

RESEARCH

Open Access



Quality of life and psychological distress in older adults with hearing loss attending outpatient clinics

Mehdi Feyzi¹, Marjan Haghi¹, Zhale Zandieh¹, Maryam Niksolat² and Vahid Rashedi^{1*} 

*Correspondence:

Vahid Rashedi
vahidrashedi@yahoo.com;
vrashedi@uswr.ac.ir

¹Department of Aging, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

²Department of Geriatric Medicine, Geriatric Mental Health Research Center, Firoozabadi Clinical Research Development Unit (FACRDU), School of Medicine, Iran University of Medical Sciences, Tehran, Iran

Abstract

Background Hearing loss is one of the most prevalent challenges of aging, often leading to diminished quality of life (QOL) and heightened psychological distress. This study aims to explore the relationship between psychological distress and QOL in older adults with hearing loss attending outpatient clinics in Tehran, in 2024.

Methods This cross-sectional descriptive-analytical study included adults aged 60 years and above with hearing impairment who sought care in outpatient clinics. Hearing loss was assessed using the whisper test, while data on psychological distress and QOL were gathered using the Kessler Psychological Distress Scale (K10) and the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S). Demographic data were also collected using a structured questionnaire.

Results The study included participants with a mean age of 72 ± 5.9 years, comprising 53.3% males. Age demonstrated a moderately strong positive correlation with both QOL ($r = 0.550, p < 0.001$) and psychological distress ($r = 0.383, p < 0.001$). In contrast, educational attainment was inversely associated with QOL ($r = -0.351, p < 0.001$), though no significant relationship was found between education and psychological distress ($r = -0.008, p = 0.594$). Neither QOL nor psychological distress exhibited statistically significant associations with gender or cohabitation status ($p > 0.05$). Notably, a robust positive correlation emerged between psychological distress and QOL ($r = 0.606, p < 0.001$), suggesting a nuanced interdependence between these factors in older adults with hearing loss.

Conclusion The findings underscore the need for targeted interventions to mitigate the effects of hearing loss on psychological well-being and QOL among older adults. Future research and comprehensive programs focusing on hearing health could significantly enhance this vulnerable population's mental and emotional well-being.

Keywords Older adults, Hearing loss, Quality of life, Psychological distress, HHIE (Hearing handicap inventory for the elderly)



1 Introduction

Aging is a process that leads to physiological, social, and psychological changes in a person. According to the World Health Organization (WHO), most countries define the calendar age of 65 as the beginning of old age [1, 2]. Improvements in health care, advancements in treatment methods, effective mortality reduction strategies, birth control policies, and increased life expectancy have contributed to a significant rise in the older adult population. It is projected that by 2050, the number of older adults will surpass that of the youth population [3]. According to the WHO, the proportion of the global population aged 60 and over is expected to rise from 12% in 2020 to 22% by 2050 [4]. Given the increasing growth rate of the older population, there is a significant concern regarding providing adequate services to meet their needs [5].

Hearing loss is the third most common health issue in older adults, following hypertension and arthritis [6]. In a population-based study by Rashedi et al., hearing loss was identified as the most prevalent disability among older adults, affecting 68% of participants. This highlights the critical need for addressing hearing-related issues in this age group [7]. Hearing impairment in older adults is associated with a range of consequences such as reduced independence, increased fall risk, depression, loneliness, cognitive decline, and a lower quality of life (QOL) [8].

QOL is a broad and multidimensional concept reflecting an individual's perception of their physical and mental health, social relationships, environmental conditions, and life satisfaction. As defined by the WHO [9, 10]. Numerous studies have explored the QOL in older adults, particularly emphasizing the impact of hearing loss [11]. According to the studies conducted, the QOL of Iranian older adults is average [12]. While no one questions the benefits of increased life expectancy, the growing population of older adults imposes significant health and treatment costs on individuals, families, and society as a whole [13]. This may lead to a decrease in the QOL of older adults [14].

Hearing loss also impairs a person's ability to communicate with others and causes psychological distress [15]. Psychological distress refers to a state of emotional disturbance characterized by feelings of anxiety, such as restlessness, and symptoms of depression, such as hopelessness. During studies of psychological distress in hearing-impaired older adults, it has been reported that they are more vulnerable to mental problems such as depression, aggression, and emotional sensitivity [16]. Older adults who have mental problems, such as depression are also more vulnerable to a decrease in QOL [17].

