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ORIGINAL ARTICLE

Quality of life among adults with hearing loss at the Cantonal Hospital of Zenica: a cross-sectional study

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ABSTRACT

Aim To assess quality of life (QoL) in adults by comparing two groups, one with diagnosed hearing loss (HL) and one without hearing complaints (control).

Methods This cross-sectional study included 110 consecutive voluntary adult patients divided in two groups: patients with hearing loss and control group. All participants, following the examination, completed questionnaires on sociodemographic and clinical data (age, gender, existing comorbidities, schooling, occupational status, marital status), and the World Health Organization Quality of Life-Short Version (WHO-QOL-BREF).

Results Out of 110 adults, 59 had a hearing loss - 40 were assigned to the hearing loss group (HLG), and 19 to the hearing loss with hearing aid group (HLHAG), while 51 were in the control group. A higher score in the domains of physical health (p=0.036) and psychological health (p=0.024) in control group was consistently found; other domains did not reach statistical significance. Significant differences between the HLHAG and control group in physical health (mean difference = -11.3; p=0.036) and psychological health (mean difference = -11.3; p=0.029) was confirmed.-

Conclusion Hearing loss could decrease QoL. Therefore, it is very important to recognize hearing impairment in a timely manner and take serious approach to the treatment.

Keywords: demographic factors, hearing aid, WHO QoL-BREF

INTRODUCTION

Hearing loss (HL) is a condition characterized by a partial or complete inability to hear sound in one or both ears (1). Hearing impairment can be of varying degrees and can develop in any time in life: congenital or acquired, unilateral or bilateral, with over 430 million people having some degree of HL (2). HL is one of the most common health conditions impacting more than 5% of the population and affecting physical health, financial situation, social isolation and mental health (3).

According the literature, HL can be negatively associated with quality of life (QoL), causing frustration, humiliation and social isolation (4,5). Depression, anxiety and cognitive impairments can also be associated with HL (6). The World Health Organization (WHO) estimates that unaddressed hearing loss poses an annual global cost of US$ 750 billion (7). Thus, the use of hearing aids (HA) demonstrates the improvement in QoL and could have a protective effect on cognitive capabilities (8). Early detection and intervention are mandatory to avoid or delay the onset of decreasing QoL in elderly people (9).

There is a huge amount of research that has looked at the impact of hearing loss on quality of life, but the discrepancy in the results and the lack of studies related to timely recognition of hearing impairment and the use of hearing aids, especially in low-income countries, opens up opportunities for further research in this field.

The aim of this study was the assess QoL in adults by comparing two groups, one with diagnosed HL and one without hearing complaints.

PARTICIPANTS AND METHODS

Participants and study design

A prospective cross-sectional study was conducted at the Otorhinolaryngology and Maxillofacial Surgery Department of the Cantonal Hospital in Zenica, between 1 November 2024 and 1 March 2025. The study included 110 consecutive voluntary adult patients who were admitted to the Clinic due to hearing problems, and whose audiometric tests confirmed disabling hearing loss as the inability to hear sounds at 40 decibels in a better hearing ear in adults (study group), as well as patients without other problems, with audiologically confirmed normal hearing, who were in line with the subjects (control group) in terms of sociodemographic factors. The study group was di-

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vided to the Hearing Loss Group (HLG), and the Hearing Loss and Hearing Aid Group (HLHAG).

Exclusion criteria were patients under the age of 18, patients with incorrectly completed questionnaire, patients who were diagnosed with mental illness, mental retardation, and severe organic illness, and patients who were not able to complete the questionnaire on their own.

At the beginning of the study, all participants were informed in detail about the study plan and procedure, after which they gave a written consent for voluntary participation in the study. This study was approved by the Ethics Committee of the Cantonal Hospital of Zenica (No: 00-03-35-745-5/22). Registration of a clinical trial: ClinicalTrials.gov Identifier: NCT05520957.

Methods

The procedure for processing the participants included medical history, objective physical examination, audiological processing (pure tone audiometry) and filling in the World Health Organization Quality of Life- Short Version (WHOQOL-BREF) (10).

