

# Emotional status and quality of life in older adults, pre and post use hearing aids

Estados emocionais e qualidade de vida em pessoa idosa pré e pós uso de dispositivos eletrônicos de amplificação sonora

Estados emocionales y calidad de vida en ancianos antes y después del uso de audífono

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## Abstract

**Introduction:** Hearing loss (HL), by impacting the auditory perception, affects socialization, and is related to emotional states and quality of life. **Objective:** To describe emotional states and quality of life of older adults with HL before and after the use of hearing aids (HA). **Method:** This is a descriptive, longitudinal study with a quantitative approach, consisting of a convenience sample of 20 older adults with HL (50% men), with a mean age of 75.8 years (SD = 8.5), who were in the process of adapting to the use of the HA, who answered the following instruments: Sociodemographic Data Questionnaire, Hospital Anxiety and Depression Scale (HAD) and Quality of Life in the Elderly (WHOQOL-OLD), before and after thirty days of HA use, by means of statistical comparison. **Results:** Comparatively, according to the two moments, there were improvements in the reduction of anxiety and depression scores with the use of HA, as well as an improvement in quality of life, especially in social participation. **Conclusion:** The use of HA was an improvement on the life of the older adults, through the reduction of depression and anxiety indicators, and has demonstrated superior scores in quality of life.

**Keywords:** Hearing Aids; Older adults; Quality of Life; Anxiety; Depression.

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## Resumo

**Introdução:** A deficiência auditiva (DA), ao impactar a capacidade de percepção auditiva, afeta a socialização, e está relacionada aos estados emocionais e qualidade de vida. **Objetivo:** Descrever estados emocionais e qualidade de vida de pessoas idosas com DA pré e pós uso do dispositivo eletrônico de amplificação sonora (DEAS). **Método:** Estudo descritivo, de corte longitudinal e abordagem quantitativa, composto por amostra de conveniência de 20 idosos com DA (50% homens), com média de idade de 75,8 anos (DP = 8,5), que estavam em processo de adaptação ao uso do dispositivo eletrônico de amplificação sonora - DEAS, que responderam aos instrumentos: Questionário de dados sociodemográficos, Escala Hospitalar de Ansiedade e Depressão (HAD) e Qualidade de Vida no Idoso (WHOQOL-OLD), pré e pós trinta dias de uso de DEAS por meio de comparação estatística. **Resultados:** Comparativamente, conforme os dois momentos, houve melhorias em redução de escore de ansiedade e depressão com o uso de DEAS, outrossim melhora da qualidade de vida, principalmente em participação social. **Conclusão:** O uso do DEAS demonstrou impacto positivo na vida da pessoa idosa, por meio da redução de indicadores de depressão e de ansiedade e demonstrou aumento nos escores de qualidade de vida.

**Palavras-chave:** Auxiliares de Audição; Pessoa Idosa; Qualidade de Vida; Ansiedade; Depressão.

## Resumen

**Introducción:** La hipoacusia, al impactar en la capacidad de percepción auditiva, afecta la socialización, y se relaciona con los estados emocionales y la calidad de vida. **Objetivo:** Describir los estados emocionales y la calidad de vida de ancianos con hipoacusia antes y después del uso de audífonos. **Método:** Estudio descriptivo, de corte longitudinal e abordagem quantitativa, composto por amostra de conveniência de 20 idosos com DA (50% homens), com média de idade de 75,8 anos (DP = 8,5), que estavam em processo de adaptação ao uso de audífonos, que responderam aos instrumentos: Cuestionario de datos sociodemográficos, Escala Hospitalaria de Ansiedad y Depresión (HAD) y Calidad de Vida en el Anciano (WHOQOL-OLD), antes y después de treinta días de uso, mediante comparación estadística. **Resultados:** Comparativamente, según los dos momentos, hubo mejoras en la reducción de las puntuaciones de ansiedad y depresión con el uso de audífonos, así como una mejora en la calidad de vida, especialmente en la participación social. **Conclusión:** El uso de audífonos ha demostrado un impacto positivo en la vida de los ancianos, a través de la reducción de los indicadores de depresión y ansiedad, y ha demostrado puntuaciones aumentadas en calidad de vida.