Building on the foundation of existing literature and prior research, this study seeks to investigate the intricate relationship between psychological distress and QOL among older adults experiencing hearing loss. Specifically, the research will focus on individuals attending outpatient clinics in Tehran during the year 2024. By examining this underexplored dynamic, the study aims to shed light on how hearing impairment impacts mental well-being and overall life satisfaction in an aging population, thereby contributing valuable insights to both clinical practice and gerontological research.

2 Methods

2.1 Participants

This cross-sectional study aimed to examine the relationship between psychological distress and QOL in older adults with hearing loss attending outpatient clinics. The study population included all hearing-impaired older people referred to outpatient clinics in

Tehran in 2024. The sample size of this study according to previous studies [15] using G-Power software and considering: an effect size = 0.25, $\alpha = 0.05$, and Power = 0.95, 164 people were obtained, considering a 10% sample drop, 180 people were included in the study. In this descriptive-analytical study, hearing-impaired older adults were selected using the convenience sampling method. Participants were eligible to participate in the study if they were aged 60 years or older, who had been diagnosed with hearing loss for at least six months based on the Whisper Test (to enhance the accuracy and sensitivity of the Whispered Voice Test, we ensured consistent test conditions by controlling factors such as whisper intensity, examiner experience, and the distance between the examiner and the patient. Experienced practitioners conducted the tests, maintaining a uniform distance of 2 feet and using a standardized whisper volume. The test primarily focused on consonants, which are more challenging to detect in cases of high-frequency hearing loss, and we acknowledge that this could lead to potential underestimation of high-frequency hearing impairments, commonly observed in presbycusis.), were able to communicate fluently in Persian, and provided informed written consent. Individuals were excluded if they had severe cognitive impairment or dementia (based on clinical records or judgment), suffered from acute psychiatric disorders such as schizophrenia or bipolar disorder, were in terminal stages of illness or under palliative care, or were unable to complete the study questionnaires either independently or with assistance.

After obtaining the necessary permits, the researcher visited clinics in Tehran to identify potential participants. It is important to note that all procedures and the completion of questionnaires were conducted by the researcher personally.

2.2 Data collection

2.2.1 Questionnaires

Demographic information was gathered using standardized questionnaires. Demographic data about age, gender, marital status, coexistence situation, and education were collected. Data on psychological distress and QOL were gathered using the Kessler Psychological Distress Scale (K10) and the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S).

2.2.2 Hearing handicap inventory for the elderly screening version (HHIE-S)

This study utilized the Hearing Handicap Inventory for the Elderly (HHIE) to assess the QOL among hearing-impaired older adults. The original 25-item version of the HHIE was developed by Ventry et al. in 1982. A shortened version, known as the HHIE-S, consists of ten items—five focused on social or situational aspects and five addressing emotional responses [18]. This tool is used for early detection and screening of hearing impairment in older adults [19]. Individual questions are scored as yes (4 points), sometimes (2 points), or no (0 points). Therefore, scores on the HHIE-S range from 0 (no impairment) to 40 (maximum impairment) [20].

A score of 0 to 10 indicates no disability or partial disability, a score of 12–24 indicates mild to moderate disability, and 26 to 40 indicates severe disability [21]. Based on the research conducted by Silveira et al., we have concluded that there is an inverse relationship between the degree of hearing disability and the QOL in older adults, as measured by the HHIE-S questionnaire. Specifically, higher scores on the HHIE-S indicate a greater degree of hearing impairment and correspond to a lower QOL. A score

above 8 suggests a low QOL, while a score below 8 indicates a high QOL [22]. The tool demonstrated robust internal reliability, as evidenced by Cronbach's alpha coefficients ranging from 0.78 to 0.91, indicating strong consistency across its measures [23]. This consistency has also been confirmed in the Iranian population, where Faraji et al. (2013) reported strong correlations between the HHIE/HHIE-S scores and the degree of hearing loss [24]. Furthermore, the questionnaire's validity and reliability were rigorously established by Behboodi et al. in a 2022 study conducted in Iran, where it underwent comprehensive validation procedures to ensure its applicability and accuracy within the target population [25].

