI and BDI at the end of 2019, be literate, as well as have the possibility to access the material sent via Google Forms in June 2020. They should also be respecting the rules of social distancing, that is, leaving the house only to seek essential services. In this study, "essential services" were understood to be going to the supermarket and/or health services once a week at most. In addition, they could not, in the period between assessments, have presented symptoms and/or diagnosis of middle ear impairment, changes in location and/or type of tinnitus, self-reported changes in hearing acuity, having started a new treatment (pharmacological or therapeutic), as well as having been diagnosed with any illness of any origin (including COVID-19), so that there was no interference in the findings of this study, mainly in the perception of the symptom.

Initially, the individuals were contacted via e-mail and then a questionnaire was structured and applied in order to identify the eligibility criteria in the contacted individuals. Subsequently, the participants included in this research should answer the THI, BAI and BDI questionnaires based on what they had experienced in April, May and June 2020. It is worth mentioning that all the aforementioned material was transcribed into Google Forms and, before being sent to the individuals, it was reviewed by two specialist judges regarding its content.

Information regarding Pure-Tone Threshold Audiometry (PTTA) was collected from the database and individuals could not be reassessed due to the pandemic. However, it should be noted that the time between the audiological evaluation and the contact to participate in the research was around six months, excluding subjects who had self-perception of the progression of the loss, that is, who reported hearing worsening during this period.

In order to answer the research question, the following procedures were applied:

Semi-structured questionnaire: consisted of seven multiple-choice questions, in which individuals were instructed to read the questions and mark the alternatives with "yes", "no" or "sometimes". Thus, it was applied with the aim of measuring auditory self-perception, otological symptoms, treatments performed or diagnoses of diseases, as well as on tinnitus, mainly when changing its type and/or location.

Tinnitus Handicap Inventory (THI): applied in order to measure the discomfort caused by the symptom before and during the period of social distancing (SD). The individual was instructed to read the questions and mark which of the alternatives – "yes", "no" or "sometimes" – best corresponded to what he was feeling. Each alternative has a value to be scored, being that "no" corresponding to zero points, "sometimes" to two points and "yes" to four points. The THI result was calculated by adding the scores assigned to each question, generating a total score[11].

Beck Anxiety Inventory (BAI): applied to observe the intensity of anxiety symptoms. The subjects were instructed to read the 21 questions and indicate their response within a three-point scale: Absolutely not (zero points); Lightly (one point); Moderately (two points) and Severely (three points). The sum of the individual scores of each item results in a total score that can vary from zero to 63 points, generating a certain level of anxiety according to the value[12].

Beck Depression Inventory (BDI): tool used to identify probable cases of depression in non-clinical populations. As in the previous instruments, the individual had to read the 21 questions and mark their answers. The summed items result in a total score that can vary from zero to 63, generating different levels of depression[13].

It should be noted that, despite the existence of a qualitative classification for the results of the aforementioned instruments, in this research, only the raw scores were used, that is, the final numerical data for carrying out the comparison and correlation analyses. In addition, all individuals were literate, so, as in the first assessment, they were instructed to read the questions in the questionnaires and mark the corresponding alternative. In case of doubts, the evaluator was available via email.

After applying the instruments, the acquired data were allocated in an *Excel*® spreadsheet. Initially, the Shapiro-Wilk test was used to determine the distribution of the sample (normal or not). Then, data were analyzed regarding their normality, using the *SPSS 20*® software. From this analysis, using the same software, a comparison analysis was performed with the Wilcoxon non-parametric test, for the THI, BAI and BDI before and during the period of social distancing.

Finally, for the correlation analysis, the calculation of the difference in the THI, BAI and BDI score before and during the SD period was performed individually for each questionnaire. Thus, the relative difference in THI was correlated with the difference observed in BAI and BDI, using Spearman's non-parametric test. The accepted significance level was 5%, that is, $p<0.05$. The correlation was analyzed using the r value, considering: r= 0 to 0.19 (very weak); r= 0.20 to 0.39 (weak); r= 0.40 to 0.69 (moderate); r= 0.70 to 0.89 (strong); r= 0.90 to 1 (very strong).