**Palabras clave:** Audífonos; Ancianos; Calidad de Vida; Ansiedad; Depresión.

## Introduction

Increasing advances in senescence care knowledge improve health and, therefore, quality of life<sup>1</sup>. Health issues resulting from age-related hearing loss (HL) can be linked to older people's social and family participation, which strongly determines and intervenes with the use of hearing technologies to integrate hearing in their biopsychosocial context<sup>1</sup>.

According to data from the World Health Organization (WHO), approximately 1.5 billion people have some degree of HL, of which 430 million have moderate to severe HL. This is a public health issue with specific intervention needs<sup>2</sup>, as HL can lead to difficulties in carrying out social activities, with a series of impacts and environmental challenges in this phase of life – such as in cinemas, theaters, and churches – caused by the decrease in speech perception in noisy environments<sup>3</sup>.

Hence, HL impacts the ability to auditorily perceive speech sounds, jointly influencing discursive aptitude and performance, cognitive processes, and language constructions of oral-verbal language – it markedly affects the socialization of people with HL, leading to isolation and compromising their emotional states and quality of life<sup>4</sup>.

According to the WHO<sup>5</sup>, quality of life is “an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”. From this perspective, estimating older adults' quality of life requires various biological, psychological, and socio-structural criteria because many elements are cited and studied as fundamental indicators of well-being in this life cycle, such as longevity, biological health, mental health, satisfaction, performance, effectiveness and permanence of cognitive skills, social skills, productivity, social status, income, continuity of family and occupational roles, and informal relationships with friends and family<sup>6</sup>.

There are cases in which the psychological consequences of HL can go beyond aspects of well-being, affecting the older person's mental health – including depression. This can occur due to social isolation since hearing well is an important requirement for social interaction<sup>7</sup>. Moreover, emotional reactions such as anxiety, depression, and hopelessness<sup>8</sup>, common clinical complaints, suggest an interprofessional approach, especially when hearing technology enables audi-

bility, providing the integration of hearing for the benefit of the biopsychosocial development of this population. Anxiety, loneliness, and lack of positive feelings are risk factors for depression<sup>9</sup>. It is known that older people tend to have high levels of anxiety, suffer from anticipation, and question their intellectual abilities. They can also produce a set of negative thoughts about themselves<sup>10,11</sup>, also interfering with the construction of auditory skills in central competencies such as memory, attention, and other positions that involve self-esteem<sup>8-11,16</sup>.

The speech-language-hearing auditory rehabilitation of HL and its socioemotional consequences involves using hearing aids (HA)<sup>12</sup>. Hearing-impaired individuals need to make frequent and consistent use of the HA to achieve better results, with communication strategies and auditory training, involving new possibilities of brain plasticity and management of social situations (e.g., environmental acoustics, interlocutors, and different audibility situations according to the perception of speech sounds).

When older adults wear HAs, they use technology to integrate hearing into their biopsychosocial development by amplifying mainly speech sounds, enabling them to use their residual hearing to minimize everyday limitations related to HL<sup>13</sup>.

The initial HA adaptation is impactful, as they establish the role of hearing in the social context and the understanding of the social role of audibility in daily routine<sup>4,6,12,14,15,18</sup>. The impact of using these hearing technologies involves, for instance, self-knowledge about the difficulties experienced and new perspectives regarding the acceptance of the auditory sensory deprivation condition. This first moment is characterized by challenges with handling/placing the HA and the acclimation of neural connections<sup>21,26-29</sup>.