2.2.3 Kessler psychological distress scale (K10)

The Kessler Psychological Distress Scale (K10) was used to collect data related to psychological distress. This questionnaire was created in 1992 by Ronald Kessler and colleagues, which evaluates the two spectrums of depression and anxiety and has 10 questions [26]. The questions of the K10 questionnaire show the negative emotions that the participants have experienced in the last four weeks and before the interview and measure the level of psychological distress in low and high levels [26]. For each section of the K10 questionnaire, respondents indicate how long they have experienced specific problems. The response options are: never, very little, sometimes, most of the time, and always. In this scoring system, a score of one is assigned to "never," while a score of five is assigned to "always." The scores from all ten items are then summed together. The total score ranges from a minimum of 10 to a maximum of 50. Low scores indicate a low level of psychological distress, whereas high scores suggest a high level of psychological distress. Previous studies have established that a score between 15 and 20 reflects moderate psychological distress, while a score above 20 indicates high psychological distress [27]. This scale was rigorously validated and demonstrated high reliability in a study conducted by Lotfalinezhad et al. in 2015, specifically among older adults in Iran. The internal consistency of the scale was confirmed through Cronbach's alpha coefficients, which were reported at 0.88 and 0.90, respectively [28].

2.3 Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 23 (Armonk, NY: IBM Corp.) was used to analyze the data. In the descriptive statistics section, mean, minimum, maximum, variance, standard deviation, different tables and graphs, and inferential statistics were used to analyze the data to answer the research questions. To assess the normality of the distribution of the variables, the Kolmogorov-Smirnov test was employed. This test provided a foundation for determining the appropriate statistical methods to evaluate the study's hypotheses. Given the distribution characteristics of the data, non-parametric tests were deemed suitable for analysis. Consequently, the Spearman correlation coefficient was utilized to examine relationships between variables, while the Mann-Whitney U test was applied to compare differences between two independent groups. Additionally, the Kruskal-Wallis test was conducted to assess variations across three or more independent groups.

Table 1 Demographic information of participants

Variables		n	%
Gender	Male	96	53.3
	Female	84	46.7
Age	60–69	62	34.44
	70–79	97	53.9
	≥ 80	21	11.67
Cohabitation status	Alone	4	2.2
	With family and children	130	72.2
	With husband(wife)	46	25.6
Marital status	Married	142	78.9
	Not married	38	21.1
Education	Secondary education	146	81.2
	Associate degree	26	14.4
	Bachelor's degree	6	3.3
	Master's degree and Doctorate	2	1.1

Table 2 QOL and psychological distress according to demographic information

Variables		QOL		Psychological distress		
		High	Low	High	Moderate	Low
Gender	Male	30.2%	69.8%	66.67%	13.54%	19.8%
	Female	26.2%	73.8%	54.8%	23.8%	21.4%
Age	60–69	59.7%	40.3%	33.9%	27.4%	38.7%
	70–79	12.4%	87.6%	73.2%	16.5%	10.3%
	≥ 80	9.5%	90.5%	85.7%	0%	14.3%
Cohabitation status	Alone	25%	75%	75%	25%	0%
	With family and children	29.2%	70.8%	64.6%	13.1%	22.3%
	With husband (Wife)	26.1%	73.9%	50%	32.6%	17.4%
Marital status	Married	33.8%	66.2%	59.9%	21.1%	23.9%
	Not married	17.9%	82.1%	84.2%	7.9%	7.9%
Education	Secondary education	21.2%	78.8%	63%	18.5%	18.5%
	Associate degree	61.5%	38.5%	53.8%	19.2%	26.9%
	Bachelor's degree	66.67%	33.33%	33.3%	16.7%	50%
	Master's degree and Doctorate	0	100%	100%	0%	0%

3 Results

Table 1 presents the demographic characteristics of the 180 participants, including age, gender, education, marital and cohabitation status. The mean age of participants was 72 years (SD = 5.9), with ages ranging from 60 to 85 years.

