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Original Article

# A simple supportive evaluation way for the diagnosis of psychogenic hearing loss

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## Abstract

**Aim:** Purpose of this study is to assess patients diagnosed with psychogenic hearing loss, who describe hearing deficiency complaints but lack the auditory pathology in audiological examinations, in terms of depression and anxiety levels. Psychogenic hearing loss is presence of hearing deficiency despite the absence of any pathology that could cause hearing loss in auditory system. Purpose of this study is to assess patients diagnosed with psychogenic hearing loss, who describe hearing deficiency complaints but lack the auditory pathology in audiological examinations, in terms of depression and anxiety levels.

**Material and Methods:** In our study 54 female patients, who admitted to our clinic between July 2015 and June 2017 with solely hearing deficiency complaint and had no other complaints including mainly otorhinolaryngology and psychiatric diseases, and 51 healthy female subjects who volunteered to attend our study were compared with regards to their Beck Anxiety and Depression scores.

**Results:** Comparison of mean ages of patients group included in the study and the control group did not reveal any statistically significant difference ($p>0.05$). No significant difference was observed among groups for both pure tone audiometry and speech sound differentiation scores ($p>0.05$). Beck Anxiety Scale and Beck Depression Scale scores of the patient group was determined to be statistically significantly greater than that of those control group ($p<0.001$).

**Conclusion:** Psychogenic hearing losses are examined as one of the pseudoneurologic symptoms observed in conversion disorder. Our study results show that women who admit with psychogenic hearing loss had higher depression and anxiety levels than healthy control subject, therefore, points to the necessity for these patients to be evaluated for anxiety and depression and followed up jointly by psychiatry department with regards to psychotherapeutic intervention needs.

**Keywords:** Beck anxiety inventory; beck depression inventory; psychogenic hearing loss

## INTRODUCTION

Hearing losses are classified as organic and non-organic hearing losses (NOHL). Pseudohypacusis, functional or NOHL that cannot be related to organic causes was first defined in 1961 by Carhart (1). Prevalance of pseudohypacusis was reported as 1.35% in a series of 4720 patients (2). It is characterized with the inconsistency between the hearing ability of the patient and the threshold measured by pure tone or speech audiometry (3).

Today, there are different terms in the literature that are used instead of pseudohypacusis, such as psychogenic hearing loss, functional hearing loss and NOHL. Current definitions can be classified as consciously (malevolent, simulation, malingering) and unconsciously (psychogenic, disassociative, conversive) false audiometry results. Psychogenic hearing losses are pseudohypacusis that have unconscious psychological roots that mimic the hearing loss symptoms (4).

Although psychogenic hearing losses are rarely seen by otorhinolaryngologists, they are considered as a subtype of conversion disorder, which is classified under Somatic Symptom and Related Disorders, that is accompanied by special sensory symptoms in DSM-5 (American Psychiatric Association, 2013). Conversion disorder is defined as a psychiatric condition caused by psychogenic conflicts or needs, causes functionality losses, and manifest with symptoms related to one or more motor or sensory function changes that can lead to consideration of neurologic or medical conditions (5,6). Hearing loss is also a sensory symptom that can be seen as a form of conversion disorder; it can be unilateral or bilateral, however, neurological examinations indicate healthy and

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steady sensory paths (7). It is 2-10 times more prevalent in women than men (8). The other most frequent psychiatric disorders accompanying conversion disorder are major depressive disorder and anxiety disorders (7).

In this study, we aimed to evaluate patients, who are complaining hearing difficulty and diagnosed with psychogenic hearing loss as they had no detectable organic auditory pathology, but depression and anxiety.