The use of sound amplification is a means of reducing or correcting the cognitive and psychological effects of HL, improving quality of life and mental health<sup>14</sup>. The entire process of adapting hearing technology should not be based solely on auditory perception assessments and tests. It is necessary to value the patient's judgment, acceptance, benefits, and satisfaction with its use<sup>15</sup>.

Therefore, it is important to understand and highlight the socioemotional aspects of older people's rehabilitation through HAs to direct appropriate intervention strategies. Hence, this study aimed to describe the emotional state and quality

of life of older people with HL before and after using HAs.

## Method

The study was approved by the Research Ethics Committee under protocol no. 4.478.183. This descriptive, quantitative study had a convenience sample of 20 older adults with HL who spoke oral-verbal Brazilian Portuguese and were adapting to HA use, before and after 30 days. This period is known to comprise the acclimatization, tending to continue strongly for approximately 90 days, adjusting for better fitting audibility. Instrument application was limited to this short period because it is part of the service's routine, prioritizing the same professional to reapply them. It considers the particularities of the instruments, also raising awareness and guiding rehabilitation since the diagnosis to integrate hearing with socioemotional determinants of older people's routines.

The following sample eligibility criteria were checked and controlled for this study: (a) being 60 years or older (i.e., an older person in a developing country, as defined by the WHO); (b) having mild to severe acquired symmetrical sensorineural HL; (c) being candidates for using HAs and being in the initial process of HA use at the beginning of the research; (d) not having evident or self-reported cognitive or psychiatric impairments. Effective use was defined as using the HA for at least 8 hours a day, according to the data recorded by the HA algorithm. All HA selection, fitting, and adjustment procedures were carried out according to the regulations and recommendations of national and international scientific bodies and the Brazilian Hearing Health Regulation. Goals were progressively achieved, assiduously recording, for instance, techniques applied to control the maximum output level and measures to verify the achievement of prescriptive assurance targets, through the NAL/NL2 prescriptive method. Amplified speech audibility was verified with a Speech Intelligibility Index (SII) greater than or equal to 50%. Participants were assisted by a private company that offers specialized speech-language-hearing audiology services.

The instruments applied included a questionnaire on sociodemographic and clinical data, characterizing participants in terms of age, sex, place of birth, marital status, education, occupation, comorbidities, previous surgeries, medications in use, and audiological clinical data.

The study also applied the Hospital Anxiety and Depression Scale (HADS)<sup>16</sup>, which briefly assesses symptoms of anxiety and depression, excluding somatic ones. The scale was initially developed to assess these symptoms in patients admitted to a general hospital, without psychiatric indicators. The HADS contains 14 items, of which seven assess anxiety (HADS-A) and seven assess depression (HADS-D). Each item can be scored from 0 to 3, reaching a maximum score of 21 points per subscale, as follows: 0-7 points: normal; 8-11 points: borderline abnormal (borderline case); and 12-21 points: abnormal (case).

Furthermore, the Quality of Life in Old Age (WHOQOL-OLD)<sup>17</sup> was applied to assess older people's quality of life in the following domains: sensory abilities; autonomy; past, present, and future activities; social participation; death and dying; and intimacy. This is the older people's version of the WHO's questionnaire widely known as WHOQOL. It has 24 items answered on a Likert scale ranging from 1 to 5. Each domain has four items, with scores ranging from 4 to 20. The sample size was calculated based on the average monthly number of participants who acquired HAs and, therefore, could be included in the sample and evaluated at the two moments. Data collection took 6 months.

IBM® SPSS® Statistics, version 24, was used for all data analyses. The instruments were described in frequency, percentage, minimum, and maximum values, median, mean, and standard deviation of the variables of interest – anxiety, depression, and quality of life – at the two assessment moments. The Wilcoxon test compared the HADS before and after evaluations. Student's paired samples t-test compared the WHOQOL-OLD before and after evaluations. The alpha level of significance was set at 5%.