Based on the HHIE-S scores, 28.3% of the participants had a high QOL, while 71.7% reported low QOL. Regarding psychological distress measured by the K10 scale, 20.6% had low distress, 18.3% had moderate distress, and 61.1% experienced high psychological distress.

Table 2 presents the distribution of QOL and psychological distress levels across demographic variables including gender, age group, education, marital status, and cohabitation status.

Table 3 shows the results of the Spearman correlation analysis between age and education with the outcomes of QOL and psychological distress. Age had a moderate positive correlation with both QOL ($r = 0.550$, $p < 0.001$, $CI = [0.439, 0.644]$) and psychological distress ($r = 0.383$, $p < 0.001$, $CI = [0.251, 0.501]$). Education showed a negative correlation with QOL ($r = -0.351$, $p < 0.001$, $CI = [-0.473, -0.216]$), but its relationship with

Table 3 Correlation between QOL, psychological distress, and demographic variables

Variables	p Value (QOL)	p Value (Psychological distress)
Gender	0.337	0.112
Age	*0.0001	*0.0001
Cohabitation status	0.777	0.528
Marital status	*0.002	*0.005
Education	*0.00001	0.594

* Values marked with stars (*) indicate a significant relationship between the variables

psychological distress was not statistically significant ($r = -0.008$, $p = 0.594$). These findings suggest that as age increases, both perceived QOL and psychological distress tend to increase, while higher education is associated with slightly better QOL. A strong and statistically significant positive correlation was observed between QOL and psychological distress ($r = 0.606$, $p < 0.001$, $CI = [0.504, 0.691]$), indicating that higher levels of psychological distress were associated with higher perceived QOL among older adults with hearing impairment, based on the scoring direction of the questionnaires used.

4 Discussion

This study aimed to determine the relationship between psychological distress and QOL in older adults with hearing loss attending outpatient clinics in Tehran, in 2024. The results reveal that 20.6% of older adults experience low mental distress, 18.3% report moderate mental distress, and a significant 61.1% face high mental distress. In comparison, Wang et al. reported that 23.8% of older adults had poor mental health [29]. This is consistent with our findings, although the percentage of individuals experiencing high distress in our study is notably higher. The findings from Bigelow et al. highlight a significant correlation between hearing loss and psychological distress, indicating that individuals with moderate to severe hearing loss are nearly twice as likely to experience psychological distress compared to those without hearing loss. This underscores the importance of addressing hearing health as a critical component of mental well-being in older adults, as the challenges associated with hearing impairment can contribute to increased levels of anxiety, depression, and overall psychological distress [30]. Hearing loss in older adults is significantly associated with an elevated risk of developing anxiety and depression, underscoring its profound impact on mental health. Consequently, older individuals with hearing impairment are more likely to experience psychological distress compared to their peers with normal hearing. Also, it was found that 28.3% of the older adults participating in the research have a high QOL, and 71.7% of them have a low QOL. According to the results of Farajzadeh's study, Iranian older adults have an average QOL [31]. However, it is important to note that the QOL of older adults in our study appears to be lower compared to the general population. This discrepancy can be attributed to the specific focus of our study on older adults with hearing loss, a factor that significantly impacts their QOL. The negative impact of hearing loss on QOL has been well-documented in the literature. For instance, Ciorba et al. found that hearing loss significantly reduces the QOL of older adults by affecting various aspects of daily living, including social engagement, physical activity, and overall life satisfaction [11]. Our findings corroborate these results, highlighting the importance of addressing both the physical and psychological aspects of hearing loss to improve the QOL of older adults.

The present study investigated the relationship between QOL and psychological distress among older adults with hearing impairment. The results indicated that a considerable proportion of participants experienced low QOL and high levels of psychological distress. The significant correlations observed between QOL, distress, age, and education highlight the importance of these demographic factors in shaping the well-being of this population.

