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Implications of using the Hearing Aids on quality of life of elderly

Implicações do uso do Aparelho de Amplificação Sonora Individual na qualidade de vida de idosos

ABSTRACT

Purpose: To evaluate through standardized questionnaires the quality of life of elderly people with hearing loss diagnosed with and without the use of hearing aids (HA) and elderly without hearing complaints. **Methods:** This is a cross-sectional study with non probabilistic sample, divided into three groups divided as follows: 30 elderly people with diagnosed hearing loss and indication for use of individual sound amplification devices (hearing aids), but have not yet made use of the prosthesis; 30 individuals with hearing impairment who used hearing aids and 30 elderly without hearing complaints. Participants completed a questionnaire investigating sociodemographic and family data, the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S) and the World Health Organization Quality of Life - Short version (WHOQOL-BREF). In addition to the descriptive analysis of the data were performed tests to compare the three groups by applying analysis of variance (ANOVA) and the Bonferroni post hoc test. **Results:** The three groups differed significantly in all domains of quality of life. The group of the elderly people with hearing loss diagnosed and with indication for the use of hearing aids presented lower scores and the group of the elderly with hearing disabilities that used the hearing aid and that the reference group. The AASI group presented the best quality of life results. **Conclusion:** The hearing loss affects the quality of life of the elderly. The effective use of hearing aid is beneficial to this population, improving their living and health conditions.

RESUMO

Objetivo: Avaliar, por meio de questionários padronizados, a qualidade de vida de idosos com deficiência auditiva diagnosticada que utilizam ou não a prótese auditiva (AASI) e de idosos sem queixa auditiva. **Método:** Trata-se de um estudo transversal, com amostra não probabilística, distribuída em três grupos divididos da seguinte forma: 30 idosos com perda auditiva diagnosticada e com indicação para uso do aparelho de amplificação sonora individual (AASI), mas que ainda não faziam uso da prótese; 30 idosos com deficiência auditiva que usavam o AASI; e 30 idosos sem queixa auditiva. Os participantes completaram um questionário que investigava dados sociodemográficos e familiares, o *Hearing Handicap Inventory for the Elderly Screening Version* (HHIE-S) e o *World Health Organization Quality of Life - versão breve* (WHOQOL-Breve). Além das análises descritivas dos dados, foram realizados testes para comparação dos três grupos, aplicando-se a análise de variância (ANOVA) e o teste *post hoc* de Bonferroni. **Resultados:** Os três grupos se diferenciaram significativamente em todos os domínios de qualidade de vida. O grupo de idosos com perda auditiva diagnosticada e com indicação para uso do AASI apresentou menores escores que o grupo de idosos com deficiência auditiva que usavam o AASI e que o grupo de referência. O grupo com AASI apresentou os melhores resultados de qualidade de vida. **Conclusão:** A perda auditiva afeta a qualidade de vida do idoso. O uso efetivo da prótese auditiva é benéfico a esta população, melhorando suas condições de vida e saúde.

Study conducted at the Department of Neurosciences and at the Department of Ophthalmology, Otolaryngology and Head and Neck Surgery, Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo – USP - Ribeirão Preto (SP), Brazil.

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INTRODUCTION

Since 1970, the Brazilian demographic profile has undergone important transformations arising from decreased rates of mortality and birth and increased life expectancy of the population, resulting in the phenomenon of population aging. In 1920, the elderly represented 4.0% of the country's total population; in 2010, 10.8% of the Brazilian population was aged over 60 years⁽¹⁾. Data from the Brazilian Institute of Geography and Statistics (IBGE) indicate a 23.8% increase in the elderly population by 2040. With this change in the population age structure, aging has become a widely studied theme^(1,2).

However, increased life expectancy and population aging also reflect a change in the morbidity and mortality profile, with an increase in situations that require chronic care⁽³⁾.

The aging process is progressive and degenerative, and is characterized by reduced functional efficiency, which is unavoidable and influenced by environmental factors⁽⁴⁾. There is a genetically programmed deterioration determined by biological rules such as the primary (when and how aging begins in an individual's life) and secondary (quality of life, lifestyle, caloric diet, physical activities) processes, which are associated with increasing age and personal control⁽⁴⁾.