## Results

The collected data characterized the sample, consisting of 20 older adults, aged 60 to 89 years ( $M = 75.8$ ;  $SD = 8.5$ ). The sample was evenly distributed between men and women, and most of them were married (60%). Table 1 presents the sample's sociodemographic and clinical characterization data.

Regarding clinical characteristics, all of them had comorbidities and were taking medication. Nevertheless, the majority reported perceiving their health as good (70%). Also, most of the sample had moderate HL (85%).

Anxiety and depression indicators were obtained with the HADS. Table 2 describes the indicators before and after using HAs, showing the predominance of the "normal" classification for anxiety and depression in both analysis moments.

Quality of life was measured with the WHO-QOL-OLD. In descriptive terms, "intimacy", "past,

present, and future activities", and "autonomy" had the highest means, both before and after using HAs. When they began HA use, "social participation" also stood out (Table 3).

The inferential statistical analysis applied to the data regarding indicators of emotional state – i.e., symptoms of anxiety and depression and quality of life before and after using HAs – verified significant changes in some indicators (Tables 4 and 5). The negative positions in Table 4 indicate that HADS values for anxiety and depression were lower after using HAs – significantly lower in the case of the depression indicator.

Table 5 shows the significant difference in the means of the quality-of-life domains before and after using HAs. There was significance in "sensory abilities", "autonomy", "social participation" and overall score – all of these with higher means after using HAs.

**Table 1.** Sociodemographic characterization and audiological data of the sample.

Variables	Values		
	n	%	
<b>Sex</b>	Females	10	50
	Males	10	50
<b>Place of origin</b>	Espírito Santo	14	70
	Other states	6	30
<b>Marital status</b>	Married	12	60
	Widow(er)	6	30
	Divorced	2	10
<b>Profession</b>	Retired	16	80
	Stay-at-home partner	1	5
	Others	3	15
<b>Occupation</b>	None	9	45
	Seamster/seamstress	5	25
	Medical office assistant	1	5
	Construction	2	10
	Woodworker	1	5
	Administrator	1	5
	Mechanic	1	5
<b>Comorbidities* (n = 28)</b>	Diabetes	11	39.3
	High blood pressure	11	39.3
	Cholesterol	2	7.1
	Others (asthma, hyperthyroidism, changes in uric acid metabolism, and Parkinson's disease)	4	14.3
<b>Previous surgery* (n = 21)</b>	None	12	57.1
	Cataract	4	19
	Others (spinal disc herniation, skin cancer, myoma, prostate cancer, angioplasty)	5	23.9
<b>Medication use</b>	Yes	20	100
	No	0	0
<b>Degree of hearing loss</b>	Mild	1	5
	Moderate	17	85
	Severe	2	10
<b>Hearing aid use</b>	Unilateral	9	45
	Bilateral	11	55
<b>Health perception</b>	Very poor	0	0
	Poor	1	5
	Good	14	70
	Very good	5	25

Note: Variables marked with (\*) had varying total values, as participants provided more than one answer.

**Table 2.** Indicators of anxiety and depression before and after using HAs, measured with the Hospital Anxiety and Depression Scale (HADS) (N = 20)..

		<b>Anxiety and depression indicators</b>	<b>n</b>	<b>%</b>
HADS-A	Before	Normal	16	80.0
		Borderline abnormal (borderline case)	3	15.0
		Abnormal (case)	1	5.0
	After	Normal	18	90.0
		Borderline abnormal (borderline case)	2	10.0
		Abnormal (case)	0	0.0
HADS-D	Before	Normal	14	70.0
		Borderline abnormal (borderline case)	5	25.0
		Abnormal (case)	1	5.0
	After	Normal	19	95.0
		Borderline abnormal (borderline case)	1	5.0
		Abnormal (case)	0	0.0

Note: HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression.

**Table 3.** Descriptive data on quality of life, measured with the Quality of Life in Old Age (WHOQOL-OLD) before and after using HA (N = 20).

