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Research Paper: The Study of Affecting Factors on Attitude Toward Hearing Loss in Hearing Aid Users and Hearing Aid Non-Users

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ABSTRACT

Introduction: Attitudes and aptitudes play an important role in the acceptance of hearing aids. We can objectively and subjectively examine the attitude of individuals toward hearing loss and hearing aids, using Attitudes towards Loss of Hearing Questionnaire (ALHQ). The aim of this study was to examine the effect of demographic factors on the responses of individuals to ALHQ and to compare the scores of the questionnaire between hearing aid users and hearing aid non-users.

Materials and Methods: This study was performed on 100 hearing-impaired participants. They were divided into hearing aid users and non-users groups. After hearing assessments, the participants were asked to complete the questionnaire; then, the responses of the two groups were compared and the effects of demographic factors on the responses were examined.

Results: The questionnaire scores in the hearing aid non-users were higher than the hearing aid users. The results showed a reverse correlation between the history of hearing aid usage and the scores of the questionnaire. There was also a reverse correlation between the mean score of pure tone thresholds in the left ear with the scores of the questionnaire in the hearing aid users. Furthermore, there was a significant correlation between the type of hearing aid and the scores of the questionnaire.

Conclusion: Hearing aid non-users have a more negative attitude toward hearing aids and are more likely to deny their hearing loss compared to hearing aid users.

1. Introduction

Various studies have shown that only 14% to 31% of those who have hearing loss use hearing aids [1, 2] and the people's perception of their hearing problems and the motivation to do something to resolve those problems strongly predicted the amount of hearing aid usage [3]. Previous studies showed increment in hearing aid usage with increasing age and the severity of hearing loss so that younger people and people with milder hearing loss had the least hearing aid usage [4]. The low-frequency

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use of hearing aids in the elderly could be because of the lack of awareness of hearing problems, stigma, problems of working with hearing aids, or the lack of awareness of the benefits of hearing aids [5, 6].

One of the main reasons that people decide to stop using hearing aids is the stigma of wearing hearing aids [7]. In fact, 48% of people with hearing loss, who do not use hearing aids, declare that it is because of the stigma of hearing aids [8]. Another reason for refusing the use of hearing aids is the denial of hearing loss. Two-thirds of people with hearing loss went on to develop a self-perceived hearing handicap within 5 years after the diagnosis of hearing loss [9]. However, with the increment of the degree of hearing loss, the number of hearing-impaired people, who use hearing aids, and hours of using it per day increases [10].

Individuals' attitudes and beliefs play an important role in accepting the usage of hearing aids [11]. Through questionnaires, we can objectively examine the attitudes of people toward hearing loss and hearing aids. Questionnaires can also be used to examine the changes in attitudes of individuals over time and in the clinic, they can help clinicians to understand the personality traits that affect people's attitudes [12]. One of these questionnaires is Attitudes towards Loss of Hearing Questionnaire (ALHQ) published by Saunders and Cienkowski [13] and translated into Persian by Heidari et al. [14].

This questionnaire consists of 22 questions, including the subscales of denial of hearing loss, negative associations, negative coping strategies, manual dexterity, and vision and hearing-related esteem. It takes 10 minutes to answer its questions and the total score of the questionnaire is considered as the scores of the attitude of hearing loss and higher scores indicate a more negative attitude toward hearing loss. ALHQ helps clinicians to recognize the harmful attitudes of people and properly consult them according to their needs [15]. The aim of this study was to examine the effect of demographic factors on the responses of individuals to ALHQ and to compare the scores of the questionnaire between two groups of hearing aid users and hearing aid non-users.

2. Materials and Methods

This descriptive-analytical study was performed on 100 hearing-impaired patients referred to the Audiology Clinic of Tehran University of Medical Sciences. Individuals were divided into two groups; group 1 consisted of hearing aid users and group 2 consisted of hearing aid non-users and each group included 50 individuals. The inclusion criteria included sensory hearing loss, the age range of 30 to 65 years, the absence of effusion and active otitis media (no conductive loss), and the absence of neurological and otological diseases. The exclusion criteria consisted of fatigue and reluctance to continuing research for any reason and the loss of any of the inclusion criteria.

Initially, the aim of this study was explained to the individuals and we took a case history of all participants; we also did otoscopy examination (for examining the presence of ear wax) and tympanometry to assess tympanic membrane and middle ear status, and Pure Tone Audiometry (PTA), which is the most common test for assessing auditory sensitivity at different frequencies [16]; then, all participants were asked to answer the translated version of the ALHQ (Appendix). Finally, the responses of the two groups were compared and the effect of the demographic data on the responses of both groups was evaluated.

The data were analyzed, using SPSS 23 and nonparametric tests, including the Mann-Whitney U test, Kruskal Wallis test, and Spearman were used for data analysis. Moreover, $P<0.05$ was considered as the level of significance.