Specifically, age was positively correlated with both QOL and psychological distress, suggesting that as individuals age, they may simultaneously face emotional challenges and yet report a higher perceived QOL, possibly due to accumulated coping skills or adaptation. The findings of the study by Currin et al. also indicate that age is significantly associated with mental health [32]. As individuals age, they experience various functional and cognitive declines, which often lead to heightened anxiety and depression. These age-related disorders contribute to the increased psychological distress observed in older adults. According to studies such as the study by Bishek et al., in the target population of all older adults, age has no significant relationship with the QOL [33], but according to the study by Niazi et al., the QOL of older adults with hearing loss decreases with increasing age [15]. The reason for the difference between the QOL and age among older adults with normal hearing and hearing loss can be seen in the fact that hearing loss affects various physical and mental dimensions and causes a large decrease in the QOL of older adults, and we know that the severity of hearing loss in the older adults increases with age.

In contrast, education was negatively correlated with QOL but showed no significant relationship with psychological distress. The findings of studies by Ye et al. and Shin et al. indicate that, in older adults with hearing loss, education is significantly related to psychological distress [34]. The lack of a significant relationship between education and psychological distress in our study may be due to the specific characteristics of the population and the context of data collection. Education is a protective factor against psychological distress in other populations (47), and its potential role in mitigating distress in older adults with hearing loss should be further explored in larger, more diverse samples. These findings suggest that while education may improve access to resources and enhance life satisfaction, it may not be sufficient to mitigate psychological distress in older adults.

According to the results, there is a significant positive correlation between psychological distress and QOL. Therefore, this hypothesis has been confirmed, and it can be said that psychological distress in older adults with hearing loss has a significant relationship with the QOL. In the study of Cheraghi et al., they concluded that in the target population of older adults in Hamadan, mental health has a significant relationship with QOL [35]. In another study, Gerino et al. concluded that there is a strong relationship between psychological distress and physical QOL in the older adults studied in Italy [36]. According to the study, this hypothesis is in line with the results of other studies, and psychological distress is related to QOL for older adults with hearing loss. Depression and stress reduce the QOL by affecting different dimensions.

The relationship between psychological distress and QOL can be explained by the challenges that hearing loss imposes on daily life. Hearing impairment often leads to communication difficulties, social isolation, and reduced participation in social

activities. These factors can contribute to increased psychological distress, which in turn affects multiple dimensions of QOL.

Our findings are consistent with previous studies that reported high levels of distress among older adults with hearing loss, underscoring the emotional burden associated with sensory impairments in late life. However, the coexistence of relatively high QOL in some individuals highlights the role of psychological resilience and social or familial support as potential buffers.

5 Conclusion

This study highlights the strong relationship between hearing impairment, psychological distress, and QOL in older adults. The findings confirm a significant correlation between psychological distress and QOL, reinforcing previous research that underscores the detrimental effects of hearing loss on psychological well-being. Given the high prevalence of hearing impairment and its far-reaching consequences, addressing this issue should be a priority in geriatric healthcare. Healthcare policymakers and providers must implement targeted interventions aimed at alleviating anxiety and depression while improving the overall QOL of hearing-impaired older adults. These interventions may include expanding access to hearing rehabilitation services, integrating mental health support into routine geriatric care, and fostering social engagement programs tailored to this population. By mitigating the psychological and social challenges associated with hearing loss, such measures can enhance well-being and promote a more independent and fulfilling life for affected individuals.

Future research should focus on identifying the most effective intervention strategies, conducting longitudinal studies to examine the long-term effects of hearing loss on mental health, and exploring demographic factors that may influence these relationships. Additionally, investigating the potential benefits of emerging technologies, such as advanced hearing aids and auditory training programs, could provide valuable insights into improving QOL for this population. A holistic and proactive approach is crucial to reducing the psychological burden of hearing impairment and ensuring better support for older adults facing this challenge.

5.1 Limitations

This study has some limitations that should be considered. One of the main limitations is the sample size, which, despite being determined based on statistical calculations and previous research, may still affect the generalizability of the findings. A larger sample could provide a more comprehensive understanding of the relationship between psychological distress and QOL in older adults with hearing loss. Moreover, since the study was conducted in outpatient geriatric clinics in Tehran, the findings may not be fully generalizable to older adults in different settings, such as those living in rural areas or institutionalized care facilities. Future research with a larger and more diverse sample is recommended to enhance the applicability of the results to a broader population. Another limitation of this study is that it did not explore the varying degrees of hearing loss and their differential impact on QOL. Future research could investigate how mild, moderate, and profound hearing loss may lead to different levels of social isolation, psychological distress, and overall QOL.