## MATERIAL and METHODS

Our study was conducted upon receiving the approved by Kocaeli University Medical Faculty Clinical Studies Ethics Committee with 08.07.2014 dated and 15/11 numbered resolution. Fifty-four female patients, who admitted to our clinics between July 2015 and June 2017 with sole symptom of hearing difficulty and had no other complaints including mainly otorhinolaryngology diseases, were included in our study after simulation and artificial disorder diagnoses had been excluded by a psychiatrist. The control group is consisted of women who had no known otorhinolaryngology-related and psychiatric disorders, had no history of permanent or temporary hearing loss in any period of their lives and volunteered to take part in our study. All participants were evaluated by a psychiatrist.

Women younger than 18 and older than 65 years of age, those who have otologic-neurootologic pathology, those with otologic surgery history, conduction and/or sensorineural hearing loss, any psychiatric disorder and ones receiving psychiatric treatment, and who have chronic diseases such as; rheumatic disease, cerebrovascular diseases, diabetus mellitus and cancer were excluded from the study.

Demographic information of 105 female patients, who were eligible for inclusion criteria, was obtained and Pure Tone Audiometry (PTA), Speech Audiometry, Beck Depression Scale (BDS), and Beck Anxiety Scale (BAS) were applied.

### Audiometric evaluation

Pure tone audiometry for 250–8000 Hz frequencies and speech audiometry were carried out (with AC 40 Clinical Audiometer; Interacoustics, Assens, Denmark) for each and every patients as well as impedancemetry. Avarage of PTA scores at 500, 1,000, 2,000, and 4,000 Hz frequencies was taken as pure tone average.

### Beck Depression Scale (BDS)

This scale is widely used for quantitative evaluation of depression severity. It is consisted of 21 questions and each question is answered on a scale from 0 to 3. Threshold value indicating depression is assumed as 17. The degree of depression is graded according to the total scores: 17-20 points: mild, 21-30 points: moderate and 31-63 points: severe depression. The scale was translated into and validated in Turkish by Hisli N. (9).

### Beck Anxiety Scale (BAS)

This scale is a self-reporting evaluation scale used to measure the anxiety level of an individual. It is consisted of 21 items. It is a four-point Likert type scale. Each item is scored from 0 to 3 and total score is calculated through addition of these scores. In the scale, increased total score indicates increased anxiety level. 10-17 points suggest mild anxiety, 18-29 suggest moderate, and 30-63 suggest severe anxiety. The Turkish validity and reliability of BAS, developed by Beck et al in 1988 (10), was performed by Ulusoy et al (11).

### Statistical Methods

Data were analyzed and the Student's t test was applied to the measurements in all groups and $p < 0.05$ was considered statistically significant.

## RESULTS

Total of 105 women, 54 of those with the complaints hearing and 51 were volunteers, were evaluated in the study. The mean age of the patient group was 29.9 years (range: 18-57) and of the control group it was 29.17 years (range: 18-59). There was no statistically significant

**Table 1. Comparison of patient and control groups' PTA scores**

| | Patient group | Control group | P value |
|---|---|---|---|
| **Number of patients (n)** | 54 | 51 | |
| **Mean age (years)** | 29.09 years (18-57) | 29.17 years (18-59) | p> 0.05 |
| **Pure tone average of right ear airway (dB)** | 10.29 dB (3 dB - 20 dB) | 8.64 dB (3 dB - 20 dB) | p> 0.05 |
| **Pure tone average of right ear bone way (dB)** | 4.2 dB (0 dB - 17 dB) | 4 dB (0 dB - 12 dB) | p> 0.05 |
| **Pure tone average of left ear airway (dB)** | 10.05 dB (3 dB - 20 dB) | 8.09 dB (0 dB - 18 dB) | p> 0.05 |
| **Pure tone average of left ear bone way (dB)** | 5 dB (0 dB - 18 dB) | 3 dB (0 dB - 12 dB) | p> 0.05 |
| **Speech sound differentiation score of right ear** | 97.55 ± 2.62 (range 88 - 100) | 98.27 ± 2.29 (range 92 - 100) | p> 0.05 |
| **Speech sound differentiation score of left ear** | 97.52 ± 4.29 (range 86 - 100) | 96.94 ± 4.63 (range 88 - 100) | p> 0.05 |

difference between the groups (p>0.05) (Table 1). Based on the patients' own account, putative hearing losses were in the right ear in 13 patients, in the left ear in 10 patients, and bilateral in 31 patients. The comparison among the groups did not reveal any statistical significance between right and left ears. However, a statistically significant portion of the patients mentioned bilateral hearing loss (p<0.05).