3. Results

The number of participants in this study was 100, including 52 males and 48 females, representing 52% and 48% of the sample size, respectively. The mean age of the subjects participating in the study was 54.54 with a Standard Deviation (SD) of 12.05 years and a minimum age of 30 and a maximum of 65 years. Table 1 presents the characteristics of the participants.

The results of PTA showed that Mean±SD PTA threshold in the hearing aid users was 48.58±12.01 dB HL in the right ear and 48.19±10.98 dB HL in the left ear; these values in the right and left ears of the hearing aid non-users were 41.73±19.40 and 43.20±17.62, respectively.

Statistical analysis showed a significant difference between the mean PTA thresholds in groups 1 and 2 in the right ear ($P=0.002$) and left ear ($P=0.017$); the results also indicated that pure tone thresholds in both ears in group 1 were worse than participants in group 2.

Table 2 presents the analysis of the questionnaire scores totally and in each of the subscales in both groups. The scores of the questionnaire were higher in group 2 than in group 1, which indicates that people, who do

Table 1. Demographic characteristics of the subjects in group 1 and 2 (n=5)

Variables		Mean±SD, No. (%)		P*
		1	2	
Age (year)		56.68±11.89	52.40±11.94	0.076
Sex	Male	24 (48)	28 (56)	0.274
	Female	26 (52)	22 (44)	
Otologic and neuroligic disease	Have	4 (8)	46 (92)	0.370
	Have not	6 (12)	44 (88)	
History of using hearing aids (month)		29.52±43.31 (1-180)	-	-
Duration of using per day (hours)		8.40±5.37 (2-18)	-	-
Mode of hearing aids	Right ear	20 (40)	-	-
	Left ear	20 (40)		
	Binaural	10 (20)		
Hearing aids in right ear	BTE	12 (24)	-	-
	ITE	14 (28)		
	RIC	4 (8)		
Hearing aids in left ear	BTE	22 (44)	-	-
	ITE	8 (16)		
	RIC	0 (0)		

RIC: Receiver-in-Canal; ITE: In the Ear

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* Significant correlation is at the level of 0.05.

not use hearing aids, have a more negative attitude toward it. There was a significant difference between the two groups in the subscale of denial of hearing loss (P=0.000), manual dexterity and vision (P=0.044), and hearing-related esteem (P=0.007). The scores of denial of hearing loss were higher in group 2, whereas the scores of manual dexterity and vision and hearing-related esteem were higher in group 1.

The results of the correlation between the quantitative variables and the scores of the questionnaire in the both groups indicate that in group 1, there is a reverse correlation between the history of hearing aid usage (P=0.010) and the mean pure tone thresholds in the left ear (P=0.002) with the scores of the questionnaire; the individuals with longer hearing aids usage had better attitudes toward it and those who had a better hearing threshold in the left ear had a worse attitude toward hearing aids. However, there was no correlation among

Table 2. Mean±SD of ALHQ subscales and total score in group 1 and 2 (n=50)

Subscales	Mean±SD		P*
	1	2	
Denial of hearing loss	4±13	5±17	P<0.001
Negative associations	5.03±11	4±12	0.088
Negative coping strategies	3±20	6.05±20	0.319
Manual dexterity and vision	3±5	2±4	0.044
Hearing-related esteem	20.03±7	2±6	0.007
Total	11±59	8±61	0.038

* Significant correlation is at the level of 0.05.

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Table 3. Correlations between the mean score of ALHQ and type of hearing aid

Ear	Hearing Aid	Number	Mean±SD	P*
Right	BTE	12	60±12.29	0.616
	RIC	14	59±0	
	ITE	4	62±17.05	
	Total	30	61±13.78	
Left	BTE	22	55.27±7.13	0.023
	RIC	0	-	
	ITE	8	73.50±15.50	
	Total	30	60.13±12.72	

RIC: Receiver-in-Canal; ITE: In the Ear

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* Significant correlation is at the level of 0.05.

age, duration of hearing aids usage per day, average pure thresholds in the right ear, and the scores of the questionnaire. Furthermore, there was no correlation between any of these quantitative variables and the scores of the questionnaire in the participants in group 2.

Statistical analysis showed a significant difference between the type of hearing aid and ALHQ scores in group 1 (P=0.023). There was no significant correlation between ALHQ scores and gender, having a neurologic and otologic disease and mode of hearing aid in the studied population. Table 3 presents the results of the relationship between the type of hearing aid and the mean scores of the questionnaire in both ears. There was no correlation between the type of hearing aids and the mean scores of the questionnaire in the right ear; but, a significant relationship was found in the left ear (P=0.023) so that individuals with Behind The Ear (BTE) hearing aids had lower scores and better attitudes toward hearing aids.