Therefore, the elderly face physical limitations and disabilities and present a need for greater care⁽³⁾. In addition to physical impairments, cognitive and behavioral deficits are also common, resulting from a set of biological changes and neuropsychiatric factors such as depression and dementia, which may also be associated with advancing age. Prevalence of depressive symptomatology in the elderly is high⁽⁵⁾.

In the case of sensory functions, the five senses become less efficient with aging, interfering with the safety, daily activities, and overall well-being of individuals. With regard to hearing, a decrease in auditory acuity is observed⁽⁴⁾.

According to Mattos and Veras⁽⁶⁾, data from the Brazilian Demographic Census indicate a total of 24.5 million citizens with some type of disability; of these, 5.7 million are hearing impaired. Several studies indicate prevalence of hearing loss in individuals aged over 60 years compared with those in other age ranges^(7,8).

Natural aging of the auditory structures owing to biological aging is referred as the main cause of hearing loss among the elderly. This is called presbycusis⁽⁹⁾.

Presbycusis is an age-related hearing loss characterized by bilateral, symmetrical, progressive, neurosensory loss resulting from degeneration of the inner ear structures, which mainly affects high frequencies, making perception of speech sounds very difficult, especially in noisy environments. It is a multifactorial disorder which involves environmental and genetic factors^(8,10). The loss of this ability has a significant negative impact on the life of the elderly, and several studies associate hearing loss with social isolation, anxiety, depression, and cognitive decline in this population^(10,11).

The specific scientific literature reports that approximately one third of the elderly presents some type hearing difficulty and that only a small portion of these individuals use hearing aids (HA). Believing that it is not necessary, not getting used to it, and not being able to afford it are among the reasons given by the elderly for not using the device. This last argument can

be due to lack of knowledge about access to these prostheses via public health services, but the other justifications may be associated with the stigma of using a hearing aid or with the time required for reduction of the hearing impairment⁽¹²⁾.

Because of all the consequences that presbycusis brings to the life of elderly individuals, it is inevitable that this change interfere with their overall quality of life (QoL), and may cause frustration by the inability to understand what family and friends are saying; therefore, it becomes convenient for them to withdraw from situations that require communication⁽¹³⁾.

Oliveira et al.⁽¹⁴⁾ associated hearing loss in the elderly with cognitive decline, and observed that the higher the degree of hearing loss, the greater the cognitive deficit in these individuals. Therefore, identification of elderly individuals with hearing loss that present potential risk of developing cognitive alterations is fundamental, considering that early diagnosis enables intervention, avoiding or delaying, in some cases, the onset of dementia and/or depression processes, reducing family stress, risk of accidents, isolation, and the consequent harm to the QoL of these individuals.

Early indication, selection, and adaptation to HA, that is, immediately after the diagnosis of hearing loss, may contribute to prevent the degree of hearing loss from increasing, as well as to avoid other changes associated with psychosocial matters in the life of individuals with these alterations. Studies show numerous benefits to the elderly who make use of HA, minimizing the difficulties caused by hearing loss⁽¹⁵⁾.

In contrast, failure to use HA when indicated can lead to cognitive decline and culminate in dementia, resulting in decreased functional capacity of the elderly⁽¹²⁾.

Investigation on the impact of aging-related hearing impairment on the life of elderly individuals and on the effects of the use of HA on QoL and mood symptoms may contribute to increase knowledge about the psychosocial aspects of presbycusis and its rehabilitation, favoring audiological practice and comprehensive care for the elderly, providing healthy aging.

Therefore, the aim of the present study was to assess the quality of life of the elderly by comparing three groups: individuals diagnosed with hearing loss and indication for use of HA, but who did not use the prosthesis; individuals with hearing impairment who used HA; and individuals without hearing complaints.

METHODS

This is a cross-sectional study with a non-probabilistic sample distributed in three groups. The study was conducted after approval of the Research Ethics Committee of the Hospital das Clínicas, Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo - USP (process no. HCRP 7454/2013; CAAE 16526813.0.0000.5440). All participants were informed about the procedures and signed an Informed Consent Form prior to study commencement.

Participants were divided into three groups as follows: 30 elderly individuals diagnosed with hearing loss and indication for use of hearing aids (HA), but who did not use the prosthesis - HL Group (HLG); 30 elderly individuals with hearing impairment who used HA - HLHA Group (HLHAG); and 30 elderly individuals without hearing complaints - Control Group (CG).

