

## Health and Disability

# A preliminary validation of a Norwegian version of the Tinnitus Sample Case History Questionnaire

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At present there is no validated tinnitus questionnaire available in Norway. The aim of the present study was to psychometrically evaluate and report on a Norwegian translation of the Tinnitus Sample Case History Questionnaire (TSCHQ). Furthermore, the results were compared to those of a recent Swedish validation of TSCHQ. More than two hundred ( $N = 218$ ) participants with tinnitus participated in the study, of which 78% completed the Norwegian TSCHQ on two occasions so that test-retest reliability could be evaluated. Results show that the Norwegian TSCHQ has acceptable test-retest reliability with the exception of 10 items, which is slightly better than the recent Swedish validation of TSCHQ. At the item level, there were both similarities and differences between the Norwegian and Swedish validation studies. It is concluded that the Norwegian TSCHQ is an appropriate measure of patients' history and experience of tinnitus, and while we recommend further validation of the Norwegian TSCHQ, we encourage Norwegian researchers and clinicians to use the Norwegian translation of TSCHQ.

**Key words:** Tinnitus sample case history questionnaire, Tinnitus, Hyperacusis, Validation, Norwegian.

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### INTRODUCTION

Tinnitus is the perception of sound in the ears or head when there is no physical sound present (Baguley, McFerran & Hall, 2013). Colloquially, tinnitus is often described as “a ringing in the ears”. A recent systematic review of the literature (McCormack, Edmondson-Jones, Somerset & Hall, 2016) suggests prevalence rates from 5.1–42.7% with rates being higher in males than females. The large variability in prevalence rates appear to be due largely to inconsistencies in the definitions of tinnitus in the literature. Twelve studies included in the aforementioned review used the same question to assess the presence/absence of tinnitus (i.e., “tinnitus lasting more than five minutes at a time”), and the prevalence rates among these studies were somewhat less variable with a range from 11.9–30.3%.

Patients with tinnitus often report associated symptoms such as insomnia and lack of concentration (Anderson, Vretblad, Larsen & Lyttkens, 2001; Crönlein, Langguth, Pregler, Kreuzer, Wetter & Schecklmann, 2016). There are also reports of psychological symptoms such as anxiety, depression, and elevated levels of stress as a consequence of patients' tinnitus experience (Andersson, Kaldo-Sandström, Ström & Strömgren, 2003; Haldford & Anderson, 1991; Langguth, Landgrebe, Kleinjung, Sand & Hajak, 2011). Finally, a large proportion of patients with tinnitus also appear to develop different forms of fear and discomfort connected to sound such as misophoni (i.e., dislike of sound) and hyperacusis (i.e., a decreased tolerance to normal environmental sounds; Baguley, Andersson, McFerran & McKenna, 2012). For example, prevalence rates of hyperacusis in patients with a primary complaint of tinnitus has been reported to range from around 40–60% (Bartnik, Fabijanska & Rogowski, 1999; Goebel & Floetzinger, 2008; Jastreboff & Jastreboff, 2000;

Schecklmann, Landgrebe & Langguth, 2014; Sood & Coles, 1998), while the prevalence of tinnitus in patients with a primary complaint of hyperacusis has been suggested to be 86% (Anari, Axelsson, Eliasson & Magnusson, 1999). The large overlap between the experience of tinnitus and hyperacusis has prompted some to speculate about a common underlying mechanism (Anderson *et al.*, 2001; Chen, Lee, Sandridge, Butler, Manzoor & Kaltenbach, 2013; Jastreboff & Hazell, 1993; Norena, 2011; Zeng, 2013). Recent studies by Schecklmann and colleagues (2014) and Kojima and colleagues (2017) confirm that there is indeed an overlap in pathophysiological mechanisms between tinnitus and hyperacusis as “the sensitivity to sounds is directly related to the perception of tinnitus” in tinnitus patients with hyperacusis (Schecklmann *et al.*, 2014).

While tinnitus may sometimes coincide with damage to the cochlea, tumours on the vestibular nerve (i.e., vestibular schwannomas), or damage to the bone of the otic capsule (i.e., otosclerosis; Baguley, Andersson, McFerran & McKenna, 2013), tinnitus is a subjective experience (like the feeling of pain) and therefore, self-reports and questionnaires are ideal for gathering information about patients' tinnitus experience. There are several tinnitus questionnaires including the Tinnitus Handicap Inventory (THI; Newman, Sandridge & Jacobson, 1998), the Tinnitus Handicap Questionnaire (THQ; Kuk, Tyler, Russell & Jordan, 1990), the Tinnitus Questionnaire (TQ; Hallam, Jakes & Hinchcliffe, 1988), the Tinnitus Functional Questionnaire (TFI; Meikle, Henry, Griest *et al.*, 2012) and the Tinnitus Reaction Questionnaire (TRQ; Wilson, Henry, Bowen & Haralambous, 1991). These questionnaires focus on the reaction, distress and handicap that patients experience rather than patients' tinnitus history and/or physical characteristics of patients' tinnitus

(Langguth, Goodey, Azevedo *et al.*, 2007). This prompted the members of the Tinnitus Research Initiative (TRI) – an organization that supports scientific and clinical research on tinnitus, facilitate communication and information transfer among researchers and clinicians, and educate professionals by hosting meetings and conferences and develop diagnostic tools and guidelines – to develop a case history questionnaire. The resulting Tinnitus Sample Case History Questionnaire (TSCHQ) includes items common to many of the researcher- and clinician-developed case history questionnaires previously used and thus, contains items regarded as essential. Further, the development of TSCHQ allows for the comparison of data, something that has previously not been possible, or at least difficult, due to the many different case history questionnaires (or interview guides) in use (Langguth *et al.*, 2007).

TSCHQ has in recent years been adapted to several languages and there are published papers on the validation of the Japanese and Swedish versions of TSCHQ (Kojima *et al.*, 2017; Müller *et al.*, 2016). However, to our knowledge there is no validated Norwegian translation of TSCHQ, although it is conceivable that clinician translations may exist and be in use in audiology clinics and hospitals around Norway.

The aim of this study is to address the current situation in Norway by evaluating and reporting on the psychometric properties of a Norwegian cross-cultural adaptation of TSCHQ. A secondary aim is to compare the results of the current study with those from a recent Swedish validation of TSCHQ (Müller *et al.*, 2016) and compare the response pattern on the Norwegian TSCHQ for tinnitus patients with and without hyperacusis to further probe the possibility of a shared pathophysiological mechanism underpinning tinnitus and hyperacusis (Kojima *et al.*, 2017; Schecklmann *et al.*, 2014).

## METHOD

The Norwegian Centre of Research Data approved the methods of this study. Participants consented by selecting in the affirmative for the first question on the survey, which explained the study purpose and asked for consent to participate in the study.