RESULTS

In total, 42 individuals were contacted via Google Forms, however, only 19 responded to the materials and, as in the previous instruments, the individual had to read the 21 questions and mark their answers. Another three could not compose the sample due to eligibility criteria. Thus, the total sample of the study included 16 individuals, six males and 10 females, aged 21 to 78 years (mean of 51.75).

Regarding the hearing characteristics of the individuals, 37.5% (six individuals) had hearing thresholds within the normal range and 62.5% (ten individuals) had sensorineural hearing loss in the high frequencies.

For the perception of tinnitus, all participants (100%) reported perceiving the symptom continuously, five (31.25%) only in the left ear, two (12.5%) in the right ear and nine (56.25%) bilaterally. In terms of type, four individuals (25%) associated tinnitus with a whistle, nine (56.25%) with a cicada and three (18.75%) with a sizzle.

In the comparisons between the periods, for the THI, a statistically significant difference was evidenced (p=0.04) (Figure 1).

For the BAI, a statistically significant difference was also observed (p=0.03) (Figure 2).

As for the BDI, no statistically significant difference was observed (p=0.07) (Figure 3).

In the correlation between the perception of tinnitus and anxiety, it was evidenced that this was significant (p=0.02), positive and strong (r=0.89) (Figure 4).

As for the correlation between symptom perception and depression, this was not significant (p = 0.28) (r= 0.17) (Figure 5).

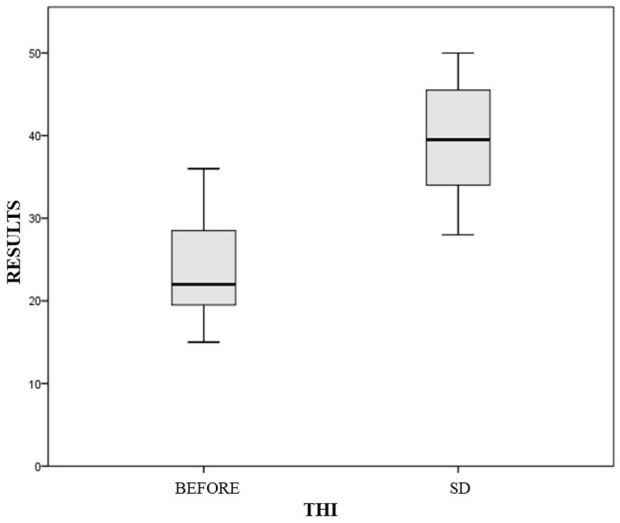

Figure 1. Tinnitus Handicap Inventory pre and during the period of social distancing (Wilcoxon test)
Subtitle: THI: Tinnitus Handicap Inventory; SD: period of social distancing

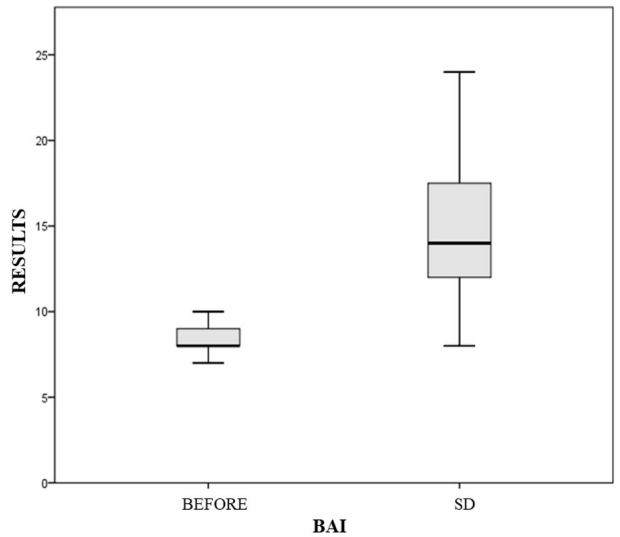

Figure 2. Beck Anxiety Inventory (BAI) before and during the period of social distancing (Wilcoxon test)
Subtitle: BAI: Beck Anxiety Inventory; SD: period of social distancing