All data were entered in a special form adapted for computer data processing. All participants were assigned a code under which they were processed. The key between the name and the assigned codes was stored in an Excel document, which was deleted after the completion of research.

Following the examination, all participants completed a questionnaire on sociodemographic and clinical data (age, gender, existing comorbidities, education, occupation, marital status), and the WHOQOL-BREF with the assistance of a researcher.

WHOQOL-BREF instrument was administered in its Bosnian-translated version to assess the quality of life (QoL). Due to a number of issues and faster resolution, WHOQOL-BREF is preferred over WHOQOL - 100. It contains 26 questions, of which 24 questions are divided into four domains: physical health, psychological, social relationship and environment. There are two general questions about QoL. All answers were rated using Likert scale from 1 to 5, with higher scores indicating higher QOL (11).

Data collection was performed at the Clinic on the day of the consultation and it took approximately 30 minutes.

Statistical analysis

Data were analysed using appropriate descriptive and inferential statistical methods. Categorical variables were summarized as frequencies and percentages, while continuous variables were presented as mean with standard deviations (SD). Differences between groups for continuous variables were assessed using one-way analysis of variance (ANOVA), followed by post hoc Bonferroni correction for multiple comparisons. For comparisons involving two groups only, independent samples t-tests were applied. Categorical variables were compared using the $\chi 2$ test or Fisher's exact test where expected cell frequencies were below five. The significance level was set at $p<0.05$. Variables showing significant differences between the groups were further explored to assess the nature and direction of the differences.

RESULTS

Among 110 participants HLG comprised 40, HLHAG 19, and the control group 51 participants. Statistically significant differences were observed in age (p=0.033), the participants in the HLHAG being the oldest on average (70.7±10.5 years), followed by HLG (65±9.4 years), and the control group being the youngest (59.5±14.4 years) (Table 1).

Table 1. Sociodemographic characteristics of 110 participants

Variable	HLG (N=40)	HLHAG (N=19)	Control (N=51)	p
Age (Mean±SD) (years)	65±9.4	70.7±10.5	62.2±14.0	0.033
	No (%) of participants			
Gender				
Female	16 (40)	7 (36.8)	24 (47.1)	0.677
Male	24 (60)	12 (63.2)	27 (52.9)	
Education				
Primary education	5 (12.5)	5 (26.3)	21 (41.2)	0.017
High school	20 (50.0)	6 (31.6)	19 (37.3)	
Higher education (collage)	13 (32.5)	4 (21.1)	8 (15.7)	
University	2 (5.0)	4 (21.1)	3 (5.9)	
Married status				
Married	25 (62.5)	9 (47.4)	21 (41.2)	0.126
Single	15 (37.5)	10 (52.6)	30 (58.8)	
Employment				
Employed	8 (20.0)	4 (21.1)	20 (39.2)	0.098
Unemployed	10 (25.0)	2 (10.5)	5 (9.8)	
Retired	22 (55.0)	13 (68.4)	26 (51)	
Place of living				
City	16 (40.0)	5 (26.3)	24 (47.1)	0.289
Rural area	24 (60.0)	14 (73.7)	27 (52.9)	

HLG, hearing loss group; HLHAG, hearing loss with hearing aid group

Educational attainment showed significant variation (p=0.017), with a higher prevalence of primary education among control participants and a relatively larger share of university education in the HLHAG. Relationship status and employment did not differ significantly between the groups, although trends suggested higher rates of retirement among the HLHAG participants (13; 68.4%), and more frequent employment in the control group (20; 39.2%). Rural living was most common in the HLHAG (14; 73.7%) compared to the HLG (24; 60.0%) and control group (27; 52.9%), though the difference was not statistically significant (p=0.289).