Acknowledgements

We extend our special thanks to all the respondents who participated in the research.

Author contributions

All authors contributed to the design and implementation of the research, analysis of the results, and manuscript writing.

Funding

Not applicable.

Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Declarations**Consent for publication**

Not applicable.

Competing interests

The authors declare no competing interests.

Ethics and guidelines.

This study was approved by the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences (IR.USWR.REC.1403.029) and conducted according to the principles of the Declaration of Helsinki.

Consent to participate

Informed consent was obtained from all individual participants.

Received: 12 December 2024 / Accepted: 28 August 2025

Published online: 06 September 2025

References

1. Naja S, Makhlof M, Chehab MAH. An ageing world of the 21st century: a literature review. *Int J Community Med Public Health*. 2017;4(12):4363–9.
2. Sadock BJ, Kaplan. *Sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry*. Wolters Kluwer Philadelphia, PA; 2015.
3. World Health Organization. *Regional Framework on Healthy Ageing (2018–2022)*. 2018.
4. World Health Organization. *Ageing and health* [Internet]: who. 2022.
5. Mirzaie M, Darabi S. Population aging in Iran and rising health care costs. *Iran J Ageing*. 2017;12(2):156–69.
6. Windle R, Dillon H, Heinrich A. A review of auditory processing and cognitive change during normal ageing, and the implications for setting hearing aids for older adults. *Front Neurol*. 2023;14:1122420.
7. Rashedi V, Asadi-Lari M, Foroughan M, Delbari A, Fadayevatan R. Prevalence of disability in Iranian older adults in tehran, iran: A population-based study. *J Health Social Sci*. 2016;1(3):251–62.
8. Lin FR, Pike JR, Albert MS, Arnold M, Burgard S, Chisolm T, et al. Hearing intervention versus health education control to reduce cognitive decline in older adults with hearing loss in the USA (ACHIEVE): a multicentre, randomised controlled trial. *Lancet*. 2023;402(10404):786–97.
9. Figueira HA, Figueira OA, Figueira AA, Figueira JA, Giani TS, Dantas EH. Elderly quality of life impacted by traditional Chinese medicine techniques. *Clin Interv Aging*. 2010:301–5.
10. Group TW. The world health organization quality of life assessment (WHOQOL): development and general psychometric properties. *Soc Sci Med*. 1998;46(12):1569–85.
11. Ciorba A, Bianchini C, Pelucchi S, Pastore A. The impact of hearing loss on the quality of life of elderly adults. *Clinical interventions in aging*. 2012:159–63.
12. Faraji A, Khalily M, Naghibzadeh ZA-s, Kazemina F, Kazemina M. The effect of religious-spiritual education and care on the life quality of Iranian elderly: A systematic review and meta-analysis. *J Relig Health*. 2023;62(5):3042–69.
13. Aghanuri A, Mahmoudi M, Asadi M, Mortaji F, Salehi H, Djafarian K. Quality of life and its relationship with quality of diet among elderly people in urban areas of Markazi province, Iran. *J Arak Univ Med Sci*. 2013;15(9):1–11.
14. Mihevc M, Potočnik TV, Zavrnik Č, Šter MP, Klemenc-Ketiš Z, Susič AP. Beyond diagnosis: investigating factors influencing health-related quality of life in older people with type 2 diabetes in Slovenia. *Prim Care Diabetes*. 2024;18(2):157–62.
15. Niazi Y, Ejaz B, Muazzam A. Impact of hearing impairment on psychological distress and subjective well-being in older adults. *Pakistan J Med Sci*. 2020;36(6):1210.
16. Cosh S, Helmer C, Delcourt C, Robins TG, Tully PJ. Depression in elderly patients with hearing loss: current perspectives. *Clin Interv Aging*. 2019:1471–80.
17. Bolina AF, Araújo MC, Haas VJ, Tavares DMS. Association between living arrangement and quality of life for older adults in the community. *Rev Latinoam Enferm*. 2021;29.
18. McBride WS, Mulrow CD, Aguilar C, Tuley MR. Methods for screening for hearing loss in older adults. *Am J Med Sci*. 1994;307(1):40–2.
19. Ventry IM, Weinstein BE. The hearing handicap inventory for the elderly: a new tool. *Ear Hear*. 1982;3(3):128–34.
20. American Speech-Language-Hearing Association. Guidelines for the identification of hearing impairment/handicap in adult/elderly persons. *ASHA*. 1989;31:59.
21. Weinstein BE, Spitzer JB, Ventry IM. Test-retest reliability of the hearing handicap inventory for the elderly. *Ear Hear*. 1986;7(5):295–9.

