

The association between tinnitus and mental health in a general population sample: Results from the HUNT Study^{☆,☆☆}

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Abstract

Objectives: Clinical studies indicate a strong association between tinnitus and mental health, but results from general population data are missing. The purpose of the study was to examine the association between tinnitus, mental health, and well-being in the general adult population and to identify factors that might mediate and moderate this association. **Methods:** Data from 51,574 adults participating in the Nord-Trøndelag Hearing Loss Study (1995–1997), part of the Nord-Trøndelag Health Study (HUNT-2), were analyzed. The association between tinnitus symptom intensity and symptoms of depression, anxiety, self-esteem, and subjective well-being was examined by multivariate ANOVA, stratified by age group and sex. Explanatory variables were age, marital status, education, hearing, dizziness, vision,

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physical disability, and somatic illness. In a subsample of participants with tinnitus, the effects of “time since onset,” “predictability of tinnitus episodes,” and “noise sensitivity” were tested. **Results:** Participants with tinnitus scored significantly higher on anxiety and depression and lower on self-esteem and well-being than people without tinnitus. The effect sizes were small and quite similar across levels of tinnitus symptom intensity. No significant effect of time since onset was found. A significant effect of predictability of tinnitus episodes and noise sensitivity was found in some groups. **Conclusion:** A weak association between tinnitus and mental health was found in this general population study.

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Introduction

Tinnitus, or buzzing or ringing in the ears or head when no external sound stimuli are present, is a common health complaint in the general population. The prevalence of tinnitus in the adult population is estimated at 8–15%, depending on the definition [1,2], and increases with age [1]. Tinnitus frequently occurs together with hearing loss but may also be experienced by individuals with normal hearing. In most cases, no specific organic cause is found and the symptoms can only be subjectively reported. Although many people learn to live with tinnitus, some find it severely debilitating [3]. In addition to general irritation and annoyance with the sound, tinnitus can cause sleeping difficulties, concentration difficulties, reduced speech intelligibility, and different kinds of psychosomatic, emotional, and interpersonal problems [4].

Given its relatively high prevalence and possible influence on several important aspects of life, tinnitus may well be a significant contributor to reduced mental health and well-being in the population. However, knowledge about this association in the general population is scanty [5]. An association between tinnitus and reduced quality of life was demonstrated in a cohort of older adults ($n=2800$) [6], whereas no association between tinnitus and depression was found in another survey of elderly people ($n=583$) [7]. A survey of members of tinnitus and hearing impairment associations found that nearly 50% of the respondents were sometimes depressed by tinnitus ($n=338$) [8]. However, these were surveys of segments and not of the whole general adult population.

The evidence on the association between tinnitus and mental health comes mostly from small clinical studies, which often found a strong association between tinnitus and psychiatric disorders. For instance, the prevalence of tinnitus patients who met the criteria for a lifetime psychiatric diagnosis has been reported to be as high as 45–78% [9–11]. Among tinnitus patients, various clinical studies found a prevalence of diagnosed current depressive disorders of 33–74% [9,10,12–14] and a prevalence of anxiety disorder of 29–49% [10,13,14]. Most of these studies reported a higher prevalence of anxiety and depression in tinnitus patients than in the general population [15]. However, other studies did not find a particularly high prevalence of psychiatric symptoms in tinnitus patient samples [16].

The strong association between mental health and tinnitus that is found in many clinical studies might apply to the group of persons who seek help at audiology clinics but cannot necessarily be generalized to the whole population of tinnitus cases, since many people with tinnitus never consult specialists [17]. This point is illustrated by studies that found systematic differences between help seekers and non-help seekers on psychological variables [18,19]. In a review of research on diagnosed anxiety and depression in tinnitus patients, Robinson et al. [15] found that studies having specific severity criteria for inclusion of participants reported generally higher rates of depression than studies where no specific severity was required for participation.

The purpose of the present study was to examine the association between tinnitus and mental health and well-being in the general adult population. A further goal was to examine factors that might influence the variation in mental health and well-being among people with tinnitus.

Method

Sample

In the years 1995 to 1997, all adult inhabitants of Nord-Trøndelag County, Norway, were invited to participate in the Nord-Trøndelag Health Study (HUNT-2). Two municipalities refused to participate. In some municipalities the data

collection for the ordinary HUNT-2 was already finished before the integrated project, the Nord-Trøndelag Hearing Loss Study, started. Thus, the populations of 17 of the 24 municipalities were invited to participate in the Hearing Loss Study. One municipality, Levanger, was re-invited to the hearing examination after the ordinary HUNT-2 was finished, because this municipality represented a much bigger loss of participants than any of the other municipalities not included in the study. Ages ranged from 20 to 101 years (mean, 50; S.D., 17). The participation rate for all municipalities together except Levanger was 66.7%; in Levanger, overall, 41.1% participated. Altogether, 51,574 people attended the hearing examination and signed an informed consent.

A questionnaire on hearing-related information (Hearing Q1) was completed by the participants at the examination site. A second hearing questionnaire (Hearing Q2) was distributed to participants with a certain degree of hearing loss and to a control group for completion and return by mail ($n=39,085$). All participants from Levanger completed Hearing Q2 at the examination site. Hearing Q2 was returned by a total of 28,066 (71.8%) respondents. The participants of the Hearing Loss Study also completed the questionnaires of HUNT-2 on a wide range of somatic and mental health topics. The first questionnaire (HUNT Q1) was distributed together with the invitation to HUNT and was completed at home shortly before the examination. A second questionnaire (HUNT Q2) was handed out during the examination, completed at home, and returned by mail by 84% of the Hearing Loss Study participants.

Main measures

Mental health

Hearing Q1 included 10 items from the Symptoms Checklist-25 (SCL-25) [20,21], four items tapping symptoms of anxiety and six tapping depression. The procedure for choosing the 10 items is described elsewhere [22,23]. Separate scores for anxiety and depression were computed by summing the values (scored 1–4) from each item. An SCL item tapping dizziness was excluded from the anxiety index. Dizziness frequently occurs together with hearing disorders, so keeping this item as a symptom of anxiety would probably have inflated the observed association between tinnitus and anxiety. Calculations based on an available data material with valid SCL scores for 5999 subjects [23] showed a correlation between the three-item index and the original anxiety score of 0.87. The correlation between the six-item and the original depression scores has been shown to be 0.96, and the correlation between the original anxiety and depression scores was 0.73 [22]. The correlation between the three-item anxiety short-form and the depression short-form scores observed in the available data set [23] was 0.61. The alpha reliability, estimated from the present data set, was 0.66 for three-item short-form anxiety and 0.81 for short-form depression.

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