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BRIEF REPORT

Determining the quality of life in the elderly with high frequency hearing loss before and after hearing aid fitting

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Abstract

Background and Aim: Hearing loss is a social damage affecting the most important aspect of social life i.e. communication. People with high frequency hearing loss do not accept hearing aid easily and resist its using. The purpose of this study was to determine the role of hearing aid in the quality of life of the elderly people with high frequency hearing loss.

Methods: This study was performed on 22 elderly people over 60 years old with mild to moderate sensory neural high frequency hearing loss living in Hamadan City, Iran. Hearing Handicap Inventory for the Elderly (HHIE) questionnaire was completed before and three month after using hearing aid. Social, emotional, and total scores before and after intervention were compared, too.

Results: Findings showed significant improvement of social, emotional and total scores before and three months after using hearing aid ($p<0.001$). Comparison of mean scores showed that prescribing hearing aid was effective in improving the quality of life in the elderly with high frequency hearing loss.

Conclusion: Considering beneficial effects of hearing aid on improving the quality of life in elderly patients with high frequency hearing loss, applying appropriate hearing aid and if needed rehabilitation programs are recommended.

Keywords: High frequency hearing loss; hearing aid; quality of life; elderly

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Introduction

The auditory sense has a vital role in human communication development [1]. Communication with others is an important part of the daily life that can be damaged severely in hearing-impaired subjects and can even lead to decrease in their quality of lives. In addition, hearing loss can lead to depression, isolation, inattention, losing self-confidence, and weak performance in the elderly, especially when they miss being treated for hearing loss [2]. Hearing loss can also result in social problems and affect communication as the most important aspect of social living [3].

WHO reported that the number of elderly people is growing in the world and 14% of the total world population will be 60 years or older by 2025 [4].

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Based on population growth rate, the elderly population in Iran will be extensive in near future. In recent years, the elderly population has increased from 7.2% to 8.2% of total population [5]. Hearing loss is the third most common chronic disorder in the elderly, right after rheumatoid arthritis and hypertension. About 20% to 40% of subjects older than 60 years have impaired hearing [6]. Also, presbycusis is the most common hearing disorder in humans and is the most common form of sensorineural hearing loss (SNHL) in the U.S. [7].

Presbyacusis is one type of the SNHL that happens as a result of improper transmission of acoustic information into neural signals. The age-related hearing loss known as presbyacusis is characterized by progressive reduction in the hearing sensitivity, number of sensory cells, and central processing abilities. Its consequences include high-frequency hearing loss, speech perception difficulty in noisy or reverberant environments, difficulty in the perception of rapid speech changes, and sound localization [8]. Aging may lead to hair cell damage and vascular impairments because the cochlear tissue is a delicate organ [9]. The auditory nerve can also be involved. Auditory nerve is responsible for transmitting auditory information from inner ear to central auditory system [10]. The age-related hearing loss has various important effects on the elderly's quality of lives. These effects can lead to severe handicap, even in patients with mild to moderate hearing loss [11]. In these subjects, the hearing aid can facilitate and improve speech recognition and quality of life [12].

In past times, behind the ear (BTE) hearing aids with occluded mold or with a small vent were used that resulted in low-frequency enhancement in the ear canal. Therefore the users complained of hearing their voices louder, hollow, or booming. Occlusion effect in normal-hearing subjects or subjects with mild low-frequency hearing loss is a common phenomenon and voice perception can be improved by using larger vent or open fitting [13].

Patients with mild to moderate hearing loss are usually reluctant to wear a hearing aid, and their families force them to pursue audiological services. Therefore they need special consultation. This study was conducted to determine hearing aid prescription effects on emotional and social aspects of patients with the high-frequency hearing loss, before and after using a hearing aid.

Methods

This is a descriptive-analytic study, conducted on 22 elderly people with mild to moderate SNHL referring to private audiology clinics in Hamadan City. Subjects were selected by simple sampling method from available cases. Auditory thresholds for 500, 1000, 2000, 4000, and 8000 Hz were 25, 35, 50, 50 and 70 dB HL, respectively. There was not any air-bone gap and the auditory threshold above 20 dB HL was considered as SNHL. After otoscopic examination, PTA, tympanometry, speech perception threshold, and speech recognition scores were obtained. Patients with speech recognition score above 70% were included in the study. After determining the degree of hearing loss, the patients were referred to ENT specialist for confirming their hearing aid necessity. Then the audiologist consulted the patient for receiving receiver in the canal (RIC) hearing aids for both ears. This hearing aid may result in more satisfaction due to decreasing occlusion effects [14]. These subjects received RIC hearing aids based on their physical and mental status and degree of hearing loss. Data collection was conducted in two steps via interview by using Hearing Handicap Inventory for the Elderly (HHIE) questionnaire. It is a valid qualitative screening tool for determining auditory handicap in the elderly [1]. To study quality of life in the elderly, before and after hearing aid prescription, HHIE was used. HHIE is a self-reported questionnaire for evaluating the extent of adverse effects of hearing impairment on emotional and social status in the elderly. It has 25 standard questions in two subscales: one subscale is related to emotional consequences and includes 12 items; the other one is for social and vocational consequences and has 13 items. The answers have three options: yes (4 points), sometimes (2 points), no (0 points). The total score can range from 0 to 100.

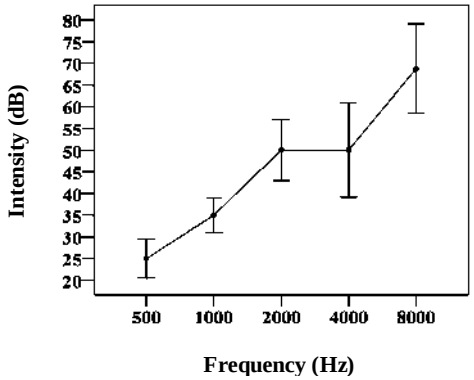

Fig. 1. Mean (standard deviation) of pure tone thresholds of the participants.