### Participants

Patients were identified through two otorhinolaryngology (ear, nose and throat; ENT) clinics in Oslo, Norway and through audiology-themed Norwegian Facebook groups. Eligible participants had to have tinnitus and be between 18–85 years of age. A total of 218 patients agreed to participate in the study and 78% (171 participants) completed the Norwegian translation of TSCHQ on two occasions. This was to ensure that test-retest reliability could be assessed. Participants in the study were between 18 and 83 years ( $M = 49$ ,  $SD = 13$ ; median = 50, IQR = 42, 57.8) and one third were male.

### Tinnitus sample case history questionnaire

Tinnitus Sample Case History Questionnaire (TSCHQ) was developed by Langguth and colleagues following the first TRI meeting in Regensburg in 2006 (Langguth *et al.*, 2007). Initially a list of items (i.e., questions) was devised based on feedback from and items provided by participants at the meeting, and this list was subsequently narrowed down to 14 items considered essential to include and 21 items considered highly desirable to include. Thus, TSCHQ ended up having a total of 35 questions focusing

on the history and most central characteristics of patients' tinnitus. More specifically, questions deal with tinnitus history, background information about the patient, how tinnitus is experienced and consequences such as problems with sleep. The questionnaire has items mostly in the multiple-choice format, although some items require the patient to answer on a scale from 1–100 (e.g., 1 = very faint; 100 = very loud) or provide answers as free-writing (i.e., Please describe in your own words what your tinnitus usually sounds like).

### Translation

If a questionnaire (with good psychometric properties) already exists, it is better to adapt this to another language rather than to construct a new questionnaire (Beaton, Bombardier, Guillemin & Ferraz, 2000). However, the cross-cultural adaptation of a questionnaire is complex and involves much more than word-for-word literal translations. For example, the source (i.e., original language) and target (i.e., language being translated into) languages may have non-equivalent words or idiomatic expressions. Further, the difference in culture may mean that certain items have a very different meaning or no meaning at all in the target language (Epstein, Santa & Guillemin, 2015). Thus, careful consideration is needed in the adaptation process, including the translation, in order to maintain the integrity and validity of a questionnaire. There are several guidelines for cross-cultural adaptations of questionnaires, but a recent review study by Epstein *et al.* (2015) suggests that there is no consensus on what is best practice for adapting a questionnaire to a different language and culture. That being said, the forward- and back-translation design is commonly used, where the back-translation is meant to be a quality control of the (forward) translation (Brislin, 1970). However, the back-translation process as a quality control measure has in recent years been criticized and some even suggest it is obsolete (Behr, 2016; Dept, Ferrari & Halleux, 2017; Harkness, Dorer & Mohler, 2010). Based on this and taking into account the restrictive timeframe for the present study, it was decided to use the Translation, Review, Adjudication, Pretesting, and Documentation (TRAPD; Harkness, 2003) approach, which does not include a back-translation, to guide to the translation process (see Fig. 1).

One of the authors, a trained clinical audiologist, and another person who is a native English-speaker with good professional Norwegian language skills within the field of audiology did the first translation of TSCHQ from the source language (i.e., English) to the target language (i.e., Norwegian). Each person did the initial translation separately, before exchanging translations and discussing sentence by sentence which translation should be used. After reviewing each questionnaire item, they agreed on the most adequate translation. In the adjudication stage, the agreed upon translation was evaluated by two ENT specialist and audiologists for quality control. The adjudication process led to minor changes in the wording of two questions, namely, Question 32: Do you suffer from temporomandibular disorder? [Har du plager i kjeveledd?] and Question 34: Do you suffer from other pain syndromes? [Plages du av

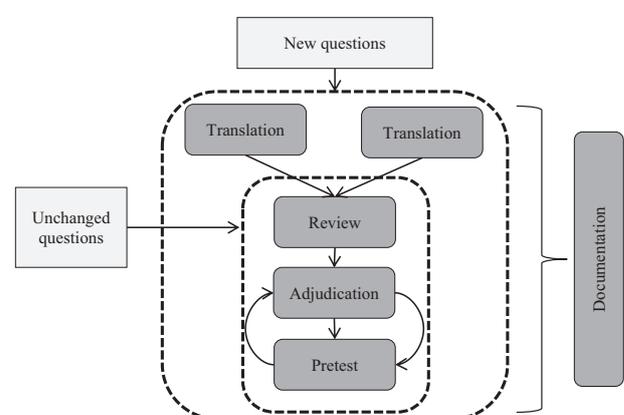


Fig. 1. Adapted schematic representation of the TRAPD approach from Harkness (2003).

smarter andre steder i kroppen?]. Finally, the Norwegian translation of TSCHQ was pretested on a small group of volunteers and this did not result in any further changes to items (see Appendix A for a copy of the Norwegian TSCHQ).

An online version of the Norwegian TSCHQ was made using *Nettskjema* [Internetsurvey], which is a secure platform that can be used for data collection and management. *Nettskjema* is similar to other research software or questionnaire tools such as Survey Monkey and Qualtrics.

### Procedure

A link to the online version of the Norwegian TSCHQ was provided by email to two ENT clinics in the Oslo region, who had agreed to be involved in the study. More specifically, the ENT clinics informed eligible patients about the study and provided them with a link to the online questionnaire. A link to the questionnaire was also posted on two Norwegian closed audiology-themed Facebook groups. These are both large groups with more than 800 and 6,400 members each.

After patients clicked on the survey link they were first presented with information about the study – the aim and purpose – before the nature of voluntary participation was explained. Patients were then asked to give informed consent by selecting a tick box. Patients were asked to fill out the questionnaire on two occasions. Patients who completed the questionnaire at Time 1 (T1) received an email with a new link to an identical questionnaire at Time 2 (T2). A reminder email was sent to those patients who had not yet completed the second questionnaire about a week after the T2 questionnaire was sent. There was a two-week gap between T1 and T2.