Mean value of the right ear air conduction (Ac) PTA of the patients was 10.29 dB (3 dB - 20 dB) as their bone conduction (Bc) PTA mean value was 4.2 dB (0 dB - 17 dB). The left ear Ac PTA mean value was 10.05 dB (3 dB - 20 dB) and Bc PTA mean value was 5 dB (0 dB - 18 dB). The mean PTA values of the control group were as follows: right Ac PTA: 8.64 dB (3 dB - 20 dB) and right Bc PTA: 4 dB (0 dB - 12 dB). The left ear Ac PTA mean value was 8.09 dB (0 dB - 18 dB) and Bc PTA mean value was 3 dB (0 dB - 12 dB). The comparison of Ac and Bc PTA mean values the control group did not reveal any statistically significant difference (p>0.05) (Table 1).

Speech discrimination (SD) scores of patient and control groups were compared; the SD scores of the patients group was measured as 97.55 ± 2.62 (range 88 - 100) in the right ear and as 97.52 ± 4.29 (range 86 - 100) in the left ear. For the control group, SD scores was 98.27 ± 2.29 (range 92 - 100) in the right ear, and 96.94 ± 4.63 (range 88 - 100) in the left ear. No statistically significant difference was found between the groups in terms of SD scores (p>0.05) (Table 1).

According to the comparison of BAS of patient and control groups; patient group had mean score of 21.83 ± 11.71 and control group had mean score of 3.80 ± 3.73. The patient group had statistically significantly greater anxiety scores in comparison with the control group (p<0.001) (Figure 1).

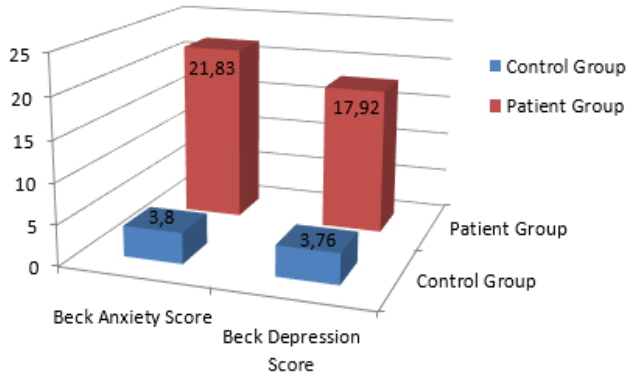


**Figure 1.** Comparison of BAS and BDS of patient and control groups

According to the evaluation of BAS's of the patient group in terms of symptom severity, 7 patients (13%) had anxiety scores lower than the threshold value, 20 patients (37%) had mild, 16 patients (30%) had moderate, and 11 patients (20%) had severe anxiety symptoms (Figure 2 ). In control group, 46 patients (90.2%) had anxiety scores lower than the threshold value and only 5 patients (9.8%) had mild anxiety symptoms. No moderate or severe level of anxiety was observed.

