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Are Demographic and Socioeconomic Factors Predictive for Perceived Tinnitus Impairment?

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Abstract: Patients suffering from chronic tinnitus were analyzed to examine whether tinnitus impairments can be predicted by demographic and socioeconomic factors. For this purpose, subjective tinnitus complaints were measured in 153 patients using the tinnitus impairment questionnaire (THI-12) that distinguishes between emotional-cognitive and functional-communicative factors. Age, gender, marital status, and education levels were assessed and treated as predictive variables.

In computing canonical correlations, only the level of education served as a significant emotional-cognitive predictor for tinnitus impairment. Patients with lower education demonstrated impairments in the emotional-cognitive domain that were more marked than those in higher-educated people.

The results indicated that demographic and socioeconomic variables have no predictive value for tinnitus impairments, with the exception of a person's level of education.

Key Words: demographic variable; predictive value; socioeconomic variable; tinnitus impairment

Investigations of sociodemographic variables [1, 2] showed that female and male individuals are often affected identically by tinnitus and that tinnitus can begin at any age, although more typically the onset occurs between the ages of 40 and 60 years [3]. Because of the epidemiological nature of these studies, correlations between the severity of the tinnitus impairment and the various examined factors could not be computed. Comparing the comorbidity of tinnitus with respect to gender, Erlandsson et al. [3] found that female patients reported vertigo more frequently, whereas male patients suffered more often from concentration problems and hyperacusis. However, these authors could not find any impact of social support on the severity of tinnitus, an outcome that contrasts with earlier findings of Tylor and Baker [4]. Prior studies about gender differences in the severity of tinnitus are inconsistent [5–7], and gender-specific differences or the relationship of age to tinnitus impairments (or both) could not be determined in the later literature [8–12]. In couples in which one partner suffered from tinnitus, Sullivan et al. [13] detected less role dysfunction among those who sought more social support. These authors found that tinnitus impairment was influenced by marital interaction. In the patient-rated set among such couples, lower marital cohesion was associated with greater tinnitus-related role dysfunction, whereas in the spouse-rated set, punishing responses to subject illness behavior correlated more directly with greater tinnitus-related role dysfunction.

Lutman et al. [14] failed to observe interactions between tinnitus impairment and socioeconomic factors, and the same conclusion was drawn in the epidemiological study by Coles [2], who found no dependence of tinnitus impairment on social class. In contrast, Hallberg and Carlsson [15] and Hallberg et al. [16] showed that years of education correlated with perceived handicap in the subgroup of middle-aged subjects with acquired hearing loss and in patients with tinnitus. Subjects with low education scored significantly higher on

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assessment of perceived handicap than did subjects with higher education. The investigators related these results to ineffective coping strategies of individuals with less education, a limitation accompanied by lower self-esteem, less cognitive capacity, and a sense of lost control over a situation.

Taken together, previous studies failed to detect a consistent influence of socioeconomic or demographic variables on tinnitus impairments. The aim of our investigation was to analyze demographic and socioeconomic factors—age, gender, level of education, and marital status—as predictor variables for tinnitus impairment.

Table 1. Student's *t*-Test Statistics and Level of Significance Between the Factors of Tinnitus Impairment and Socioeconomic and Demographic Variables

	Emotional-Cognitive Impairment		Functional-Communicative Impairment	
Variables	***t* Value**	***p* Value**	***t* Value**	***p* Value**
Gender	−.287	−.775	−.428	.670
Age	.285	.776	.342	.733
Education level	−2.410	.017	−1.844	.067
Marital status	.337	.736	1.527	.129

MATERIAL AND METHODS

Subjects

One hundred and fifty-three patients (75 female, 78 male) suffering from chronic tinnitus participated in the present study. The mean patient age was 51.6 years (standard deviation, 14.5). Patients were recruited from the outpatient clinic of the general hospital in Salzburg and from a head and neck practice in Traunstein, Germany. Patients had suffered from tinnitus for a mean duration of 71.4 months (minimum, 2 weeks; maximum, 660 months). The subjects gave their consent to participation in the study according to the regulations specified in the *Declaration of Helsinki.*

The patients' level of completed education ranged from an elementary school diploma to a university graduate degree. Patients were divided according to two independent variables, level of education and marital status. The level of education differentiated between low education (n = 87; patients with elementary school and completed secondary school [junior high school] diplomas) and high education (n = 66; patients with A-level or higher and university degrees). Marital status was designated as either not living in a partnership (i.e., living alone; n = 46) or living in a partnership (n = 107).