All participants responded to a questionnaire on sociodemographic and family data, the Hearing Handicap Inventory for the Elderly - Screening Version (HHIE-S), and the World Health Organization Quality of Life - Short version (WHOQOL-BREF) with the assistance of a researcher.

The HHIE-S is a hearing loss screening instrument that provides information on individuals' restricted participation in activities of daily living (ADL) resulting from hearing impairment. It comprises ten questions divided into two scales (social/situational and emotional), each of them composed of five items⁽¹⁶⁾.

The WHOQOL-BREF was used to assess the quality of life (QoL) of the investigated individuals. This tool consists of 26 questions, of which two are general about QoL and the 24 remaining address four domains: physical health, psychological, social relationships, and environment⁽¹⁷⁾.

Participants in the hearing impaired groups (HLG and HLHAG) were recruited at the Hearing Rehabilitation and Research Outpatient Clinic of Hospital das Clínicas, Faculdade de Medicina de Ribeirão Preto, USP, based on the referrals of the speech-language therapists of this outpatient clinic. Data collection was performed at the clinic on the day of consultation.

Participants in the Control Group (CG) were recruited from the Associação de Professores Aposentados do Magistério Público do Estado de São Paulo (APAMPESP). The first contact was made by phone, from information provided by the association, or in person, on days that the associates were in the premises. Data collection was performed at the place of preference of the participants.

Completion of the instruments took approximately 40 minutes in all the groups. In addition to descriptive analysis, data from the three groups were compared by applying analysis of

variance (ANOVA) and the Bonferroni *post hoc* test using the SPSS 17.0 software. A significance level of 5% ($p < 0.05$) was adopted for statistical analyses.

RESULTS

The groups differed with respect to mean age, with the CG composed of younger elderly individuals and the HLG of older individuals. Gender distribution was also different in the three groups: in the HLG and HLHAG, most of the elderly presented lower schooling levels (up to the 4th grade of Elementary School), whereas in the CG, most individuals had College degrees (Table 1).

Most of the participants in the three groups were retired and engaged in other unpaid work activities, were catholic, and belonged to the B or C socioeconomic classes.

Restricted participation in activities of daily living (ADL) confirmed the differentiation between the three groups, with all participants in the HLG reporting significant perception of hearing loss and participants in the CG presenting no hearing complaints (Table 2).

Regarding QoL, the three groups differed significantly in all domains of the WHOQOL-BREF (Table 3).

Application of the Bonferroni *post hoc* test (Table 4) verified statistically significant differences between the HL and HLHA groups for all domains of the WHOQOL-BREF, namely, physical health ($p < 0.001$), psychological ($p < 0.001$), social relationships ($p < 0.001$), and environment ($p < 0.001$), as well as for overall QoL ($p < 0.001$). Difference was also observed compared with

Table 1. Sociodemographic profile of the study sample

Variable	HLG (N=30)		HLHAG (N=30)		CG (N=30)	
	Frequency	%	Frequency	%	Frequency	%
Mean age in years (±SD)	75.6 (8.6)		72.9(7.8)		70(7.2)	
Gender						
Female	14	46.7%	15	50%	24	80%
Male	16	53.3%	15	50%	6	20%
Schooling						
Illiterate/Incomplete Elementary School (up to 3 rd grade)	10	33.3%	11	36.7%	0	0%
Incomplete Elementary School (up to 4 th grade)	13	43.3%	9	30.0%	0	0%
Elementary School	1	3.3%	5	16.7%	0	0%
High School	3	10%	4	13.3%	0	0%
College	3	10%	1	3.3%	30	100%
Marital status						
Single	13	43.3%	12	40%	19	63.3%
Married	17	56.7%	18	60%	11	36.7%
Occupational status						
Employed/performing occupational activity with remuneration	4	13.3%	2	6.7%	2	6.7%
Unemployed/engaged in unpaid occupational activity	0	0%	0	0	2	6.7%
Retired	26	86.7%	27	90%	26	86.7%

*Socioeconomic data were grouped in A (A1 and A2), B (B1 and B2), C (C1 and C2), and D; no participants were classified as class E. Based on data from the Brazilian Association of Research Firms⁽¹⁸⁾

Caption: HLG = Hearing Loss Group; HLHAG = Hearing Loss with Hearing Aid Group; CG = Control Group

Table 1. Continued...