		<b>Minimum</b>	<b>Maximum</b>	<b>Median</b>	<b>Mean</b>	<b>Standard deviation</b>
Sensory abilities	Before	1.50	4.00	2.75	2.88	0.75
	After	1.75	4.25	3.50	3.36	0.71
Autonomy	Before	3.00	5.00	4.00	3.93	0.53
	After	3.25	5.00	4.00	4.03	0.49
Past, present, and future activities	Before	2.25	5.00	4.25	4.01	0.72
	After	2.25	5.00	4.25	4.16	0.61
Social Participation	Before	2.75	4.50	3.75	3.73	0.59
	After	3.00	4.75	4.25	4.01	0.56
Death and dying	Before	1.75	4.75	3.50	3.36	0.99
	After	1.75	4.75	3.38	3.35	0.98
Intimacy	Before	1.50	5.00	4.63	4.13	1.10
	After	1.75	5.00	4.63	4.23	0.96
Overall	Before	2.33	4.25	3.81	3.62	0.54
	After	2.83	4.38	4.04	3.81	0.51

**Table 4.** Comparison of anxiety and depression indicators measured with the Hospital Anxiety and Depression Scale (HADS) before and after using hearing aids.

		<b>HADS difference before and after</b>	<b>n</b>	<b>p-value*</b>
HADS/Anxiety (after) – HADS/Anxiety (before)		Negative Positions	3	0.250
		Positive Positions	0	
		Ties	17	
HADS/Depression (after) – HADS/Depression (before)		Negative Positions	6	<b>0.031</b>
		Positive Positions	0	
		Ties	14	

Note. Wilcoxon test; significant when  $p < 0.05$ . The positions refer to the difference between values obtained after and before using HA. HADS = Hospital Anxiety and Depression Scale.



**Table 5.** Comparison of the perception of quality of life measured with WHOQOL-OLD before and after using HA, for anxiety and depression.

		Mean	Standard deviation	p-value*
Sensory abilities	Before	2.88	0.75	< 0.001
	After	3.36	0.71	
Autonomy	Before	3.93	0.53	0.042
	After	4.03	0.49	
Past, present, and future activities	Before	4.01	0.72	0.076
	After	4.16	0.61	
Social Participation	Before	3.73	0.59	0.001
	After	4.01	0.56	
Death and dying	Before	3.36	0.99	0.330
	After	3.35	0.98	
Intimacy	Before	4.13	1.10	0.176
	After	4.23	0.96	
Overall	Before	3.62	0.54	< 0.001
	After	3.81	0.51	

Note. Student's paired samples t-test; significant when  $p < 0.05$ .

## Discussion

This study analyzed the impact of HA use on emotional state through indicators of anxiety, depression, and quality of life in hearing-impaired older adults before and after using HAs. These parameters evaluate the benefits of using hearing technology, from the first moments of adaptation to HAs, and are relevant to raise awareness and measure the impact of rehabilitation. This approach was based on the recognition of the impacts of HL on older adults' psychosocial life and on the fact that using hearing technology can motivate them and significantly improve their quality of life by minimizing their HL and facilitating their communication<sup>18</sup>.

Older people's engagement and understanding, according to their needs and aligned with the prescriptive methods of hearing technologies, are built in rehabilitation since the audiological diagnosis to provide assertive and individualized audibility<sup>14</sup>. This study did not attempt generalizations because of the few sample participants and the limitation of applying the instruments in a short interval due to the service's workflow. However, it allowed inferential statistical analyses. Biopsychosocial factors of hearing (e.g., emotional state and quality of life) must be understood to monitor the HA adaptation process through instruments that measure indicators and markers of hearing.

The sociodemographic data indicated that 60% of the participants were married. It has been

suggested that the need to use hearing technology is more commonly perceived when complaints are mapped and monitored by a partner. Nonetheless, studies have found indicators of the role of family resilience – i.e., despite recognizing that HL interferes with communication, there are satisfactory indicators of resilience, contributing to family functioning<sup>19</sup>, according to patient-centered care.

