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Presbiakuzili Hastalarda İşitme Cihazı Kullanımı Öncesi ve Sonrası İşitme Engeli Anketi Sonuçlarının Karşılaştırılması

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Öz

Çalışmamın amacı yaşlılığa bağlı işitme kaybının işitme cihazı kullanmadan önce ve sonra yaşam kalitesi üzerindeki etkilerini incelemek, hasta memnuniyetini ölçümlemek, işitme cihazlarının sağladığı yararı ortaya koymak ve bu oranlar üzerinde etkili olan faktörleri saptamaktır. Çalışmaya 65 yaşın üzerinde presbiakuzi tanısı konulmuş olan ve ilk kez işitme cihazı kullanmaya başlayan bireyler çalışmaya dâhil edilmiştir. Katılımcıların ikinci anket sürecine kadar (3 ay boyunca) minimum 10 saat düzenli olarak cihazlarını kullanmıştır. Katılımcıların günlük işitme cihazı kullanım sürelerinin aralığı 10 saat ile 14 saat arasında değişim göstermektedir. İşitme cihazı kullanılmaya başlanılan gün yapılan anket sonuçları ile 3 ay sonra tekrarlanan anket sonuçları arasında anlamlı bir fark gözlendi ve her bireyin puanında ortalama 12.533 düşüş saptandı. Bu sonuçlara göre işitme sorunlarının geçen sürede azaldığı kabul edildi ve 3 ay düzenli cihaz kullanımının hastaların daha pozitif bir psikolojiye sahip oldukları gözlendi. Presbiakuzinin erken teşhis edilmesi ve ardından işitme cihazı kullanımı ile birlikte işitsel rehabilitasyon yapıldığında işitme kaybını oluşturabileceği negatif psikolojik etkilerin azalacağı gözlenmiştir. Çalışma geniş hasta kitlesiyle tekrarlanabilir. Bu çalışma bize gösteriyor ki geriatrik popülasyonda işitme cihazı rehabilitasyonunda başta odyolojik tetkikler olmak üzere işitme kaybına uygun cihaz seçilmesi ve ayarlanması gibi işitme engeli ölçeğinin de yapılması işitme cihazı performansını arttıracak ve bireyin psikolojik durumu gözlemleyebilmeyi sağlayacaktır.

Anahtar Kelimeler: Presbiakuzi, geriatri, yaşlı, işitme kaybı, işitme cihazı

Comparison of Hearing Disability Questionnaire Results Pre and Post Hearing Aids Use in Presbycusis Patients

Abstract

The aim of this study was to examine the effects of hearing aids on quality of life in age-related hearing loss, both before and after use, to measure patient satisfaction, to demonstrate the benefits of hearing aids, and to identify factors influencing these rates. The study included individuals over 65 years of age diagnosed with presbycusis who were using hearing aids for the first time. Participants used their devices regularly until the second survey (over a period of 3 months). Daily hearing aid use ranged from 10 to 14 hours. A significant difference was observed between the survey results conducted on the day the hearing aid was first used and the survey results repeated three months later, with an average decrease of 12.533 points in each individual's score. Based on these results, it was concluded that hearing problems had decreased over time, and it was observed that three months of regular device use led to patients having a more positive psychological state. It has been observed that early diagnosis of presbycusis, followed by hearing aid use and auditory rehabilitation, can reduce the negative psychological effects that may contribute to hearing loss. The study could be replicated with a larger patient population. This study shows us that in hearing aid rehabilitation in the geriatric population, conducting audiological examinations, selecting and adjusting devices appropriate for hearing loss, and administering a hearing impairment scale will improve hearing aid performance and enable observation of the individual's psychological state.

Keywords: Presbycusis, geriatrics, elderly, hearing loss, hearing aids

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Introduction

Aging is the changes in structure and function that occur in living things over time. There is a decrease in the physiological function of the biological system. It is a long process that begins with birth and ends with death, and the end of 64 years and the beginning of 65 years are defined as old age by calendar age (Unal, 2019).