The prevalence of comorbidities varied notably among the groups. Tinnitus was significantly more common in HLG (26; 65.0%) and HLHAG (15; 78.9%) compared to the control group (11; 21.6%) ($p<0.001$). Similarly, nasal septum deviation was more prevalent in HLHAG (63.2%) than in HLG (12; 30.0%) and controls (eight; 15.7%) ($p<0.001$). No significant differences were observed for hypothyroidism (p=0.373) or smoking status (p=0.127).

Hypertension was significantly more common in HLHAG (16; 84.2%) compared to HLG (22; 55.0%) and controls (24; 47.1%) (p=0.02). Deafness was bilateral in all HLHAG participants and in 33 (82.5%) HLG participants, with a small subset (17.5%) of HLG having unilateral deafness; this distinction approached significance (p=0.052) (Table 2).

The quality of life scores across WHOQOL domains showed significant differences in the domains of physical health (p=0.036) and psychological well-being (p=0.024), with the control group consistently scoring higher than HLG and HL-

Table 2. Overview of underlying health conditions among three groups of participants

Variable		No (%) of participants in the group			p
		HLG (N=40)	HLHAG (N=19)	Control (N=51)	
Tinnitus	NO	14 (35)	4 (21.1)	40 (78.4)	<0.001
	YES	26 (65)	15 (78.9)	11 (21.6)	
Nasal septum deviation	NO	28 (70)	7 (36.8)	43 (84.3)	<0.001
	YES	12 (30)	12 (63.2)	8 (15.7)	
Hypothyroidism	NO	35 (87.5)	14 (73.7)	40 (78.4)	0.373
	YES	5 (12.5)	5 (26.3)	11 (21.6)	
Smoker	NO	20 (50)	6 (31.6)	30 (58.8)	0.127
	YES	20 (50)	13 (68.4)	21 (41.2)	
Hypertension	NO	18 (45)	3 (15.8)	27 (52.9)	0.02
	YES	22 (55)	16 (84.2)	24 (47.1)	
Deafness	One sided	7 (17.5)	0	X	0.052
	Both sided	33 (82.5)	19 (100)	X	

HLG, hearing loss group; HLHAG, hearing loss with hearing aid group

HAG. Although the social relationships (p=0.073) and overall quality of life (p=0.077) domains did not reach statistical significance, there was a trend towards lower scores in HLHAG (Table 3).

Table 3. Quality of life assessment among patients with hearing loss (HGL), hearing loss with hearing aid (HLHAG), and the control group

Quality of life domains	HLG (N=40)	HLHAG (N=19)	Control (N=51)	F	p
	Mean ±SD				
Physical Health	70.4±18.3	64±16.4	75.3±15	3.421	0.036
Psychological	74±17.1	68.5±16.8	79.9±14.7	3.87	0.024
Social Relationships	62.6±23.5	58.3±20.6	69.8±18.2	2.67	0.073
Environment	60.9±20.1	56.7±18.5	61.4±15	0.515	0.599
Overall Quality of life	67±18.6	61.9±16.9	71.6±14.3	2.62	0.077

F- ANOVA test; P- significance set at 0.05

Post hoc Bonferroni analysis confirmed significant differences between the HLHAG and control group in physical health (mean difference=-11.3; p=0.036) and psychological health (mean difference=-11.3; p=0.029). No significant differences were detected between HLG and HLHAG or HLG and controls in these domains. Other quality of life domains did not yield significant post hoc differences (Table 4).

DISCUSSION

Hearing impairment and deafness are one of the leading health problems worldwide that requires timely recognition and treatment (12). In everyday life, hearing loss not only leads to difficulties in understanding speech, but also affects social integration of each individual, causing social and psychological disorders that affect interpersonal and communicative relationships, depriving individuals of interaction with family and friends, leading to isolation and compromising their quality of life (13,14).