This aspect has a favorable connotation, although characteristics of the sample, such as most of them being retired and having no occupation, may increase their vulnerability to mental health and pose challenges for integrating hearing with less exposure to social interaction. In the case of women, vulnerability can be perceived in their greater risk of developing anxiety disorders when compared to men<sup>20</sup>.

The analysis of older adults' emotional state in this study, obtained with HADS-A and HADS-D before HA use, reveals scores for indicators of depression and anxiety not characterized as clinical risk levels – despite the psychological impacts of HL commonly referred to in the literature<sup>21,24,26-28</sup>, such as depressive symptoms. This population's social context allows them to seek and access rehabilitation with HA, which may have contributed to a more favorable self-perception and ongoing care of their emotional symptoms.

Although non-clinical levels of anxiety and depression were observed before HA use, these indicators were even lower for anxiety and, especially, for depression after they used it, with a statistically



significant decrease. Other studies have reported such findings, reinforcing that HA use improves older people's emotional state<sup>1,3,4,6,12,13,18,21,24,26-28</sup>. Adequate adaptation includes everything from the guidance and programming for the patient to use HA effectively, generating auditory benefits, and minimizing the difficulties and emotional symptoms caused by HL<sup>21-24</sup>.

Research on depression in older adults with HL is still scarce, but studies in the general population show that middle-class and lower-middle-class older people have a higher incidence of these indicators<sup>10</sup>. On the other hand, other authors have reported less consistent or weak relationships between HL and depression in older people, which may be attributed to emotional adaptation to HL, varying from person to person through a set of psychological and social processes<sup>23</sup>.

The results show that after using HA, older people report better quality of life, implying the importance of good adaptation. This positive outcome confirms the relevance of auditory rehabilitation to improving the participants' quality of life, as in another study<sup>24</sup>. Analyzing the WHOQOL-OLD instrument, there was a significant improvement in "social participation", indicating that individuals participated more actively in groups, with better integration into society, avoiding social isolation<sup>(22-24, 26)</sup>.

Timely HL diagnosis and intervention, as early as possible, are essential for a good quality of life for older people. Studies and research in this area point to the possibility of a functional change based on brain plasticity, even in the case of adults and/or older adults<sup>12</sup>. The results indicate a significant improvement in the overall quality of life after using HAs for some time, highlighting the importance of amplification and referring users to adaptation programs and communication strategy training<sup>(12,15)</sup>.

Providing older adults with the opportunity to use hearing technologies in their daily lives means dealing with social restrictions and the deprivation of audibility. Sources of information and communication in their routine are known to be responsible for keeping them active in society<sup>22</sup>.

This study highlighted the strengthening of auditory rehabilitation by applying instruments such as the HADS in patients with HL to understand the particularities of patient-centered care, raise awareness, and promote the patients' knowledge of their quality of life.

It also showed that anxiety should be assessed before HA use as a guide to help monitoring, especially in research, future needs, and questions regarding necessary HA adjustments.

This study has limitations related to sample size and group composition based on specific sociodemographic characteristics of the private network. Nevertheless, it indicates that future studies should include such indicators (emotional state before using hearing technology) since HL diagnosis, impacting comprehensive care.

This study highlights the integrated work of the Hearing Health Network concerning information about patients and services that seek good interprofessional work practices, sensitive to the intervening factors of the biopsychosocial role of hearing. Hence, guidelines are continually established for older adults, allowing them to participate in social activities, integrate into their families, and improve their quality of life.<sup>25,26</sup>

## Conclusion

HA use had a positive impact on the lives of older people with HL, reducing depression and anxiety indicators, and increasing quality-of-life scores. Instruments for screening emotional state and quality of life since diagnosis and in the initial moments of HA use can reinforce awareness of person-centered care, integration of hearing into the biopsychosocial context, and impact rehabilitation decisions.

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