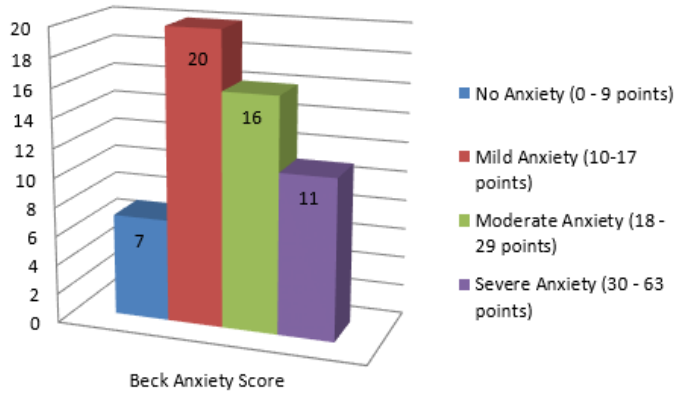


**Figure 2.** BAS distribution of the patient group

Based on the comparison of patient and control group in terms of BDS, the patient group had mean BDS score of 17.93 ± 8.97, and control group had mean BDS score of 3.76 ± 2.74 (Figure 1). The patient group had statistically significantly greater depression score in comparison with the control group (p<0.001) (Figure 1).

According to the evaluation of BDS of the patient group in terms of symptom severity, 3 patients (5.5%) had depression scores lower than the threshold value, meaning that it did not meet the clinical depression diagnosis, 23 patients (42.5%) had mild, 24 patients (39%) had moderate and 7 patients (13%) severe depression symptoms (Figure 3). BDS scores of all individuals in the control group were lower than 9.

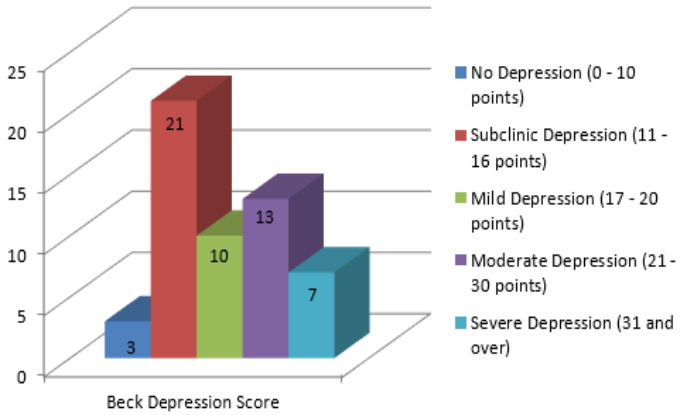


**Figure 3.** BDS distribution of the patient group

## DISCUSSION

Non-organic hearing loss is a condition in which there is a discrepancy between the actual hearing threshold and perceived hearing level of the patients. Various terms are used to describe this condition, including functional

hearing loss, pseudohypacusis, psychogenic hearing loss, and conversion deafness. Psychogenic hearing loss is classified under the umbrella term of conversion disorder. Psychogenic hearing loss can be easily diagnosed in most of the cases by experienced clinicians through conventional audiological tests. PTA and speech audiometry are standard subjective tests in the evaluation of hearing loss. A discrepancy between speech and PTA thresholds or lock of a shadow curve should alert the clinician to the possibility of psychogenic hypoacusis (12).

The fact that functional hearing loss is more frequent in adult women between 20-40 years of age enables it differentiation from idiopathic sensorineural hearing loss that typically onsets after the age of 50. In a case series consisted of 31 patients, 24 of them were reported to be women (13). Because of the functional hearing loss is more prevalent in female sex as in conversion disorder, female patients who admitted with hearing loss complaints were included in this study since. The mean age of patients included was 29.13 (range:18-59).

In cases with no discernable organic etiology, the differential diagnosis must be performed to exclude presence of factitious disorder or malingering (simulation), which is the individual's assumption of the role of a patient intentionally and mimicking physical or psychological symptoms, in order to gain some benefit. This is first and foremost differential diagnosis in the NOHL and they must be excluded through psychiatric evaluation. Georgescu et al (2014) reported that psychogenic hearing loss is more frequent in childhood, which it is generally bilateral, and their hearing loss is often related to simulation or conversion disorder (8). Same authors also quoted that symptoms in adults were generally bilateral and hearing loss follows a stable or fluctuant course, and the women/men ratio varied between 2/1 and 10/1 in the literature (8). Hiraumi et al (2007) stated that there was similar numbers of patients admitting with unilateral and bilateral hearing loss in their case series (12). The fact that 31 of the 54 patients included in the study had bilateral hearing loss, 13 had hearing loss in the right ear and 10 had hearing loss in the left ear supports the previous study findings.