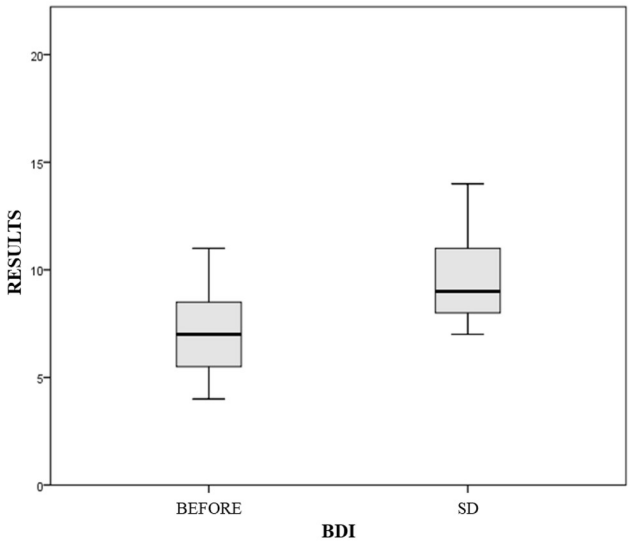

Figure 3. Beck Depression Inventory (BDI) Pre and during the period of social distancing (Wilcoxon test)
Subtitle: BDI: Beck Depression Inventory; SD: period of social distancing

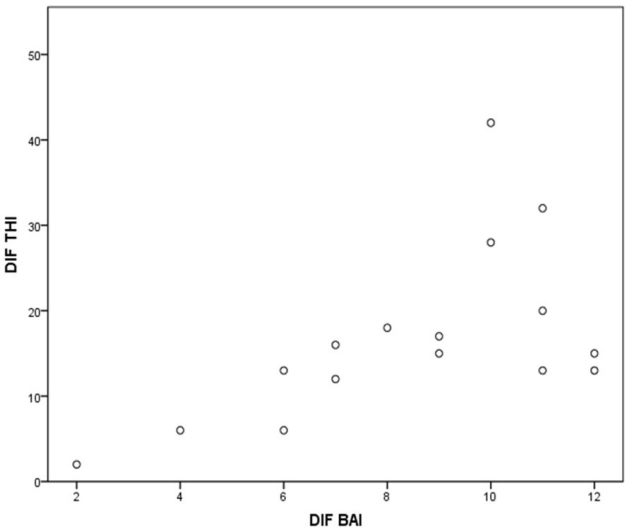

Figure 4. Correlation of the difference in the Tinnitus Handicap Inventory (THI) pre and during the period of social distancing with the difference in the Beck Anxiety Inventory (BAI) pre and during the period of social distancing (Spearman test)
Subtitle: BAI: Beck Anxiety Inventory; THI: Tinnitus Handicap Inventory; DIF: difference in questionnaire score before and during the period of social distancing

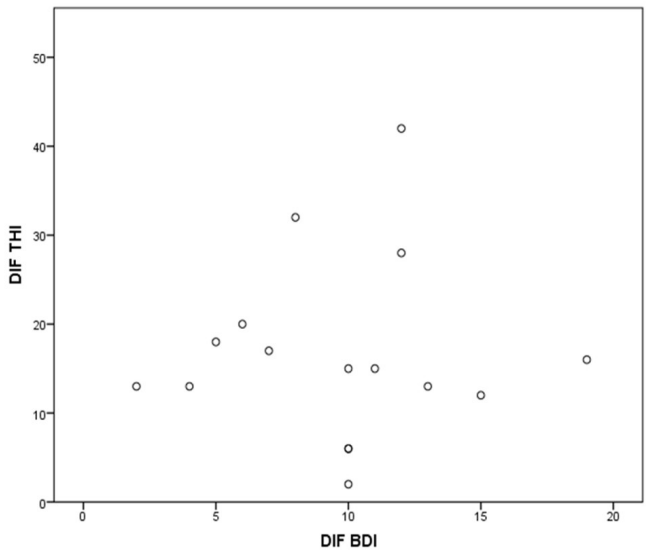

Figure 5. Correlation of the Tinnitus Handicap Inventory (THI) difference pre and during the period of social distancing with the difference in the Beck Depression Inventory (BDI) pre and during the period of social distancing (Spearman test)
Subtitle: BDI: Beck Depression Inventory; THI: Tinnitus Handicap Inventory; DIF: difference in questionnaire score before and during the period of social distancing