Instrument

Tinnitus impairment was measured using the Tinnitus Impairment Questionnaire (THI-12) from Greimel et al. [17], a German version of the Tinnitus Handicap Inventory (THI) adapted from Newman et al. [9]. This instrument consists of 12 items (THI total score) and includes two subscales: emotional-cognitive and functional-communicative.

Data Analysis

Canonical correlations were computed, for which the socioeconomic and demographic variables served as predictors and the emotional-cognitive and the functional-communicative scales of the THI were the criterion variables.

RESULTS

In this study, 5.6% of the variance of the emotional-cognitive subscale (canR, 0.236; χ^2 test, 10.6; degrees of freedom, 8; $p = .225$) could be explained by the predictor variables. For the functional-communicative dimension, 1.4% of the variance (canonical correlation coefficient [canR], 0.119; χ^2 test, 2.12; degrees of freedom, 3; $p = .548$) could be explained by socioeconomic and demographic data. In the emotional-cognitive domain, the level of education reached a significant value ($p = .017$), indicating that people with a higher level of education are suffering less from tinnitus than are less-educated patients. Tables 1 and 2 present an overview of the Student's *t*-test statistics, level of significance, means, and standard deviations.

Table 2. Means and Standard Deviations of the Factors of Tinnitus Impairment and Socioeconomic and Demographic Variables

	Emotional-Cognitive Impairment		Functional-Communicative Impairment	
Variables	**Mean**	**SD**	**Mean**	**SD**
Gender				
Female	7.60	3.69	5.01	2.60
Male	7.71	3.97	5.23	2.81
Education level				
Low	8.37	3.65	5.54	2.48
High	6.76	3.87	4.58	2.92
Marital status				
Living alone	7.33	3.81	4.48	2.76
Living in partnership	7.84	3.82	5.40	2.65

DISCUSSION

In analyzing demographic and socioeconomic data as predictors of perceived tinnitus impairment, we could not find any significant overall results for the criterion variables of emotional-cognitive and functional-communicative tinnitus impairment. The evaluation of level of education showed significant differences between highly educated and less-educated people, such that less-educated patients exhibited higher values on the emotional-cognitive tinnitus impairment assessment. These results underscore the results of studies by Hallberg and Carlsson [15] and Hallberg et al. [16], who observed that years of education correlated with perceived handicap in subjects with acquired hearing loss and in patients with tinnitus. This finding was attributed to low self-esteem, diminished cognitive capacity, and a sense of lost control over the situation. Increased severity of tinnitus impairment could also be associated with lower socioeconomic status, as less-educated people, as compared with higher-educated individuals, are exposed more frequently to noise in industrial jobs and suffer greater associated high-frequency hearing loss (which is related to tinnitus) [18, 19].

In summary, these data highlight the minor impact of socioeconomic and demographic factors on tinnitus impairments. In contrast, Greimel et al. [20] examined psychological factors for the same subjects participating in our study. Those authors showed that depression, physical and social domains of quality of life, and subjective experienced somatic and general complaints are appropriate predictors of tinnitus impairments for computing canonical correlations [see also ref. 21]. Depression was the best predictor for emotional-cognitive tinnitus impairment.

Somatic and general complaints as well as physical and social domains of quality of life are shown to be good predictors of functional-communicative tinnitus impairments. A comparison of these studies reveals that psychological variables provide better predictive functions than do socioeconomic and demographic data in this regard.

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