### Statistical analyses

Analyses were performed using SPSS version 25.0 (SPSS Inc., Chicago, IL) and the significance level was set at  $p < 0.05$ . There were four steps in the analysis. First, descriptive statistics for all questionnaire items were calculated and frequencies ( $n$ ), percentages (%), means ( $m$ ) and standard deviations ( $SD$ ), and medians and interquartile ranges (IQR) are reported. Second, test-retest analysis was used to check reliability of the different items and how stable responses were over time. Cohen's kappa was used to assess categorical variables (e.g., handedness), while Intra Class Correlation (ICC) was used for numeric variables (i.e., tinnitus loudness on a scale from 1–100). ICCs were calculated using a two-way mixed model with absolute agreement, and ICCs  $> 0.70$  and Cohen's kappa  $> 0.60$  were considered acceptable results (Cohen, 1960; Koo & Li, 2016; McHugh, 2012; Shrout & Fleiss, 1979). Third, chi-square analyses were used to compare the results of the current study with the results of the recent validation study of the Swedish TSCHQ (Müller *et al.*, 2016). Finally, following Kojima *et al.* (2017) and Schecklmann *et al.* (2014), we compared two sub-groups of patients – those with and those without symptoms of hyperacusis – on all TSCHQ items. Due to deviations from normality, the Mann-Whitney  $U$ -test was used for numeric variables, while Pearson's chi-square was used for categorical variables. Person's  $r$  coefficients were transformed into Cohen's  $d$  effect sizes and effect sizes are indicated as small with a range from 0.20 to 0.50, medium with values between 0.50 to 0.80, and high with values above 0.80 (Cohen, 1988). The presence of hyperacusis symptoms was determined by Question 29: Do sounds cause you pain or physical discomfort? Answering "Yes" is indicative of the presence of hyperacusis symptoms, whereas answering "No" is indicative of the absence of hyperacusis symptoms.<sup>1</sup>

## RESULTS

### Descriptive results

**Family aetiology.** Most of the patients in this study did not have tinnitus aetiology related to family (71.8%). Around one-fifth had

a parent (parents) with tinnitus (21.3%) and only a few patients had a sibling (siblings) with tinnitus (6.4%).

**Tinnitus history.** Patients had suffered from tinnitus on average 17 years (range: 1–60 years, median = 13.5). Almost half (49.8%) of patients reported that they had experienced their tinnitus for the first time gradually, while 50.2% had a sudden (abrupt) encounter. The initial tinnitus onset was related to loud sound (20.1%), stress (14.0%), changes in hearing (21.3%), head trauma (0.6%), whiplash (3.0%) and others which did not fit the categories (30.7%). Almost 90% reported that they experienced tinnitus as a constant sound and 73.9% felt that their tinnitus varied in strength from day-to-day. On a scale from 1–100, the average strength of tinnitus was 67.7 ( $SD = 21.3$ , median = 70). Close to one-third of patients described their tinnitus as a very high frequency sound, 31.1% as high frequency and only 1.4% described it as low frequency. On a scale from 1–100, the average awareness of tinnitus was 62.2 ( $SD = 28.8$ , median = 67.5).

**Modifying influences.** In this study, 70.2% reported that a nap during the day had no effect on tinnitus and 93.5% reported that medication had no effect on their tinnitus. Table 1 column 2 presents descriptive statistics for all TSCHQ items.

### Test-retest reliability

Test-retest reliability was acceptable for most items with Cohen's kappa ranging from 0.42–0.90 and ICCs ranging from 0.69–0.86 (not considering items assessing age, sex and handedness, which expectedly had very high reliability coefficients, that is  $\geq 0.90$ ). Table 1 column 3 shows test-retest reliability coefficients for all TSCHQ items. There were 10 (categorical) items that had kappa values below the cut-off (i.e.,  $< 0.60$ ), with one item having a kappa value of 0.42 and the remaining nine items having kappa values ranging from 0.50–0.59. The items below the cut-off were: Question (Q) 7 (What was the initial onset of your tinnitus related to?), Q8 (Does your tinnitus seem to PULSATE?), Q10 (How does your tinnitus manifest over time?), Q11 (Does the loudness of the tinnitus vary from day to day?), Q15 (Describe the PITCH of your tinnitus?), Q19 (Is your tinnitus reduced by music or by certain types of environmental sounds such as the noise of a waterfall or the noise of running water when you are standing in the shower?), Q23 (Is there any relationship between sleep at night and your tinnitus during the day?), Q25 (Does medication have an effect on your tinnitus?), Q28 (Do you have a problem tolerating sounds because they often seem much too loud?) and Q29 (Do sounds cause you pain or physical discomfort?).

### Comparison of results from the Norwegian and Swedish translations of TSCHQ

In terms of background variables (Q1–Q4), there were significantly more females in the Norwegian study ( $p < 0.001$ ) and a significantly smaller proportion of patients reported a family history of tinnitus ( $p < 0.001$ ) compared to the Swedish study by Müller *et al.* (2016). On tinnitus history items (Q5–Q18), significantly more patients reported an abrupt onset of tinnitus ( $p < 0.001$ ), pulsatile tinnitus that is different from a heartbeat

Table 1. Tinnitus Sample Case History Questionnaire (TSCHQ) descriptive data, test-retest reliability coefficients, and chi-square statistics for comparison between the Norwegian and Swedish validation studies of TSCHQ