Hearing loss occurs due to pathologies in one or more regions of the hearing pathways. The speech and understanding of a person with hearing loss becomes weaker compared to their previous hearing, and is noticed by themselves or those around them. Hearing loss can be seen in a wide range, from a very mild loss to a total loss. It can occur unilaterally or bilaterally, suddenly or gradually. There are many causes of hearing loss. It can occur due to congenital reasons, noise-related reasons, autotoxic drug use, genetic factors, and trauma (Çık, 2018).

Presbycusis is a bilateral, symmetrical and sensorineural type hearing loss. Higher frequencies are mostly affected. The person's ability to distinguish speech generally decreases. They hear speech, feel the presence of sound, but have difficulty in distinguishing what is being said. Usually, individuals with presbycusis do not notice the hearing loss until it is moderate. The first to notice are the people around them. Social activities of individuals with presbycusis are restricted, they do not want to go out and talk to people, and they isolate themselves from society because they do not understand what is being said. Psychological problems arise. They become withdrawn. In withdrawn individuals with presbycusis, hearing loss and inability to distinguish words progress more rapidly. The quality of life decreases gradually. Cognitive functions decrease. Dementia is possible in individuals with presbycusis who have decreased cognitive functions. There is a connection between presbycusis and dementia. The likelihood of developing dementia is twice as high in an individual with mild hearing loss as in an individual with normal hearing, three times as high in an individual with moderate hearing loss, and five times as high in an individual with severe hearing loss (Lotfi et. al., 2009).

Individuals with presbycusis have hearing loss that progresses silently. They have difficulty in identifying words, especially in a loud and crowded environment. Tinnitus may also accompany hearing loss. When taking the history in the geriatric population, noise exposure, smoking and alcohol use, hypertension, ototoxic drug use, and genetic family history are asked about. Usually, the otoscopic examination is normal. After the patient is examined by an Ear Nose Throat (ENT) specialist, audiological evaluations are performed. In patients who undergo pure tone audiometry and speech audiometry, a decrease in high frequencies is observed in the early period. Over time, it affects all frequencies. There is hearing loss in both ears and the hearing loss is symmetrical. There is an increase in the speech reception threshold and a decrease in the speech discrimination scores. Speech audiometry is important in order to select the appropriate device and to determine the efficiency of the device (Çakır et. al., 2013).

When hearing loss cannot be corrected with medication or surgery, hearing aids are considered the best treatment method. The important thing here is to choose the appropriate device for the hearing loss, to make the appropriate device adaptation for the hearing loss and to teach the patient how to use the device correctly (Hamurcu et al., 2012). Hearing aids are used to improve the hearing and speech skills of individuals with hearing loss. Hearing aids are frequency specific. Pre applying a hearing aid, a detailed medical history should be taken from the patient. The hearing aid model is determined according to the type and degree of loss. The hearing aid helps compensate for the existing loss and makes life easier for people with hearing loss (Çık, 2018).

The hearing disability scale is versatile and can be used in various places. It allows individuals to self-evaluate and increase their awareness throughout the process. The scale is the Hearing Handicap Inventory for the Elderly, which evaluates the impact of hearing loss on the emotional and social adaptation of the elderly. The Hearing Handicap Inventory for the Elderly **(**HHIE)scale is a scale used to evaluate a person's emotional state of hearing, scored as yes (4), sometimes (2) and no (0). It consists of 25 items. The total score determines the level of hearing impairment. The long form consists of 100 points. The application time is approximately 10 minutes. Level 1 is between (0–16) points and is considered as “no obstacle”. A score of Level 2 (17-42) is considered “mild to moderate impairment”, and a score of Level 3 (43+) is considered “significant hearing impairment”(Aksoy, Aslan and Köse, 2020).

The aim of this study is to evaluate the effects of hearing aids on the quality of life of individuals with Presbycusis pre and post using hearing aids, and to determine the satisfaction levels of hearing aid users. The basis of this study is to examine the effects of hearing aids on the quality of life of individuals with age-related hearing loss pre and post use, to measure patient satisfaction, to reveal the benefits provided by hearing aids and to determine the factors affecting these rates. The study was conducted using the Hearing Impairment Scale - Elderly (long form) for evaluation.