The most frequent comorbid psychiatric disorders accompanying conversion disorder are depression and anxiety disorder (7). Anxiety is often accompanied by various medical and neurological disorders in addition to other mental disorders. (14). Our study results revealed that anxiety levels of patients who had no other complaints except hearing difficulty and diagnosed with psychogenic hearing loss based on the absence of hearing loss at the audiologic examinations were significantly higher than those of the healthy controls. It is noteworthy that an anxiety symptom was found in a patient group that could be as high as 87%. According to the evaluation of BAS's of the patient group in terms of symptom severity, only 7 patients had anxiety scores lower than the threshold value, 20 patients (37%) had mild, 16 patients (30%) had moderate, and 11 patients (20%) had severe anxiety symptoms. In the control group, mild anxiety symptoms were detected in only 5 individuals and moderate and severe levels of anxiety were not found. No study that investigates the association between functional hearing loss and anxiety was found in the literature. Cosh et al (2017) suggested that anxiety levels were increased in patients over the age of 60 years who were admitted with hearing loss complaints, however, they claimed that the increase in the anxiety levels did not persisted in their follow-ups (15). Terzi et al (2015) conducted a study where they compared anxiety and depressive symptom levels of 46 patients at the time of their admittance with sudden hearing loss, and researchers reported that they did not find any significant difference with regards to anxiety and depressive symptom levels in comparison to the control group that had no otologic complaints (16).

Our study results show that patients with functional hearing loss had higher depressive and anxiety symptom scores at statistically significant level than the control group. Many previous studies have shown that patients suffering from age-related hearing loss could also suffer from various concurrent mental problems, that depressive symptoms are highly related and that social functionality and cognitive functions were also affected in association with the condition (15-17-18). Keidser et al (2015) found that poor functional hearing was associated with increased depressive symptoms in adults between 39-70 years of age and this association was more significant in younger ages and in women (19). Although there are case presentations related to mental problems observed in functional hearing losses in the literature (20-21), no studies were found in terms of examination of psychiatric symptoms that accompany functional hearing loss in adults.

No other studies using BAS and BDS in psychogenic hearing loss were found in the literature. It is important to explain to the patients his/her diagnosis of psychogenic hearing loss and that this disorder is not related to any organic pathology of the auditory system based on the audiometric examination results. These patients also should be referred to a psychiatrist on the ground that such situation may be a reflection of a psychiatric problem. Some problems can encountered as the patient is referred to a psychiatrist. Patient can deny that he/she may have psychic problems and can request further tests considering there is a serious disease that cannot be diagnosed by the physician. In this regard, since BAS and BDS are self-reporting scales that can be easily completed by the patient, our study has shown that those scales are easily filled out under out-patient clinic conditions, and it may be possible for the patient to be able to see more objectively that he or she is experiencing some psychological problems. It has been shown through our work that there are evaluation tools that will make it easier for the patient to be directed to the psychiatrist. Further studies with larger study groups are required to investigate the effects of anxiety and depressive symptoms accompanying the etiology, clinical course and treatment process of functional hearing loss in detail.

## CONCLUSION

Psychogenic hearing losses are examined under the umbrella term of conversion disorder. According to the results of our study, patients with psychogenic hearing loss had higher anxiety and depressive symptom levels than healthy control group, that anxiety and depression symptoms may have both triggering and maintaining effects for hearing loss, and therefore that patients should be followed-up in collaboration with psychiatrists. Patients diagnosed with functional hearing loss may recover spontaneously without any therapeutic intervention; however, cases that have accompanying anxiety and depression should be referred to psychiatry department for potential psychopharmacological treatment or psychotherapy needs.