	Our study	Cohen's kappa/intra class coefficient (single ICC(2,1))	Swedish TSCHQ (Müller <i>et al.</i> , 2016)	Chi-square statistics and <i>p</i> -value
<b>Background</b>				
1. Age (years); median (IQR)	50 (42, 57.8) ( <i>n</i> = 216)	0.95	62.40 (56, 68) ( <i>n</i> = 260)	
2. Sex (female, male)	147/71 ( <i>n</i> = 218); 67%/33%	1	124/136 ( <i>n</i> = 260); 48%/52%	18.8; < 0.001
3. Handedness (right/left/both) <sup>a</sup>	187/23/8 ( <i>n</i> = 218); 86%/11%/4%	0.90		
4. Family history (yes, no)	66/145 ( <i>n</i> = 211); 31%/69%	0.78	187/73 ( <i>n</i> = 260); 72%/28%	77.4; < 0.001
<b>Tinnitus history</b>				
5. Onset of tinnitus (years); mean (SD); median (IQR)	16.9 (13.1); 13.5 (6, 25) ( <i>n</i> = 204)	0.86	15 (6, 25) ( <i>n</i> = 230)	
6. Onset style (gradual/abrupt)	108/109 ( <i>n</i> = 217); 50%/50%	0.72	168/92 ( <i>n</i> = 260); 65%/35%	10.7; 0.001
7. Onset related events (loud blast of sound, whiplash, change in hearing, stress, head trauma, other) <sup>a</sup>		0.50		
8. Pulsatile (yes, with heartbeat; yes, different from heartbeat; no)	17/20/175 ( <i>n</i> = 212); 8%/9%/83%	0.52	33/12/215 ( <i>n</i> = 260); 13%/5%/83%	6.41; 0.041
9. Site of tinnitus (right, left, both worse in left, both worse in right, both equally, elsewhere) <sup>a</sup>	15/21/46/46/82/2 ( <i>n</i> = 212); 7%/10%/22%/22%/29%/1%	0.69		
10. Manifestation over time (intermittent, constant)	28/190 ( <i>n</i> = 218); 13%/87%	0.57	68/192 ( <i>n</i> = 260); 26%/74%	13.1; < 0.001
11. Fluctuating (yes, no)	161/55 ( <i>n</i> = 216); 75%/26%	0.56	173/87 ( <i>n</i> = 260); 67%/34%	3.6; 0.058
12. Subjective tinnitus loudness (0–100); mean (SD); median (IQR)	67.7 (21.3); 70 (50, 80) ( <i>n</i> = 218)	0.69	60 (35, 75) ( <i>n</i> = 260)	
14. Character of tinnitus sound (tone, noise, crickets, other)	85/66/10/13 ( <i>n</i> = 174); 49%/38%/6%/8%	0.65	102/108/36/14 ( <i>n</i> = 260); 39%/42%/36%/5%	9.8; 0.021
15. Subjective tinnitus pitch (very high, high, medium, low)	60/70/46/3 ( <i>n</i> = 179); 34%/39%/26%/2%	0.59	51/120/74/15 ( <i>n</i> = 260); 20%/46%/29%/6%	14.0; 0.003
16. Subjective tinnitus awareness time (0–100); mean (SD); median (IQR)	62.2 (28.7); 67.5 (40, 90) ( <i>n</i> = 218)	0.69	60 (25, 100) ( <i>n</i> = 260)	
17. Subjective tinnitus annoyance (0–100); mean (SD); median (IQR)	31.5 (27.7); 22.5 (10, 50) ( <i>n</i> = 218)	0.69	20 (10, 50) ( <i>n</i> = 260)	
18. Treatments (none, one, several, many) <sup>a</sup>	78/40/78/22 ( <i>n</i> = 218); 36%/18%/36%/10%	0.60		
<b>Modifying influences</b>				
19. Maskable by music or sound (yes, no, don't know)	146/54/17 ( <i>n</i> = 217); 67%/25%/8%	0.56	19/65/56 ( <i>n</i> = 260); 54%/25%/22%	107.3; < 0.001
20. Aggravated by noise (yes, no, don't know) <sup>b</sup>	143/42/31 ( <i>n</i> = 216); 66%/19%/14%		133/82/45 ( <i>n</i> = 260); 51%/32%/18%	11.9; 0.003
21. Somatic modulation (yes, no)	67/151 ( <i>n</i> = 218); 31%/69%	0.66	54/206 ( <i>n</i> = 260); 21%/79%	6.2; 0.013
22. Influenced by nap (worsens, reduces, no effect)	17/47/151 ( <i>n</i> = 215); 8%/22%/70%	0.66	7/34/219 ( <i>n</i> = 260); 3%/13%/84%	14.6; 0.001
23. Influence by sleep (yes, no, don't know)	113/50/54 ( <i>n</i> = 217); 52%/23%/25%	0.53	49/103/108 ( <i>n</i> = 260); 19%/40%/42%	58.2; < 0.001
24. Influenced by stress (worsens, reduces, no effect)	179/0/38 ( <i>n</i> = 217); 83%/0%/18%	0.73	139/2/119 ( <i>n</i> = 260); 54%/1%/46%	45.3; < 0.001
25. Influenced by medication (yes, no)	14/203 ( <i>n</i> = 217); 7%/94%	0.53	21/239 ( <i>n</i> = 260); 8%/92%	0.5; 0.498
<b>Related conditions</b>				
26. Hearing impairment (yes, no)	181/37 ( <i>n</i> = 218); 83%/17%	0.73	220/40 ( <i>n</i> = 260); 85%/15%	0.2; 0.638
27. Hearing aids (right, left, both, none)	7/15/103/91 ( <i>n</i> = 216); 3%/7%/48%/42%	0.90	8/9/74/169 ( <i>n</i> = 260); 3%/4%/29%/65%	25.9; < 0.001
28. Noise intolerance (never, rarely, sometimes, usually, always)	20/24/66/63/40 ( <i>n</i> = 213); 9%/11%/31%/30%/19%	0.42	41/44/100/49/26 ( <i>n</i> = 260); 16%/17%/39%/19%/10%	20.3; < 0.001
29. Hyperacusis (yes, no, don't know)	139/79/0 ( <i>n</i> = 218); 64%/36%/0%	0.54	115/124/21 ( <i>n</i> = 260); 44%/47%/8%	29.8; < 0.001
30. Headache (yes, no)	95/123 ( <i>n</i> = 218); 44%/56%	0.76	56/204 ( <i>n</i> = 260); 22%/79%	26.7; < 0.001
31. Vertigo or dizziness (yes, no)	91/123 ( <i>n</i> = 214); 43%/58%	0.72	72/188 ( <i>n</i> = 260); 28%/72%	11.4; 0.001
32. Temporomandibular disorder (yes, no)	61/154 ( <i>n</i> = 215); 28%/72%	0.75	29/231 ( <i>n</i> = 260); 11%/89%	22.7; < 0.001
33. Neck pain (yes, no)	115/102 ( <i>n</i> = 217); 53%/47%	0.73	72/188 ( <i>n</i> = 260); 28%/72%	31.8; < 0.001
34. Other pain syndromes (yes, no)	118/98 ( <i>n</i> = 216); 55%/45%	0.65	71/189 ( <i>n</i> = 260); 27%/73%	36.8; < 0.001
35. Psychiatric problems (yes, no)	21/197 ( <i>n</i> = 218); 10%/90%	0.77	16/244 ( <i>n</i> = 260); 6%/94%	2.0; 0.156

Notes: All correlation coefficients (column 3) are statistically significant ( $p > .05$ ).

<sup>a</sup>Study comparison not possible due the two studies using different response categories or one study not reporting on the specific item.

<sup>b</sup>Due to an administrator error, test-retest statistics could not be calculated.

( $p = 0.041$ ), and constant manifestation over time ( $p < 0.001$ ) compared to Müller *et al.* (2016). Further, the proportion of patients in this study who reported their subjective tinnitus pitch as very high or high was fairly similar (34% and 39%), whereas Müller *et al.* (2016) found more than twice as many reported their subjective tinnitus pitch as high (46%) compared to very high (20%). The difference between studies was significant ( $p = 0.003$ ). Finally, significantly fewer patients in this study reported that the sound of their tinnitus resembled that of crickets ( $p = 0.021$ ) compared to the results of Müller *et al.* (2016).

When comparing test-retest reliability coefficients between the Norwegian and Swedish studies, the Norwegian study had 10 items below the cut-off as outlined above, whereas the Swedish study by Müller *et al.* (2016) had 15 items below the cut-off. Further, the Norwegian study had five items with reliability coefficient higher than Müller *et al.* by at least 0.10 (i.e., Q5, Q15, Q18, Q19, Q23, and Q31), although most items (21) had very similar reliability coefficients across the two studies (i.e., within 0.10 of each other). Taken together, this suggests only minor differences between studies in terms of test-retest reliability with slightly better stability reliability for the Norwegian study. See Table 1 for descriptive statistics and results from the comparison between the Norwegian and Swedish studies.