Variable	HLG (N=30)		HLHAG (N=30)		CG (N=30)	
	Frequency	%	Frequency	%	Frequency	%
Dwelling conditions						
Alone	4	13.3%	3	10%	7	23.3%
With family	26	86.7%	27	90%	23	76.7%
Religion						
Catholic	19	63.3%	22	73.3%	23	76.7%
Evangelical	4	13.3%	6	20%	4	13.3%
Spiritualist	3	10%	0	0%	3	10%
Others	4	13.3%	2	6.7%	0	0%
Presence of chronic disease						
Yes	20	66.7%	22	73.3%	8	26.7%
No	10	33.3%	8	26.7%	22	73.3%
Economic classification*						
Class A	0	0%	1	3.3%	3	10%
Class B	8	26.7%	15	50%	27	90%
Class C	16	53.3%	12	40%	0	0%
Class D	6	20%	2	6.7%	0	0%

*Socioeconomic data were grouped in A (A1 and A2), B (B1 and B2), C (C1 and C2), and D; no participants were classified as class E. Based on data from the Brazilian Association of Research Firms⁽¹⁹⁾

Caption: HLG = Hearing Loss Group; HLHAG = Hearing Loss with Hearing Aid Group; CG = Control Group

Table 2. Classification obtained in the Hearing Handicap Inventory for the Elderly - Screening Version (HHIE-S) according to groups

HHIE-S classification	HLG (n=30)		HLHAG (n=30)		CG (n=30)	
	Frequency	%	Frequency	%	Frequency	%
No handicap	0	0	22	73.3	30	100
Mild-to-moderate handicap	0	0	7	23.3	0	0
Significant handicap	30	100	1	3.3	0	0

Caption: HLG – Hearing Loss Group; HLHAG - Hearing Loss with Hearing Aid Group; CG – Control Group

Table 3. Means and standard deviations of the results on quality of life - World Health Organization Quality of Life - Short version assessment (WHOQOL-BREF) (N=90)

Domains	HLG (N=30) Mean (±SD)	HLHAG (N=30) Mean (±SD)	CG (N=30) Mean (±SD)	F	p
Physical Health*	55(9.0)	68.0 (8.3)	60.7(10.4)	14.917	0.000
Psychological*	54.3(10.6)	71.4 (10.2)	63.8(11.6)	18.764	0.000
Social Relationships*	62.8(13.3)	81.4 (13.6)	63.3(18.0)	14.731	0.000
Environment*	57.1(10.1)	74.0 (12.9)	68.8(12.8)	15.608	0.000
Overall Quality of Life *	57.3(7.4)	73.7 (8.6)	64.1(11.0)	24.311	0.000

*statistical significant difference (p<0.05)

Caption: HLG = Hearing Loss Group; HLHAG = Hearing Loss with Hearing Aid Group; CG = Control Group

Table 4. Bonferroni *post hoc* test applied to quality of life

Dependent variable	(I) Group	(J) Group	Mean difference (I-J)	Standard error of the mean	p	Confidence interval 95% (limits)	
						Lower	Upper
Physical Health	HLG	HLHAG	-12.976*	2.381	0.000	-18.789	-7.163
		CG	-5.714	2.381	0.056	-11.527	0.099
	HLHAG	CG	7.261*	2.381	0.009	1.449	13.075
		HLG	12.976*	2.381	0.000	7.163	18.790
	CG	HLHAG	-7.261*	2.381	0.009	-13.075	-1.449
		HLG	5.714	2.381	0.056	-0.099	11.527

*statistical significant difference (p<0.05)

Caption: HLG = Hearing Loss Group; HLHAG = Hearing Loss with Hearing Aid Group; CG = Control Group; QoL = Quality of Life

Table 4. Continued...