Table 4. Post hoc Bonferonni analysis

Dependent variable	Participants groups		p*	95% CI	
				LB	UB
Physical health	CG	HLG	0.483	-3.6	13.4
		HLHAG	0.036	0.5	22.1
	HLG	CG	0.483	-13.4	3.6
		HLHAG	0.499	-4.8	17.6
	HLHAG	CG	0.036	-22.1	-0.5
		HLG	0.499	-17.6	4.8
Psychological	CG	HLG	0.256	-2.3	14.1
		HLHAG	0.029	0.9	21.8
	HLG	CG	0.256	-14.1	2.3
		HLHAG	0.665	-5.4	16.3
	HLHAG	CG	0.029	-21.8	-0.9
		HLG	0.665	-16.3	5.4
Social relationships	CG	HLG	0.295	-3.3	17.9
		HLHAG	0.119	-2.0	25.1
	HLG	CG	0.295	-17.9	3.3
		HLHAG	1.000	-9.7	18.3
	HLHAG	CG	0.119	-25.1	2.0
		HLG	1.000	-18.3	9.7
Environment	CG	HLG	1.000	-8.5	9.6
		HLHAG	0.970	-6.8	16.2
	HLG	CG	1.000	-9.6	8.5
		HLHAG	1.000	-7.8	16.1
	HLHAG	CG	0.970	-16.2	6.8
		HLG	1.000	-16.1	7.8
Overall Quality of life	CG	HLG	0.548	-3.8	13.1
		HLHAG	0.089	-1.0	20.5
	HLG	CG	0.548	-13.1	3.8
		HLHAG	0.808	-6.0	16.2
	HLHAG	CG	0.089	-20.5	1.0
		HLG	0.808	-16.2	6.0

*The mean difference is significant at the 0.05 level
CI, confidence interval; CG, control group; HLG, hearing loss group; HLHAG; hearing loss with hearing aid group; LB, lower bound; UB, upper bound

The main objective of this study was to investigate the association between hearing loss and quality of life using WHO-QOL-BREF 32 questionnaire. The study included 110 adult participants, 59 with hearings loss and 51 in the control group. Our results confirmed, in accordance with the literature (15), consistently higher score in the domains of physical health and psychological health in the control group, although other domains did not reach statistical significance, but there was a trend towards lower scores in HLHAG. Also, results did not show significant differences between HLG and HLHAG even though lower scores were detected in HLHAG. Previous studies demonstrated multiple advantages of using hearing aids in regard to several dimensions of quality of life (16). Thus, less than 20% of the elderly with hearing loss used their hearing aids (17). Aging decreases the quality of life, but it is more affected by hearing loss (18).

Previous studies have identified time constraints and economic factors as key contributors to the decline in quality of life

with increasing age (19). According to the literature, females showed lower results of QoL (20). Also, place of residence is an important factor associated with QoL, especially in the domain of physical health (21). Higher level of education and employment can also increase the level of QoL (22).

We found that tinnitus is commonly associated with hearing loss, that can further impair the quality of life (23). No association between smoking and QoL was found. Previous studies showed that smoking provides a short-term sense of satisfaction that can increase the QoL. On the other hand, long-term effects could decrease QoL (24). According to the literature, our results showed that nasal septal deviations, causing headache and facial pain, could have negative impact on QoL (25). Our study showed similar results of QoL (26).

The limitations of this study include cross-sectional nature, data collection through self-reporting, without full access to electronic documentation, small sample size, stigma and patient prejudice against participation.

In conclusion, it is obvious that hearing loss decreases QoL. The results of this study showed that hearing loss creates difficulties in everyday life. Early detection and intervention in hearing loss are essential for preserving quality of life. Furthermore, our results did not show a positive impact of the hearing aid on quality of life. Further research should investigate the factors that could help patients with hearing loss to become compliant with their prescribed hearing aids.

This study is among the few that stratify hearing-impaired participants into those with and without hearing aid use, allowing for a more detailed comparison. By introducing the third group, we were able to explore not only the impact of hearing loss but also whether hearing aid use mitigated its effect on QoL. Our findings suggest that hearing aids alone may not be sufficient to improve quality of life, particularly in older adults with complex health profiles. Additionally, the identification of nasal septal deviation as a potential contributor to reduced QoL in this population is a novel observation that warrants further investigation.

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TRANSPARENCY DECLARATION

Competing interests: None declared

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