#### Group comparison between tinnitus patients with and without hyperacusis symptoms

As the Norwegian TSCHQ was deemed to have adequate psychometric properties a final set of analyses, which compared responses for tinnitus patients with and without hyperacusis, was carried out. There was 64% of tinnitus patients who reported having symptoms of hyperacusis, while 36% of tinnitus patients reported not to have symptoms of hyperacusis. Due to an administration error the response option "I don't know" was omitted from the question used to assess hyperacusis symptoms and therefore, there were no patients who did not know whether or not they had symptoms of hyperacusis. The results of the comparison between the hyperacusis symptoms present and hyperacusis symptoms absent groups are presented in Table 2. In summary on items regarding background information (Q1–Q4), tinnitus patients with hyperacusis symptoms were more likely to be female ( $p = 0.005$ ,  $d = 0.38$ ) and also right-handed ( $p = 0.033$ ,  $d = 0.23$ ). On tinnitus history items (Q5–Q18), tinnitus patients with hyperacusis symptoms reported higher subjective tinnitus awareness ( $p = 0.026$ ,  $d = -0.30$ ), annoyance ( $p = 0.001$ ,  $d = -0.47$ ) and were significantly more likely to seek medical treatment for their tinnitus ( $p = 0.015$ ,  $d = -0.34$ ). On items assessing modifying influences on the tinnitus experience (Q19–Q24), tinnitus patients with hyperacusis symptoms were more aggravated by noise ( $p < 0.001$ ,  $d = 0.63$ ), and more likely to recognize the influence of sleep ( $p = 0.003$ ,  $d = 0.31$ ) and stress ( $p = 0.008$ ,  $d = 0.37$ ). In terms of related conditions (Q26–Q35), tinnitus patients with hyperacusis symptoms were more likely to have difficulties tolerating sounds ( $p < 0.001$ ,  $d = -1.43$ ), had significantly more headaches ( $p = 0.001$ ,  $d = 0.45$ ), vertigo/dizziness ( $p < 0.001$ ,  $d = 0.58$ ), temporomandibular disorder ( $p = 0.031$ ,  $d = 0.30$ ), neck pain ( $p < 0.001$ ,  $d = 0.55$ ), and other pain syndromes ( $p < 0.001$ ,  $d = 0.60$ ).

## DISCUSSION

Tinnitus is the perception of sound in the ears or head when there is no physical sound present (Baguley, McFerran & Hall, 2013). Because tinnitus is common in the general population and has high rates of co-occurrence with other conditions such as hyperacusis (Anari *et al.*, 1999), it is important to have adequate tools to measure patients' tinnitus history and experience in order to provide adequate treatment. While several tinnitus questionnaires exist, we are not aware of any that have been adapted to the Norwegian language and culture. The present study was directed at addressing this need. Specifically, we translated the Tinnitus Sample Case History Questionnaire (TSCHQ) into Norwegian before evaluating the psychometric properties of the Norwegian TSCHQ using a population-based sample. Overall, we found that the Norwegian TSCHQ has acceptable test-retest reliability with the exception of 10 items that fell below the acceptable threshold. A recent validation of a Swedish translation of TSCHQ also report acceptable test-retest reliability, however, with the exception of slightly more items (15) than our study (Müller *et al.*, 2016). We note that the item that did not meet the reliability threshold were similar across the Norwegian and Swedish studies (Question (Q)7, Q10, Q11, Q15, Q19, Q23, Q28 and Q29).

There could be several reasons why items did not meet the acceptable threshold. First, patients may respond slightly differently at the two testing occasions on items concerning more private information, for example, regarding the effect of medication on tinnitus. However, the current study also had acceptable reliability for some items that concerned private information, like family history and items related to patients' tinnitus experience (e.g., stress, head trauma). Another possibility relates to the accuracy with which things are remembered and subsequently, reported on. Questionnaire items pertaining to the variation in tinnitus strength, pitch, pulsation, and handling of loud noises could have been affected by the accuracy of patients' memory, but again this is not always the case. Finally, patients' perception of their own tinnitus might have changed from the first to the second time they completed TSCHQ and this may have led to lower reliability for some items.

A secondary aim of this study, was to compare the results of the present study with those of a recent Swedish validation study of TSCHQ (Müller *et al.*, 2016) – both at the item level and in terms of test-retest reliability. At the item level we found similarities between the studies as indicated by non-significant chi-square statistics (see column 5 of Table 1). For example, 83% of patients in the Norwegian study reported that they had a hearing problem, while 85% of patients in the Swedish study reported a hearing problem. Further, the majority of patients in both studies reported that medication had no effect on their tinnitus (94% and 92%, respectively) and that they had no psychiatric problems (90% and 94%, respectively). However, and as evidenced by significant chi-square statistics, we also observed differences in the pattern of responding to many items between the Norwegian and Swedish studies. For example, significantly fewer patients reported a family history of tinnitus in the Norwegian study (31%) compared to the Swedish study (72%) and in the Norwegian study, an equal proportion of patients responded that the onset style of their

Table 2. Tinnitus Sample Case History Questionnaire (TschQ) descriptive data for tinnitus patients with and without hyperacusis symptoms