Dependent variable Domains	(I) Group	(J) Group	Mean difference (I-J)	Standard error of the mean	p	Confidence interval 95% (limits)	
						Lower	Upper
Psychological	HLG	CG	-9.444*	2.794	0.003	-16.264	-2.624
		HLHAG	-17.083*	2.794	0.000	-23.904	-10.263
	HLHAG	CG	7.639*	2.794	0.023	0.819	14.459
		HLG	17.083*	2.794	0.000	10.263	23.904
	CG	HLHAG	-7.639*	2.794	0.023	-14.459	-0.819
		HLG	9.444*	2.794	0.003	2.624	16.265
Social Relationships	HLG	CG	-0.556	3.901	1.000	-10.080	8.968
		HLHAG	-18.611*	3.901	0.000	-28.135	-9.087
	HLHAG	CG	18.056*	3.901	0.000	8.532	27.580
		HLG	18.611*	3.901	0.000	9.087	28.135
	CG	HLHAG	-18.056*	3.901	0.000	-27.580	-8.532
		HLG	0.556	3.901	1.000	-8.968	10.080
Environment	HLG	CG	-11.667*	3.093	0.001	-19.218	-4.116
		HLHAG	-16.875*	3.093	0.000	-24.426	-9.324
	HLHAG	CG	5.208	3.093	0.287	-2.343	12.759
		HLG	16.875*	3.093	0.000	9.324	24.426
	CG	HLHAG	-5.208	3.093	0.287	-12.759	2.342
		HLG	11.667*	3.093	0.001	4.116	19.218
Overall QoL	HLG	CG	-6.845*	2.361	0.014	-12.608	-1.083
		HLHAG	-16.386*	2.361	0.000	-22.149	-10.624
	HLHAG	CG	9.541*	2.361	0.000	3.779	15.304
		HLG	16.386*	2.361	0.000	10.624	22.149
	CG	HLHAG	-9.541*	2.361	0.000	-15.304	-3.779
		HLG	6.845*	2.361	0.014	1.083	12.608

*statistical significant difference ($p < 0.05$)

Caption: HLG = Hearing Loss Group; HLHAG = Hearing Loss with Hearing Aid Group; CG = Control Group; QoL = Quality of Life

the CG regarding the psychological ($p=0.003$) and environment ($p=0.001$) domains, as well as overall QoL ($p=0.014$). In all comparisons, the worst results concerning QoL were obtained in the HLG.

The HLHA and Control groups also differed with regard to the physical health ($p=0.009$), psychological ($p=0.023$), and social relationships ($p < 0.001$) domains and overall QoL ($p < 0.001$), always with better results in the HLHAG.

DISCUSSION

This study aimed to assess the quality of life (QoL) of the elderly by comparing three groups: individuals diagnosed with hearing loss and indication for use of hearing aids (HA), but who did not use the prosthesis (HL group - HLG); individuals with hearing impairment who used HA (HLHA group - HLHAG); and individuals with no hearing complaints (Control group - CG).

Hearing impairment not only limits the ability of individuals to perceive and discriminate sounds, but also directly influences their perception of language, affecting the socialization capacity of these individuals and their families⁽¹⁰⁾. These disabilities can generate social and psychological disorders which influence interpersonal and communication relations, depriving individuals of interacting with family and friends, leading to isolation and compromising their quality of life⁽¹⁹⁾.

Our results confirm the findings of other studies, which report that hearing impairment harms the QoL and may even increase the prevalence of dementia among the elderly⁽¹²⁾, considering that the CG presented higher scores in all domains of QoL compared with those of the HLHAG, with significant differences for the psychological and environment domains and for overall QoL.

In contrast, it is worth emphasizing that the HLHAG presented the best results in all domains compared with those of the other two groups (HLG and CG). This fact highlights the importance of using HA. It is possible that the discomfort and losses caused by the hearing disability are experienced so intensely that being able to listen again greatly rescues QoL, and possibly leads to a more positive attitude towards life and other health problems.

It should be considered that studies have shown that the incidence of decreased QoL is frequent among the elderly^(3,20,21), both with and without disabilities, however, the results of this study show that this dimension is much more affected in hearing impaired elderly individuals who do not use HA.

Some studies have demonstrated that the implantation of an auditory rehabilitation program and the use of HA can, in addition to minimizing psychosocial reactions, improve the QoL of the aged^(12,15,22).

Regarding the differences between the HLHAG and CG, it is worth considering that they can be explained in part by the

difference in the profile of these two groups. The CG presents a larger number of elderly individuals who live alone, do not have a partner, and are mostly female - conditions which favor the emergence of negative feelings and can influence personal perception of health and QoL. In this sense, some authors have reported that women face widowhood differently from men, being less likely to seek a new relation, which can be a contributing factor to depressive disorders; in contrast, men usually remarry⁽¹⁹⁾. It can be inferred that even individuals who have never had a partner are more vulnerable to depression and consequent decreased QoL, noting that older women are more prone to depression⁽²³⁾.