22. Silveira ACSL, Zazzetta MS, Orlandi FS, Pavarini SCI, Santos AAd, Say KG, et al. editors. Association between participation restriction due to hearing loss and self-perception of health, social support, and quality of life in elderly people: a cross-sectional study. *CoDAS*; 2024.
23. Weinstein B. Validity of a screening protocol for identifying elderly people with hearing problems. *Asha*. 1986;28(5):41–5.
24. Faraji-Khiavi F, Bayat A, Dashti R, Dindamal B, Kalkhajejeh SG. Consistency of two versions of hearing handicap inventory for elderly (HHIE and HHIE-S) with degree of hearing loss (HL). *Hear Balance Communication*. 2023;21(3):210–5.
25. Behboodi L, Chattu VK, Adelirad F, Heizomi H, Asghari-Jafarabadi M, Allahverdipour H. The psychometric properties of the Persian version of the hearing handicap inventory screening scale (HHIE-S) among older adults. *J Commun Disord*. 2022;100:106257.
26. Gutmanis I, Coleman BL, Ramsay K, Maunder R, Bondy SJ, McGeer A. Psychological distress among healthcare providers during the COVID-19 pandemic: patterns over time. *BMC Health Serv Res*. 2024;24(1):1214.
27. Anderson TM, Sunderland M, Andrews G, Titov N, Dear BF, Sachdev PS. The 10-item Kessler psychological distress scale (K10) as a screening instrument in older individuals. *Am J Geriatric Psychiatry*. 2013;21(7):596–606.
28. Lotfalinezhad E, Barati F, Sahaf R, Shati M, Abolfathi Momtaz Y, Forughan M, et al. Psychometric properties of the Persian Kessler psychological distress scale among Iranian older adults. *Iran J Health Sci*. 2023;11(1):21–8.
29. Wang S, Li B, Ungvari GS, Ng CH, Chiu HF, Kou C, et al. Poor mental health status and its associations with demographic characteristics and chronic diseases in Chinese elderly. *Soc Psychiatry Psychiatr Epidemiol*. 2016;51:1449–55.
30. Bigelow RT, Reed NS, Brewster KK, Huang A, Rebok G, Rutherford BR, et al. Association of hearing loss with psychological distress and utilization of mental health services among adults in the united States. *JAMA Netw Open*. 2020;3(7):e2010986–e.
31. Farajzadeh M, Gheshlagh RG, Sayehmiri K. Health related quality of life in Iranian elderly citizens: a systematic review and meta-analysis. *Int J Community Based Nurs Midwifery*. 2017;5(2):100.
32. Currin JB, Hayslip B Jr, Temple JR. The relationship between age, gender, historical change, and adults' perceptions of mental health and mental health services. *Int J Aging Hum Dev*. 2011;72(4):317–41.
33. Bishak YK, Payahoo L, Pourghasem B, Jafarabadi MA. Assessing the quality of life in elderly people and related factors in Tabriz. *Iran J Caring Sci*. 2014;3(4):257–63.
34. Ye X, Zhu D, Chen S, He P. The association of hearing impairment and its severity with physical and mental health among Chinese middle-aged and older adults. *Health Qual Life Outcomes*. 2020;18:1–8.
35. Cheraghi P, Eskandari Z, Bozorgmehr S, Zanjari N, Cheraghi Z. Quality of life and its related factors among elderly people. *J Educ Community Health*. 2019;6(3):145–51.
36. Gerino E, Rollé L, Sechi C, Brustia P. Loneliness, resilience, mental health, and quality of life in old age: A structural equation model. *Front Psychol*. 2017;8:2003.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.