	Tinnitus with hyperacusis symptoms	Tinnitus	Group comparison statistics (chi square/Mann-Whitney U-test; p-value; Cohen's <i>d</i> effect size)
Background			
1. Age (years); median (IQR)	49 (42, 57) ( <i>n</i> = 138)	51.5 (42.8, 59.3) ( <i>n</i> = 78)	5007; 0.395; -0.12
2. Sex (female, male)	103/36 ( <i>n</i> = 139); 74%/26%	44/35 ( <i>n</i> = 79); 56%/44%	<b>7.8; 0.005; 0.38</b>
3. Handedness (right/left/both)	125/9/5 ( <i>n</i> = 139); 89%/7%/4%	62/14/3 ( <i>n</i> = 79); 78%/18%/4%	<b>6.8; 0.033; 0.23</b>
4. Family history (yes, no)	46/90 ( <i>n</i> = 136); 34%/66%	20/55 ( <i>n</i> = 75); 27%/73%	1.152; 0.283; 0.15
Tinnitus history			
5. Onset of tinnitus (years); median (IQR)	13 (7, 25) ( <i>n</i> = 134)	15 (4.8, 24.5) ( <i>n</i> = 70)	4526; 0.682; -0.06
6. Onset style (gradual/abrupt)	66/73 ( <i>n</i> = 139); 48%/53%	42/36 ( <i>n</i> = 78); 54%/46%	0.8; 0.368; -0.12
7. Onset related events (loud blast of sound, whiplash, change in hearing, stress, head trauma, other)	23/2/22/14/1/43 ( <i>n</i> = 105); 22%/2%/21%/13%/1%/41%	10/3/13/9/0/24 ( <i>n</i> = 59); 17%/5%/22%/15%/0%/41%	2.4; 0.792; 0.03
8. Pulsatile (yes, with heartbeat; yes, different from heartbeat; no)	13/16/106 ( <i>n</i> = 135); 10%/12%/79%	4/4/69 ( <i>n</i> = 77); 5%/5%/90%	4.2; 0.120; 0.25
9. Site of tinnitus (right, left, both worse in left, both worse in right, both equally, elsewhere)	9/10/31/31/52/2 ( <i>n</i> = 135); 7%/7%/23%/23%/39%/2%	6/11/15/15/30/0 ( <i>n</i> = 77); 8%/14%/20%/20%/39%/0%	4.121; 0.532; -0.12
10. Manifestation over time (intermittent, constant)	16/123 ( <i>n</i> = 139); 12%/89%	12/67 ( <i>n</i> = 79); 15%/85%	0.6; 0.435; -0.11
11. Fluctuating (yes, no)	107/303 ( <i>n</i> = 137); 78%/22%	54/25 ( <i>n</i> = 79); 68%/32%	2.509; 0.113; 0.22
12. Subjective tinnitus loudness (0-100); median (IQR)	75 (7, 85) ( <i>n</i> = 139)	70 (50, 80) ( <i>n</i> = 79)	4636; 0.055; -0.26
14. Character of tinnitus sound (tone, noise, crickets, other)	51/44/8/4 ( <i>n</i> = 107); 48%/41%/8%/4%	34/22/2/9 ( <i>n</i> = 67); 51%/38%/6%/13%	7.455; 0.059; 0.13
15. Subjective tinnitus pitch (very high, high, medium, low)	37/51/25/1 ( <i>n</i> = 114); 33%/45%/22%/1%	23/19/21/2 ( <i>n</i> = 65); 35%/29%/32%/3%	5.581; 0.134; 0.14
16. Subjective tinnitus awareness time (0-100); median (IQR)	70 (50, 90) ( <i>n</i> = 139)	50 (25, 80) ( <i>n</i> = 79)	<b>4499; 0.026; -0.30</b>
17. Subjective tinnitus annoyance (0-100); median (IQR)	30 (10, 50) ( <i>n</i> = 139)	10 (5, 46) ( <i>n</i> = 79)	<b>3991; 0.001; -0.47</b>
18. Treatments (none, one, several, many)	39/29/54/17 ( <i>n</i> = 139); 28%/21%/39%/12%	39/11/24/5 ( <i>n</i> = 79); 49%/14%/30%/6%	<b>10.463; 0.015; -0.34</b>
Modifying influences			
19. Maskable by music or sound (yes, no, don't know)	94/33/11 ( <i>n</i> = 138); 68%/24%/8%	52/21/6 ( <i>n</i> = 79); 66%/27%/8%	0.192; 0.908; 0.03
20. Aggravated by noise (yes, no, don't know)	110/14/15 ( <i>n</i> = 139); 79%/10%/11%	33/28/16 ( <i>n</i> = 77) 43%/36%/21%	<b>30.911; &lt;0.001; 0.63</b>
21. Somatic modulation (yes, no)	45/94 ( <i>n</i> = 139); 32%/68%	22/57 ( <i>n</i> = 79); 28%/72%	0.485; 0.486; 0.09
22. Influenced by nap (worsens, reduces, no effect)	9/37/92 ( <i>n</i> = 138); 7%/27%/67%	8/10/59 ( <i>n</i> = 77); 10%/13%/77%	5.954; 0.051; 0.09
23. Influence by sleep (yes, no, don't know)	83/23/32 ( <i>n</i> = 138); 60%/17%/23%	30/27/22 ( <i>n</i> = 79); 38%/34%/28%	<b>11.866; 0.003; 0.31</b>
24. Influenced by stress (worsens, reduces, no effect)	121/0/17 ( <i>n</i> = 138); 88%/0%/12%	58/0/21 ( <i>n</i> = 79); 73%/0%/27%	<b>7.076; 0.008; 0.37</b>
25. Influenced by medication (yes, no)	8/131 ( <i>n</i> = 139); 6%/94%	6/72 ( <i>n</i> = 78); 8%/92%	0.311; 0.577; -0.08
Related conditions			
26. Hearing impairment (yes, no)	114/25 ( <i>n</i> = 139); 82%/18%	67/12 ( <i>n</i> = 79); 85%/15%	0.279; 0.597; -0.07 2.528; 0.470; 0.17

(continued)

Table 2. (continued)

	Tinnitus with hyperacusis symptoms	Tinnitus	Group comparison statistics (chi square/Mann-Whitney <i>U</i> -test; <i>p</i> -value; Cohen's <i>d</i> effect size)
27. Hearing aids (right, left, both, none)	6/9/68/54 ( <i>n</i> = 137); 4%/7%/50%/39%	1/6/35/37 ( <i>n</i> = 79); 1%/8%/44%/47%	
28. Noise intolerance (never, rarely, sometimes, usually, always)	1/3/43/54/36 ( <i>n</i> = 137); 1%/2%/31%/39%/26%	19/21/23/9/4/ ( <i>n</i> = 79); 25%/28%/30%/12%/5%	<b>82.827; &lt;0.001; -1.43</b>
30. Headache (yes, no)	72/67 ( <i>n</i> = 139); 52%/48%	23/56 ( <i>n</i> = 79); 29%/71%	<b>10.542; 0.001; 0.45</b>
31. Vertigo or dizziness (yes, no)	72/64 ( <i>n</i> = 136); 53%/47%	19/59 ( <i>n</i> = 78); 24%/76%	<b>16.569; &lt;0.001; 0.58</b>
32. Temporomandibular disorder (yes, no)	46/92 ( <i>n</i> = 138); 33%/76%	15/62 ( <i>n</i> = 77); 20%/81%	<b>4.667; 0.031; 0.30</b>
33. Neck pain (yes, no)	87/51 ( <i>n</i> = 138); 63%/37%	28/51 ( <i>n</i> = 79); 35%/65%	<b>15.364; &lt;0.001; 0.55</b>
34. Other pain syndromes (yes, no)	90/47 ( <i>n</i> = 137); 66%/34%	28/51 ( <i>n</i> = 79); 35%/65%	<b>18.499; &lt;0.001; 0.61</b>
35. Psychiatric problems (yes, no)	17/122 ( <i>n</i> = 139); 12%/88%	4/75 ( <i>n</i> = 79); 5%/95%	2.972; 0.085; 0.23

Note: Bold values indicate significant group differences at  $p < 0.05$ .

tinnitus was gradual and abrupt, respectively, while in the Swedish study more patients reported a gradual rather than abrupt onset. Further, in the Norwegian study significantly more patients reported a constant manifestation of tinnitus over time, that tinnitus was maskable by music, aggravated by noise, and influenced by stress. For numerical items, where it was only possible to compare descriptive statistics (i.e., median scores), the patients in the Norwegian study reported a relatively higher level of tinnitus loudness and awareness compared to the Swedish study, although the subjective annoyance level reported by patients was comparable between the studies.