In contrast, the CG was composed of individuals with higher level of education, which tends to positively influence QoL. Some studies on the QoL of the elderly indicate that little schooling is associated with low QoL levels^(24,25). This could justify the lower QoL scores of the HLG, but not the higher results obtained by the HLHAG.

In view of these results, it is possible to infer that the use of HA favored better results for these elderly individuals, considering that improvement in participation in activities of daily living (ADL), indicated by the HHIE-S results, facilitates communication and interpersonal relationships in the environment in which they are inserted, thus improving their QoL.

Such finding highlights the importance of attention to hearing in the health care for the elderly, especially considering the high prevalence of hearing impairment in individuals within this age range⁽⁹⁾. In this context, it is necessary that the time elapsed between assessment and rehabilitation be short, so that the consequences of this disability can be minimized.

When considering the sample profile of this study, it is important to remember that the groups investigated differed not only with respect to level of hearing impairment, but also regarding age, gender, schooling, chronic illness, and socioeconomic class. The CG presented a younger profile compared with those of the other groups (mean age of 70 years, whereas mean age was 75 and 73 years in the HLG and HLHAG, respectively); had higher concentration of females (80%, compared to 46.7 and 50% in the HLG and HLHAG, respectively); presented all participants with College degree (whereas in the HLG and HLHAG most of the participants were illiterate or attended only Elementary School); had lower incidence of chronic disease (27%, compared to 66.7% in the HLG and 73.3% in the HLHAG); and presented socioeconomic distribution in classes A and B (whereas in the HLG and HLHAG the elderly individuals belonged to classes B, C, and D).

The higher incidence of chronic diseases in the HLG and HLHAG could be justified by the frequent association between little schooling and greater occurrence of chronic problems⁽²⁶⁾. These two variables (schooling and chronic disease) could also explain the decrease in QoL, which, however, did not occur in the HLHAG, which presented higher QoL scores than the other groups.

Despite the differences between the groups with hearing impairment and the control group, the profiles of the HLG and HLHAG correspond to those reported by other authors, which show higher incidence of hearing loss among individuals over

70 years of age⁽⁸⁾, as well as higher prevalence of this problem among men⁽²⁷⁾.

It is important to remember that the inclusion criterion for the CG was not to present hearing complaints. A limitation to the results of this study lies precisely in the fact that the CG was formed based on the self-report of hearing difficulty; however, studies show that the perception of restricted participation in ADL is an acceptable measure for hearing loss screening⁽¹⁶⁾.

Rosis et al.⁽¹⁶⁾, in a study that aimed to investigate the specificity and sensitivity of the HHIE-S questionnaire, verified that this is a good screening instrument, with high sensitivity and specificity, to be used in populations that do not necessarily present complaints related to hearing, which is the case of the CG in this study.

Calais et al.⁽²⁸⁾, in a study on the complaints and otological concerns of elderly individuals, evaluated 50 elderly patients with symmetrical, descending, audiometric configuration and verified that the hearing loss complaint was present in a large part of the sample (75% of the individuals), confirming that self-report is a valid measure for hearing loss screening. The HHIE-S has frequently been used to verify restricted participation in ADL in different studies investigating self-reported hearing loss in the elderly^(29,30).

Despite the limitations previously described, this study presented important results which strengthen the need to expand access to hearing rehabilitation among the elderly, as well as the access to information about the consequences of hearing impairment in their lives and where to seek assistance, considering the significant improvement in QoL presented by the group that had undergone speech-language pathology intervention (use of HA).

CONCLUSION

Hearing loss affects the quality of life of the elderly; however, the use of hearing aids by hearing impaired elderly individuals presents good results on their quality of life, with improvements in their living and health conditions, suggesting that hearing aids can have a significantly positive impact on the aging process overall.

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Author contributions

CZC and JCFS participated in the study design and planning of all its phases, they were also responsible for the writing and revision of the manuscript; CDS and CAUFQ participated in the data collection and writing and revision of the manuscript; MAH collaborated in the data analysis and writing and revision of the manuscript; PLS was the study adviser, she participated in the study design and writing and revision of the manuscript.