1.Method

Our study was evaluated and approved at the ethics committee meeting held at Istanbul Gelişim University on March 15, 2024, under number 2024-04.

The Hearing Impairment Inventory was completed by the researcher for volunteers who were followed up at a hearing aid center, diagnosed with presbycusis, and participating in the study. The scale is the Hearing Impairment Inventory in the Elderly, which assesses the impact of hearing loss on emotional and social adjustment in the elderly. In our study, the Turkish version of this questionnaire was used. Aksoy et al. (2019) translated the scale into Turkish and obtained its validity and reliability. The HHIE processor uses an extended scale consisting of Level 1, Level 2, and Level 3. Level 1 indicates the presence of hearing loss, Level 2 indicates mild to moderate hearing loss, and Level 3 indicates significant hearing loss. Individuals who have been diagnosed with presbycusis over the age of 65 and who have started using hearing aids for the first time were included in the study. Individuals who use hearing aids but cannot respond reliably to survey forms, individuals who do not use hearing aids, individuals with anatomical or structural disorders of the external ear canal and tympanic membrane, individuals with literacy problems, individuals with difficulty in cooperation, individuals under the age of 65, individuals who have not been diagnosed with presbycusis were not included in the study.

The study included a total of 30 participants who were using hearing aids for the first time. The questionnaires were repeated 3 months after the patients became accustomed to the device. The study examined pre- and post-device scale scores. All patients included in the study used bilateral hearing aids. Patients used three different brands of hearing aids. Device adjustments were made according to the National Acoustic Laboratories – Non-Linear 2 (NAL-NL2) algorithm for all patients, with a baseline gain of 70%. If the brain has been operating with low stimulation for a long time, suddenly providing full gain can create auditory overload. Therefore, it was decided to initially provide around 70% gain and gradually increase it over several weeks.Of the patients participating in the study, 17 used bilateral behind-the-ear (BTE) hearing aids, 11 used bilateral in-the-ear (RIC-BTE) hearing aids, and 2 used bilateral in-the-ear (CIC) hearing aids.The results were evaluated statistically. escriptive statistics were evaluated with arithmetic mean, number, percentage and standard deviation. In statistics, the significance test of the difference between the two averages between the dependent and independent variables for parametric assumptions, one-way variance analysis, Mann Whitney U test for nonparametric variations, Kruskal Wallis Analysis, simple correlation between the dependent variables and the scale were performed. In the data that was found to be significant, prediction was made with regression analysis.

2.Results

30 individuals over the age of 65 participated in the study. 11 of the participants were male and 19 were female. The age range of the participants included in the study was between 65 and 75. The hearing loss of the participants was diagnosed for the first time by an Otolaryngologist and an Audiologist. The study was applied to patients with presbycusis with moderate to advanced hearing loss. All patients use bilateral hearing aids. Participants used their devices regularly for a minimum of 10 hours (over 3 months) until the second survey process.

During the study, hearing aid types were questioned. 17 individuals use bilateral behind-the-ear (BTE) hearing aids, 11 individuals use bilateral receiver-in-the-ear (RIC-BTE) hearing aids and 2 individuals use bilateral in-the-ear (CIC) hearing aids.

A paired (dependent) sample t-test was performed for pre-post comparison according to the survey results. According to these test results, a significant difference was observed between the survey results conducted on the day the hearing aid was started to be used and the survey results repeated after 3 months, and an average decrease of 12.533 was found in each individual's score. According to these results, it was accepted that hearing problems decreased over time and it was observed that patients who used the device regularly for 3 months had a more positive psychological state (Table 1, 2).

Table 1. Basic statistics of score variables include mean, median, deviation, asymmetry, and kurtosis.