Taken together, we found that there were both similarities and differences between patients' reporting on TSCHQ items in the Norwegian and Swedish studies, respectively. It is difficult to describe the pattern of result across all questionnaire items; although it appears that the Norwegian sample may have been more severely affected by their tinnitus, but this however, did not result in higher annoyance levels. This is somewhat perplexing and further investigations of tinnitus in Norwegian patients would be helpful to try and better understand this issue. When comparing the two studies for the reliability and stability of test scores, the studies were quite similar in terms of reported test-retest reliability coefficients. The present study may be seen to have slightly better test-retest reliability with fewer items falling below the cut-off.

Finally, when we compared TSCHQ responses of tinnitus patients with and without hyperacusis symptoms in the present study, we found both similarities and differences between the groups. We were particularly interested to see whether the experience of tinnitus was more aggravated by noise in tinnitus patients with hyperacusis symptoms (Q20) than in the tinnitus patients without hyperacusis symptoms. We found this to be the case. In the tinnitus plus hyperacusis symptoms group, 79% of patients responded in the affirmative (i.e., tinnitus aggravated by noise), whereas in the tinnitus only group 43% of patients responded in the affirmative. The difference was statistically

significant and had the largest associated effect size ( $d = 0.63$ ). Our finding is in accord with Schecklmann *et al.* (2014) and Kojima *et al.* (2017), and lends further support to the notion that there is an overlap in the pathophysiological mechanisms underpinning tinnitus and hyperacusis.

Tinnitus patients with and without hyperacusis symptoms were similar in terms of several tinnitus history items, such as tinnitus onset style and sound, manifestation of tinnitus over time, and pulsatile nature of tinnitus. Further, while we did not find a group difference for the reporting of psychiatric problems, tinnitus patients with hyperacusis symptoms reported higher levels of somatic comorbidities (i.e., headaches, vertigo/dizziness, temporomandibular disorder, neck pain, and other pain syndromes), had higher probability that their tinnitus was influenced by stress, and had higher levels of tinnitus awareness and annoyance compared to tinnitus only patients. These findings suggest that the presence of hyperacusis symptoms in tinnitus patients exacerbate the perception of tinnitus and tinnitus-associated somatic conditions. This in turn has implications for the treatment of tinnitus and hyperacusis; if treatment is first and foremost focused on the patient's hyperacusis this should not only alleviate (or lessen) the experience of hyperacusis, but to some extent also reduce the annoyance of tinnitus and associated somatic comorbidities (Jastreboff & Jastreboff, 2000).

## LIMITATIONS

The present study has at least four limitations that future studies may wish to address. First, it could be argued that there was no real way of knowing if participants in the study were actually suffering from tinnitus as the population sample was primarily recruited online. However, as tinnitus is a subjective experience that cannot be objectively measured and diagnosed, we have no reason to suspect that the recruitment process could in any way have affected the results of the study. It has also been argued that if people claim they suffer from tinnitus they should be believed

(Baguely *et al.*, 2012). Further, a recent study by Probst, Pryss, Langguth *et al.* (2017) has shown that online recruitment can be advantageous in accessing individuals with acute tinnitus and those who have had tinnitus for a long time (>20 years) and would be otherwise hard to get in contact with through outpatient clinics. Second, due to an administrator error the response option “I don’t know” was omitted from Q20 (at T2 only) and Q29 (T1 and T2). As a result, it was not possible to evaluate the test-retest reliability for Q20. But when we eliminated the same response option from the T1 data and then performed a reliability analysis on the remaining data, we got a high and significant correlation coefficient (Cohen’s kappa = 0.80). Third, patients were able to select more than one response option for some TSCHQ items at T1 and this was not intended. The error was corrected during the T1 data collection phase so that it was only possible to select one response option per item, but unfortunately this error resulted in the loss of some patients’ data. Despite the missing data, we had a decent response rate and were able to perform all planned analyses. Finally, we received feedback from a small number of patients (via Facebook and direct messages to the study’s first author) about the wording and structure of some questions. For example, it was commented that some items were not worded sufficiently, especially Q9 which is about the location of tinnitus. Patients were aware that in most cases tinnitus is not located in the ear, and rather is only a perception of sound. The phrasing in the Norwegian translation is as literal and close as possible to the original English version, without losing correct Norwegian grammar, which could indicate that a change in wording might be needed in both versions. The same point was also made in the Swedish validation study of TSCHQ by Müller *et al.* (2016).

To summarize, this preliminary evaluation and report on a cross-cultural adaptation of TSCHQ into Norwegian shows that the Norwegian TSCHQ has acceptable test-retest reliability with the exception of 10 items. The number of items below the cut-off is somewhat better than that reported in a recent Swedish validation study of TSCHQ (Müller *et al.*, 2016). At the item level, there were both similarities and differences between the Norwegian and Swedish studies, but these did not appear to follow a specific pattern. Further, results from the comparison of tinnitus patients with and without hyperacusis symptoms on the Norwegian TSCHQ provides further evidence of the overlap in the pathophysiological mechanisms underpinning tinnitus and hyperacusis. We recommend further evaluation and use of the Norwegian TSCHQ in both research and clinical settings.

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## NOTE

<sup>1</sup> We refer to “symptoms of hyperacusis” or “hyperacusis symptoms” (rather than just “hyperacusis”) to be more cautious in our wording as the presence or absence of hyperacusis (symptoms) is based on a single questionnaire item from TSCHQ. We note that Kojima *et al.* (2017) and Schecklmann *et al.* (2014) refer to “hyperacusis” or “comorbid hyperacusis”.