4. Discussion

In the present study, pure tone thresholds were significantly different between the two groups in the right and left ears so that pure tone thresholds in hearing aids users were higher in both ears. In the study by Saunders et al., pure tone thresholds were also worse in people, who used hearing aids [15], which is consistent with the results of this study.

The results of the study also showed that the scores of the questionnaire were higher in group 2 than group 1, indicating that people, who do not use the hearing aid, have a worse attitude toward hearing aids.

Also, there was a significant difference between the subscales of denial of hearing loss, manual dexterity and vision, and hearing-related esteem between the two groups; so, people who did not use hearing aids had more denial of hearing loss, while the subscales of manual dexterity and vision and hearing-related esteem were higher in group 1. Study of Saunders et al. also showed that the average total score of the questionnaire is higher in people, who do not use hearing aids, resulting in a worse attitude toward hearing aids, and more likely to deny their hearing loss; those who had better hearing thresholds had better hearing-related esteem that is inconsistent with the results of the present study [15].

The high score in the subscale of denial of hearing loss denotes that a person does not view his hearing as a problem and does not feel the need for hearing aids. Studies have shown that even when hearing loss, age, and gender are calculated, those with fewer disabilities are more likely to reject using hearing aids than those who report more disabilities [17]. Therefore, the high score in this subscale is likely to result in low hearing aid usage.

The results showed that in group 1, there was a significant reverse relationship between the history of using hearing aids and the mean of pure tone thresholds in the left ear with the scores of the questionnaire; thus, people who had long history of hearing aid usage had a better attitude and those who had better hearing thresholds in the left ear had a worse attitude toward hearing aids. However, there was no correlation between the other quantitative variables and the scores of the questionnaire. There was a significant difference between the type of hearing aid and the ALHQ scores in group 1 and this

correlation was seen only in the left ear and those who used BTE hearing aids had lower average scores and, therefore, better attitude. No significant relationship was found between the other qualitative variables and the questionnaire scores.

The results of a study by Jo et al. show that the demographic factors, such as gender, age, and length of the usage of the hearing aid had no effect on the scores of the questionnaire [18]. In a study by Bastos et al., no association was found between demographic data, auditory thresholds, and ALHQ scores [19].

The results of Saunders et al.'s study indicated a direct association between better hearing and older age with more denial of hearing loss; youth and male gender were related to the higher score of negative association subscale; weaker hearing, youth, and female gender were associated with the more usage of negative coping strategies. Also, lower hearing-related esteem was associated with weaker hearing, and the subscale of manual dexterity and vision was not associated with any of the independent variables [15].

The differences observed between various studies can be the result of differences in the studied populations and the characteristics of the subjects, such as cultural differences or underlying diseases and abnormalities, such as vision problems, hand tremors, depression, etc.

As the most important limitations of the present study, some questions had been ignored or left unanswered or the participants might not be truthful with their answers. These limitations were largely eliminated by increasing the sample size and explaining the purpose of the study and its importance in managing hearing loss for participants. It is suggested to examine the effects of counseling on people's responses to the questionnaire in the future studies.

The results of this study showed that hearing aid users had worse hearing thresholds than hearing aid non-users. Moreover, hearing aid non-users had a more negative attitude toward it and more likely denied their hearing loss, while hearing aid users showed more problems in the subscales of manual dexterity and vision and hearing-related esteem. It is recommended to use the quality of life questionnaires along with the ALHQ questionnaire in future studies to assess the relationship between attitudes toward the loss of hearing and quality of life.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Tehran University of Medical Sciences (Code: IR.TUMS.FNM.REC.1397.146).

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Authors contributions

Designed and performed the measurements and co-wrote the manuscript: Parisa Heidari; Planning and Supervisioin: Reza Hoseinabadi; Statistical analyses: Nematollah Rouhbakhsh.

Conflict of interest

The authors declared no conflicts of interest.

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Appendix:

پرسشنامه نگرش نسبت به کم شنوایی (ALHQ) برای افرادی که از سمعک استفاده نمی کنند.