Valid	n	Mean. ± SD	Median (Q1–Q3)	Min–Maks	Skewness	Kurtosis
Pre Total Score	30	46.00 ± 27.54	46.00 (21.50–64.00)	8–98	0.422	-0.763
Post Total Score	30	33.47 ± 23.54	33.00 (7.50–48.50)	2–92	0.564	0.044

Note: Q1 = 25. persentil, Q3 = 75. persentil.

Table 2. There is a significant difference between the pre and post measurement averages; each individual's score decreased by an average of 12.533.

Valid	Mean. ± SD	95% Confidence Interval of the Difference	t	df	p
Pre Test – Post Test	12.53 ± 14.96	6.95 – 18.12	4.59	29	<0.001

Not: df= degrees of freedom

3.Discussion

Our study group observed improvements of 20% at Level 1, 26.7% at Level 2, and 53.3% at Level 3 in hearing loss. The control group showed improvements of 30% at Level 1, 43.3% at Level 2, and 26.7% at Level 3. Analyses of both the study and control groups indicate that survey results should be considered, and malfunctions experienced despite device use should be identified and resolved. It was found that presbycusis patients in the study group had significantly higher levels of disability compared to the control group (Figure 1).

The analysis results in the study were not affected by the age and gender of the individuals. In a different study, 49% of the individuals used a device in the right ear, 20% in the left ear, and 31% used a bilateral device. In another study, 72.5% of the participants used the hearing aid in the left ear. The most important reason for the difference between the studies is that people who use bilateral hearing aids are first fitted according to their speech discrimination scores. Since the hearing aid from the side with a high SDS score will be more efficient, the use of a hearing aid is started in that ear. Another reason is that the right ear is more exposed to hearing loss than the left ear. 56.7% of the participants in our study use bilateral behind-the-ear, 36.6% use RIC, and 7% use in-the-ear hearing aids. Those who use behind-the-ear hearing aids are significantly more than those who use in-the-ear hearing aids. In-the-ear hearing aid is suitable for moderate hearing loss configuration.

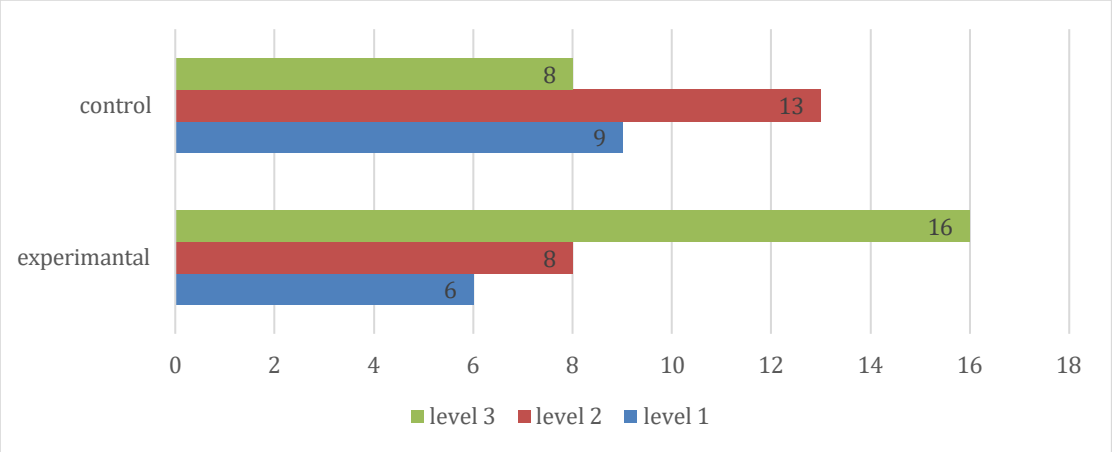


Figure 1. In the current state of HHIE's workgng and control groups

The research found that the rate of hearing aid use was higher in women. Another study found that 78% of women started using devices at moderate hearing loss, while 54% of men started using hearing aids at moderate to advanced hearing loss. According to the results, it was observed that men started using devices later than women. Since all participants in our study had moderate hearing loss, such a comparison could not be made. When the cities where individuals live were analyzed, no difference was found. In Ünal's (2019) scientific study, no significant difference was found as a result of the analysis of the city where the participants lived (Ünal, 2019). In addition, the same result was reached in the studies of Köse (2014) and Şahin (2010) (Köse and Çolpan Erkan, 2014; Şahin, 2010).