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## APPENDIX A

TINNITUS SAMPLE CASE HISTORY QUESTIONNAIRE (TSCHQ)	
Navn:	Dato:
Fødselsdato (åååå/mm/dd):	
1. Alder:	
2. Kjønn:	<input type="checkbox"/> Mann <input type="checkbox"/> Kvinne
3. Dominant håndbruk:	<input type="checkbox"/> Høyre <input type="checkbox"/> Venstre <input type="checkbox"/> Begge hender
4. Familiehistorikk med tinnitus plager:	
<input type="checkbox"/> JA      Hvis JA:	<input type="checkbox"/> Foreldre <input type="checkbox"/> Søsken <input type="checkbox"/> Barn
<input type="checkbox"/> NEI	
5. Begynte: Når opplevde du tinnitus første gang? _____	
6. Hvordan merket du tinnitus i starten?	<input type="checkbox"/> Gradvis <input type="checkbox"/> Plutselig
7. Da tinnitus begynte var lyden relatert til:	
<input type="checkbox"/> Sterk lyd <input type="checkbox"/> Nakkesleng <input type="checkbox"/> Hørselsforandringer	
<input type="checkbox"/> Stress <input type="checkbox"/> Hodetraume	
<input type="checkbox"/> Annet _____	
8. Opplever du tinnitusen din som PULSERENDE?	
<input type="checkbox"/> JA, med hjerterytme <input type="checkbox"/> JA, annerledes enn hjerterytme	
<input type="checkbox"/> NEI	
9. Hvor opplever du tinnitus?	
<input type="checkbox"/> Høyre øre <input type="checkbox"/> Venstre øre	
<input type="checkbox"/> Begge ører, verst på venstre <input type="checkbox"/> Begge ører, verst på høyre	
<input type="checkbox"/> Begge ører, likt i hodet <input type="checkbox"/> Andre steder	
10. Hvordan opplever du tinnitus over tid?	
<input type="checkbox"/> Periodevis	
<input type="checkbox"/> Hele tiden	
11. Varierer STYRKEN på tinnitus fra dag til dag?	
<input type="checkbox"/> JA <input type="checkbox"/> NEI	
12. Beskriv STYRKEN på tinnitusen din på en skala fra 1-100 (1 = <i>VELDIG SVAK</i> ; 100 = <i>VELDIG STERK</i> ) _____ (1 – 100)	
13. Beskriv med dine egne ord hvordan tinnitus oppleves: _____	
Den følgende listen gir eksempler på mulige lydopplevelser. Bruk gjerne andre begreper hvis ønskelig: hvesende, ringende, pulserende, summende, klikkende, knitrende, tonelyd (som en ringetone eller andre typer av toner), nynnende, poppende, brølende, masende, skrivemaskin, plystrende, susende.	
14. Høres tinnituslyden mer ut som en tone eller mer som støy:	
<input type="checkbox"/> Tone <input type="checkbox"/> Støy <input type="checkbox"/> Gresshopper <input type="checkbox"/> Andre	
15. Beskriv tonehøyden på tinnituslyden:	
<input type="checkbox"/> Veldig ly frekvens <input type="checkbox"/> Lys frekvens <input type="checkbox"/> Mellomfrekvens <input type="checkbox"/> Lav frekvens	
16. Hvor mange prosent av din våkne tid, de siste månedene, har du vært bevisst tinnitusen din? For eksempel, 100% vil indikere at du har vært bevisst tinnitus hele tiden, og 25% vil indikere at du har vært bevisst tinnitus ¼ av tiden. _____ % (Skriv inn et tall mellom 1 og 100)	

17. Hvor mange prosent av din våkne tid, den siste måneden, har du blitt sint, engstelig eller irritert over tinnitusen din? _____ % (Skriv inn et tall mellom 1 og 100)													
18. Hvor mange ulike behandlinger har du prøvd på grunn av tinnitusen din? <input type="checkbox"/> Ingen <input type="checkbox"/> En <input type="checkbox"/> Flere <input type="checkbox"/> Mange													
19. Blir tinnitus redusert av musikk eller av enkelte omgivelseslyder, som for eksempel ved lyden av fossefall eller lyden av rennende vann når du står i dusjen? <input type="checkbox"/> JA <input type="checkbox"/> NEI <input type="checkbox"/> Vet ikke													
20. Forverres tinnitusen din av sterk lyd? <input type="checkbox"/> JA <input type="checkbox"/> NEI <input type="checkbox"/> Vet ikke													
21. Er det noen hode- eller nakkebevegelser som påvirker tinnitusen din? (F. eks. bevege kjeven forover eller presse tennene sammen, eller når noen tar på armene/hendene eller hodet ditt) <input type="checkbox"/> JA <input type="checkbox"/> NEI													
22. Blir tinnitusen din påvirket av at du tar deg en lur i løpet av dagen? <input type="checkbox"/> Forverrer tinnitus <input type="checkbox"/> Reduserer tinnitus <input type="checkbox"/> Har ingen påvirkning													
23. Er det noen sammenheng mellom nattesøvn og tinnitus i løpet av dagen? <input type="checkbox"/> JA <input type="checkbox"/> NEI <input type="checkbox"/> Vet ikke													
24. Blir tinnitusen din påvirket av stress? <input type="checkbox"/> Forverrer tinnitus <input type="checkbox"/> Reduserer tinnitus <input type="checkbox"/> Har ingen effekt													
25. Blir tinnitus påvirket av medisiner?													
<table border="1"> <thead> <tr> <th>MEDISINER</th> <th>HVILKEN EFFEKT/DETALJER</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> </tbody> </table>	MEDISINER	HVILKEN EFFEKT/DETALJER											
MEDISINER	HVILKEN EFFEKT/DETALJER												
26. Tror du at du har et hørselsproblem? <input type="checkbox"/> JA <input type="checkbox"/> NEI													
27. Bruker du høreapparater? <input type="checkbox"/> Høyre <input type="checkbox"/> Venstre <input type="checkbox"/> Begge <input type="checkbox"/> Ingen													
28. Har du et problem med å takle lyder fordi de ofte oppleves som for høye? Med det menes; opplever du ofte at du reagerer på for høye lyder eller smertefulle lyder som andre synes er behagelige? <input type="checkbox"/> Aldri <input type="checkbox"/> Sjeldent <input type="checkbox"/> Noen ganger <input type="checkbox"/> Vanligvis <input type="checkbox"/> Alltid													
29. Fører lyder til smerte eller fysisk ubehag? <input type="checkbox"/> JA <input type="checkbox"/> NEI <input type="checkbox"/> Vet ikke													
30. Plages du av hodepine? <input type="checkbox"/> JA <input type="checkbox"/> NEI													
31. Plages du av vertigo eller svimmelhet?? <input type="checkbox"/> JA <input type="checkbox"/> NEI													
32. Har du plager fra kjeveledd? <input type="checkbox"/> JA <input type="checkbox"/> NEI													
33. Plages du av nakkesmerter? <input type="checkbox"/> JA <input type="checkbox"/> NEI													
34. Plages du av smerter andre steder i kroppen? <input type="checkbox"/> JA <input type="checkbox"/> NEI													
35. Er du for tiden under behandling for psykiatriske tilstander? <input type="checkbox"/> JA <input type="checkbox"/> NEI													