Changing patient's score equal to 9 or more is considered significant [1]. A lower score on this scale shows better quality of life. In the first step, after prescription and first fitting of hearing aid, the users completed the questionnaire. Three months after receiving hearing aid, they filled the questionnaire once more.

To analyze the data, SPSS 21 was used. We used t test for comparing the emotional, social, and the total status of the quality of life in the elderly, before and after hearing aid fitting.

Results

A total of 22 subjects with high-frequency hearing loss and a mean (SD) age of 65.6 (4.4) years were selected. Their mean hearing thresholds are shown in Fig. 1. In addition to hearing evaluations, HHIE was filled by subjects in two stages.

Based on the t-test results, the mean (SD) scores for emotional, social and total quality of life were 45.41 (2.17), 81.36 (1.95), and 27.78 (3.94), respectively, before using the hearing aid that changed to 24.18 (3.46), 18.18 (2.02), and 42.36 (5.30), respectively, after using the hearing aid. Significant changes were seen in emotional ($p<0.001$), social ($p<0.001$) and total quality of life ($p<0.001$) scores after using the hearing aid (Table 1).

Discussion

In the present study, the quality of life in the elderly with high-frequency hearing loss was studied before and after using the hearing aids. Due to the gradual progression of hearing loss in presbyacusis, the elderly people do not properly accept wearing hearing aid. This study tried to track the quality of life changes by using HHIE as a valid tool. HHIE questionnaire evaluates the quality of life in the emotional, social and total quality of life subscales. The present study showed that the quality of life in all subscales improved significantly after using the hearing aids.

Dalton et al. studied hearing loss effects on the quality of life of 2688 old subjects (age range: 53-97 years). They used Hearing Handicap Inventory for the Elderly-short form HHIE-S for the evaluation of communication problems and SF-36 for the health-related quality of life. The results showed that hearing loss can deteriorate the quality of life [15]. The results of the present study agree with Dalton et al. findings. These studies show that hearing loss has potentially negative effects on the quality of life and hearing aid can significantly compensate its adverse effects.

In Chisolm et al. study, HHIE score in the elderly showed significant improvement in psychological, social and emotional subscales after using a hearing aid [16]. Although most studies have been conducted on the high frequency loss, it has been shown that using hearing aid has positive effects on the elderly's quality of life with different types and degrees of hearing loss.

In Mondeli and Souza's study, the World Health Organization quality of life questionnaire was used. They studied 30 subjects older than 60 years, before and three months after first hearing aid fitting. They concluded that there was a significant enhancement in the quality of life but their perception of negative feelings remained unchanged [14]. On the other hand, the present study showed that both the quality of life and emotional scores of the elderly improved significantly. However, in the present study individual feelings were not specifically studied as HHIE questionnaire was used. According to Chao and Chen study, hearing aid is the most effective strategy for rehabilitation of hearing-impaired elderly and help them return to the

Table 1. Comparison of emotional, social and total scores before and after using hearing aid

	Mean (SD) scores		
	Before using HA	**After using HA**	**p**
Emotional scores	41.45 (2.17)	24.81 (3.46)	*p<0.001
Social scores	36.81 (1.95)	18.18 (2.02)	*p<0.001
Total scores	78.27 (3.94)	42.36 (5.30)	*p<0.001

HA; hearing aid

society [17].

Maeda et al., reported that no significant difference was seen between hearing aid users and control group regarding the speech recognition score and hearing dynamic range but the total score of HHIE and the emotional score was higher in hearing aid users [18]. In the present study, the quality of life improved but hearing dynamic range was not studied. Another study conducted by Lotfi et al. examined 207 subjects with age range of 60 years or above to evaluate the elderly's quality of life before and after using a hearing aid. They used HHIE before and three months after hearing aid fitting and reported significant changes in the quality of life in all subjects. They showed that the degree of hearing loss had no effects on the emotional and social scores [1]. The results of the present study agree with Lotfi et al. study and show that high frequency hearing loss and RIC hearing aid can improve emotional and social scores.

McArdle et al. studied total quality of life and hearing-related quality of life in 380 patients who were divided randomly to experimental (hearing aid fitting immediately after evaluation) and control (delayed hearing aid fitting) group. They showed that both qualities improved after hearing aid fitting; however, hearing-related quality of life improvement was more prominent than the total quality of life [19]. In the present study, all aspects of quality of life improved after using the hearing aids.

Results of the study in other aspects of hearing loss showed improvements in the quality of life after hearing aid fitting as well. Therefore audilogists must take these types and degrees of hearing loss seriously and help the elderly improve their quality of lives by proper consultation, hearing aid prescription, and fitting. In this study due to the special type and degree of hearing loss and the type of the hearing aid, the sample size was small. Future studies are recommended on the other degrees of hearing loss, audiogram configurations, and elderly populations.

Conclusion

This study showed that even a mild hearing loss can affect the quality of life especially its emotional and social aspects. These effects result from communication difficulties, social interactions, loss of self-confidence, isolation, and withdrawal. A hearing aid can improve social interactions and self-confidence in the elderly and can improve the quality of life. As a high proportion of the population consists of the elderly people and hearing loss is among the most prevalent disorders in this population, and based on its negative effects on the quality of life, working on their social interactions and emotional improvements are vital. Therefore early hearing aid fitting can significantly reduce negative consequences of hearing loss.

Conflict of interest

The authors declare that they have no conflict of interest.

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