سؤال	کاملاً مخالفم	مخالفم	نه موافقم نه مخالف	موافقم	کاملاً موافقم
۱. صحبت کردن با من برای خانواده و دوستانم سخت است.	الف	ب	ج	د	هـ
۲. مطمئن هستم برای شنیدن تا حدودی نیاز به کمک دارم.	الف	ب	ج	د	هـ
۳. مشکل شنوایی من خیلی کمتر از آن است که نیاز به سمعک داشته باشم.	الف	ب	ج	د	هـ
۴. تصّور استفاده ازسمعک به من احساس پیری می دهد.	الف	ب	ج	د	هـ
۵. اگر در موقعیتی قرار بگیرم که چند نفر در حال صحبت کردن باشند، گفتگو را رها می‌کنم.	الف	ب	ج	د	هـ
۶. میزان اعتماد به نفسم به اندازه زمانی است که شنوایی من طبیعی بود.	الف	ب	ج	د	هـ
۷. کاملاً مطمئن هستم که به سمعک نیاز ندارم.	الف	ب	ج	د	هـ
۸. این روزها انجام کارهای ظریفی مانند بستن دکمه و زیپ لباس برای من بسیار دشوار است.	الف	ب	ج	د	هـ
۹. نگران زمانی هستم که مردم ببینند در گوش من سمعک هست.	الف	ب	ج	د	هـ
۱۰. از زمانی که کم‌شنوا شده‌ام، از ملاقات با افراد جدید واهمه دارم.	الف	ب	ج	د	هـ
۱۱. سمعک باعث می‌شود افراد پیرتر به نظر برسند.	الف	ب	ج	د	هـ
۱۲. شنوایی ضعیف من باعث می‌شود که احساس ناکارآمدی کنم.	الف	ب	ج	د	هـ
۱۳. کم‌شنوایی من مشکل مهمی نیست.	الف	ب	ج	د	هـ
۱۴. فکر می‌کنم با گذاشتن پیچ های کوچک در جای خود مشکل دارم.	الف	ب	ج	د	هـ
۱۵. من در هنگام گفتگو معمولاً ساکت هستم تا مطلبی را اشتباه نگویم.	الف	ب	ج	د	هـ
۱۶. شنوایی من مشکلی ندارد.	الف	ب	ج	د	هـ
۱۷. به علت مشکلات شنوایی، سعی می‌کنم از صحبت‌های کوتاه دوری کنم.	الف	ب	ج	د	هـ
۱۸. از تصور این که مردم مرا با سمعک ببینند، خجالت می‌کشم.	الف	ب	ج	د	هـ
۱۹. مشکل شنوایی باری بر دوش من است.	الف	ب	ج	د	هـ
۲۰. اشیای کوچک خیلی راحت از دستم می‌افتند.	الف	ب	ج	د	هـ
۲۱. همانند قبل از کم‌شنوایی، اجتماعی و خوش‌صحبت هستم.	الف	ب	ج	د	هـ
۲۲. همواره متوجه هستم که حس شنوایی من چقدر ضعیف است.	الف	ب	ج	د	هـ

برای کاربران سمعک سؤالات ۳، ۴، ۷، ۹ و ۱۸ را با سؤالات زیر جایگزین کنید.

سوال	کاملاً مخالفم	مخالفم	نه موافقم نه مخالف	موافقم	کاملاً موافقم
۳. کم‌شنوایی من به حدی خفیف است طوری که به خوبی و بدون استفاده از سمعک می‌توانم مشکلم را برطرف کنم.	الف	ب	ج	د	هـ
۴. استفاده از سمعک باعث می‌شود احساس کنم پیرتر هستم.	الف	ب	ج	د	هـ
۷. واقعا فکر نمی‌کنم به سمعک نیازی داشته باشم.	الف	ب	ج	د	هـ
۹. دوست ندارم دیگران مرا با سمعک ببینند.	الف	ب	ج	د	هـ
۱۸. وقتی در حال استفاده از سمعک دیده می‌شوم، خجالت می‌کشم.	الف	ب	ج	د	هـ

نحوه امتیازدهی امتیاز سؤالاتی که با ستاره مشخص شده اند (سؤال ۱و ۲) را به صورت معکوس محاسبه کنید.

گزینه	سؤالات با امتیازات مستقیم					سؤالات با امتیازات معکوس				
	الف	ب	ج	د	ه	الف	ب	ج	د	ه
نمره	۱	۲	۳	۴	۵	۵	۴	۳	۲	۱

امتیاز سؤاالات مربوط به هر خرده مقیاس را با هم جمع کنید و بر تعداد کل سؤالات آن خرده مقیاس تقسیم کنید.

شماره	خرده مقیاس	امتیاز
۱	انکار کم شنوایی	(۱۶ +۱۳ +۷ +۳ +۲* +۱*)/ ۶ امتیاز سوالات
۲	تداعی منفی	(۱۸ +۱۱ +۹ +۴)/۴ امتیاز سوالات
۳	راهبردهای مقابله ای منفی	(۲۲ +۱۹ +۱۷ +۱۵ +۱۲ +۱۰ +۵ +۱) /۸ امتیاز سوالات
۴	مهارت های دستی و قدرت بینایی	(۲۰ +۱۴ +۸) /۳ امتیاز سوالات
۵	عزت نفس مرتبط با حس شنوایی	(۲۱ +۶)/۲ امتیاز سوالات

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