The questions with the highest scores in the HHIE are questions 6 and 15. Question 6: Does your hearing problem related to substance use cause you difficulty during a meeting/social gathering? Item 15: “Do you have difficulty watching television or listening to the radio because of your hearing problem?” Item 15 also received the highest score in Şahin (2010) and Ünal's (2019) study (Ünal, 2019; Şahin, 2010). Contrary to this study, Ünal's (2019) results showed that item 8 received a high score (Ünal, 2019). In Şahin's (2010) study, question 9, “Do you feel disabled because of your hearing problem?”, received the lowest score (Şahin, 2010). The same is true for question 9 in Ünal's (2019) study. This item received the lowest score (Ünal, 2019). However, in our study, the item that received the lowest score was the item with the question "Does your hearing problem cause you to go shopping less than you want to?" The reason for this is that the participants in the habituation group felt deprived of hearing care and disabled pre using a hearing aid. For this reason, in our study 6. The scores of the item were found to be higher compared to other studies.

Many of the participants who have just started using devices due to the fact that people who come up with hearing problems become withdrawn and isolate themselves from society, are the 24th of the HHIE scale. Does a hearing problem with substance cause you to feel uncomfortable when talking to friends? he gave a high score to his question. Studies have shown that the answer to this question decreases by 3/1 in those who use hearing aids for 3 months. In his study, Newman emphasized that individuals experience difficulties due to hearing loss as; feeling lonely, feeling excluded, and that individuals have difficulty hearing during visits to friends and neighbors due to hearing loss (Newmann and Weinstein, 1989).

The psychological and economic effects of patients diagnosed with presbycusis who are not treated with hearing aids cause a decrease in their quality of life. Does your hearing problem cause you to stay away from people? According to the examination pre and post using the device, the participants answered yes 30% pre using the hearing aid, but this rate decreased to 13.3% after using the hearing aid. According to the results of the study, it was determined that there was a significant improvement in hearing problems in 3 months of device use. In the study conducted by Hamurcu and his friends, it was observed that the quality of life increased when the device usage time was increased and used regularly. The studies are mutually confirming (Hamurcu et. al., 2012; Aksoy, 2022).

4.Conclusion

A total of 30 individuals, 11 of whom were male and 19 of whom were female, participated in our study titled 'Comparison of Hearing Impairment Questionnaire Results Pre and Post Using Hearing Aids in Patients with Presbycusis.' Data collection was carried out between January 2024 and April 2024. According to the results of the study, it was observed that the use of hearing aids had a positive effect on individuals. It has been observed that individuals were more irritable and aggressive pre using hearing aids, but when they used the device efficiently and regularly, they became calmer and took an active role in life. It has been determined that individuals who confined themselves to loneliness and became withdrawn without the device started to be more involved in society after using the hearing aid. Therefore, it is recommended that individuals with presbycusis use a hearing aid suitable for their hearing loss on a regular basis.

Presbycusis diagnosed in the early stages of aural rehabilitation and then when it is done in conjunction with the use of a hearing aid, hearing loss was observed the decrease of the negative psychological effects that can create. The study can be replicated with a larger patient population. This study shows that in geriatric recordings, hearing aid compatibility is enhanced by audiological treatments, appropriate device selection and correct treatment, as well as hearing impairment treatment, and contributes to monitoring individual psychological components.

Authors' Contribution Statement
Conflict of Interest:
The authors declare that they have no competing interests.
Ethical Approval:
This study was carried out with the approval of the Ethics Committee of Istanbul Gelisim University, dated 15/03/2024. and numbered 2024-04. A signed subject consent form in accordance with the Declaration of Helsinki was obtained from each participant. This study adheres to ethical guidelines throughout its preparation process.

Multi-Authored Works:
1st Author: Introduction, Literature Review, Conclusion
2nd Author: Methodology

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