*Informed consent: Informed consent was obtained from all individual participants recruited in the study.*

*Competing interests: The authors declare that they have no competing interest.*

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## REFERENCES

1. Carhart R. Testing for malingering, Trans. Am. Acad. Ophthalmol. Otolaryngol 2012;65:437.
2. Qiu WW, Yin SS, Stucker FJ, et al. Current evaluation of pseudohypacusis: strategies and classification, Ann. Otol. Rhinol. Laryngol 1998;107:638-47.
3. Riedner ED, Efros PL. Non-organic hearing loss and child abuse: beyond the sound booth, Br. J. Audiol 1995;29:195-7.
4. Feldmann H. The status of psychogenic hearing disorder today,(DasBild der psychogenen Ho¨ rsto¨rungheute), Laryngorhinootologie 1989;68:249-58.
5. Ali S, Jabeen S, Pate RJ, et al. Conversion disorder-Mind versus body: a review. Innov Clin Neurosci 2015;12:27-33.
6. Ejareh dar M, Kanaan RAA. Uncovering the etiology of conversion disorder: insights from functional neuroimaging. Neuropsychiatr Dis Treat 2016;12:143-53.
7. Kaplan & Sadock Psikiyatri. Sadock BJ, Sadock VA, Ruiz P. Çeviri Ed. Bozkurt A. Onbirinci Baskı 2016;473-7.
8. Georgescu MG, Stan CI, Marinescu AN, et al. Non organic hearing loss: Malingering, factitious or conversion disorder? Rom J Leg Med 2014;22:35-40.
9. Hisli N. Beck Depresyon Envanterinin geçerliliği üzerine bir çalışma. Psikoloji Derg 1988;6:118-22.
10. Beck AT, Epstein N, Brown G, et al. An inventory for measuring clinical anxiety: Psychometric properties. J Consult Clin Psychol 1988;56:893-7.
11. Ulusoy M, Erkmen H, Sahin N. Turkish version of the beck anxiety inventory: Psychometric properties. J Cog Psychother 1998;12:163-72.
12. Balatsouras DG, Kaberos A, Korres S, et al. Detection of pseudohypoacusis: a prospective, randomized study of the use of optoacoustic emissions. Ear and Hearing 2003;24:518-27.
13. Hiraumi H, Tsuji J, Kanemaru SI, et al. Non-organic hearing loss. Acta Otolaryngol Suppl 2007;557:3-7.
14. Özmen M, Önen B. Kronik obstrüktif akciğer hastalığında psikiyatrik bozukluklar. In: Umut S, Erdinç E, eds. Tanımdan tedaviye kronik obstrütif akciğer hastalığında. Galenos Yayıncılık 2008;333-45.
15. Cosh S, von Hanno T, Helmer C, et al. The association amongst visual, hearing, and dual sensory loss with depression and anxiety over 6 years: The Tromso Study. In J Geriatr Psychiatry.2017;1-8. Doi:10.1002/gps.4827.
16. 16. Terzi S, Özgür A, Alibaşoğlu H, et al. Ani işitme kayıplı hastaların anksiyete-depresyon düzeyleri ve prognoza etkisi. KBB-Forum 2015;14:71-5.
17. Kim SY, Kim HJ, Park EK, et al. Severe hearing impairement and risk of depression: A national cohort study. PLoSOne, 2017;12:1-11.
18. Hsu WT, Hsu CC, Wen MH, et al. Increased risk of depression in patients with acquired sensory hearing loss: A 12-year follow-up study. Medicine (Baltimore) 2016;95:1-7.
19. Keidser G, Seeto M, Rudner M, et al. On the relationship between functional hearing and depression. Int J Audiol 2015;54:653-64.
20. Wang YP, Wang MC, Lin HC, et al. Conversion deafness presenting as sudden hearing loss. J Chin Med Assoc. 2006;69:289-93.
21. Oishi N, Kanzaki S, Kataoka C, et al. Acute-onset unilateral psychogenic hearing loss in adults: report of six cases and diagnostic pitfalls. ORL 2009;71:279-83.