DISCUSSION

The theme of the present research is in full agreement with the present time, since in the context of the pandemic and social distancing, it is essential that health professionals understand the impacts of such aspects on the population, with the aim of developing effective coping strategies. With regard to the knowledge of Otorhinolaryngology and Audiology, studying the impacts of social distancing on chronic tinnitus becomes important, considering that the symptom has increased the demand for specialized health services.

Regarding THI, there was an increase in discomfort with the symptom during the period of social distancing. This finding corroborates a recent study, which also showed tinnitus worsening after this period[14]. Thus, the negative influence of social distancing on the daily lives of these individuals who already had the symptom is perceived.

Another study, with the objective of analyzing the perception of tinnitus in the face of environmental stressors caused by the pandemic, found an increase in the perception of the symptom, justifying that this is related to feelings of stress, mourning, frustration and nervousness perceived during the period of SD[15]. In this sense, it is also believed that the worsening observed in the present study may be related to concerns and uncertainties related to the pandemic, of which the specialized literature already lists emotional aspects as amplifiers of chronic tinnitus[16].

When comparing anxiety before and after the period of social distancing, it was possible to observe an increase in anxiety symptoms. This finding is consistent with another study, which also observed these changes[17]. In this sense, these results are justified due to the daily routine circumstances in times of a pandemic, which are potentiating triggers for emotional alterations[18]. However, no significant differences were observed between depressive symptoms between periods, but this is justified by the short SD time, making this inference possible due to the p-value being close to significance.

In the present study, it was possible to observe that the increase in anxiety symptoms worsened the perception of chronic tinnitus. This finding corroborates the finding of a recent systematic review, which aimed to observe the impacts of COVID-19 and SD on tinnitus, concluding that they are correlated. In addition, other studies also observed such aspects[19,20]. Thus, the findings described here are emphasized, so that the data from the present

study allow professionals to observe post-SD demands and have a more assertive management in the search for symptom remission.

No relationships were found between depression and tinnitus perception. This finding does not corroborate the specialized literature[21], but it is believed that the time between assessments may not have been relevant for the establishment of a depressive condition and, consequently, significantly influence the perception of tinnitus, since the brain neurochemical changes and functioning of neuronal circuits in areas of humor tend to require a longer time for behavioral manifestation.

However, the aforementioned finding does not exclude the possibility of the influence of depression on the perception of tinnitus, during social distancing. This is because, due to the unprecedented nature and simultaneity of distancing and social isolation in millions of people, some authors have pointed out that the consequences of this period should be even greater, and may also remain for a longer period of time[22,23]. The relationship between anxiety, depression and tinnitus is due to associative connections in the brain, mainly related to the limbic system, which in tinnitus, through a non-auditory pathway, is activated, causing negative emotional and physiological reactions to the symptom[24].

Finally, the present findings must be carefully considered by professionals in the tinnitus evaluation and treatment clinic, taking into account that the symptom, clinically, is a recurrent complaint, not only in those infected with COVID-19[19], but also by the population in general, due to the psychosocial consequences of the period of social distancing. Furthermore, it is suggested that other studies to be carried out, using a larger sample number and analyzing the impacts in a longitudinal design, allowing greater findings.

Study limitation

Despite the importance and originality of the study - to analyze the impacts of distancing and not of COVID-19 itself on tinnitus - the sample calculation was not fulfilled. Thus, the results obtained are reported to the sample, suggesting the development of other studies with a similar methodological design.

CONCLUSION

The social distancing, due to the COVID-19 pandemic, worsened the perception and discomfort with chronic tinnitus, being correlated with an increase in anxiety symptoms.

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