



An online evaluation of the reliability and validity of hyperacusis questionnaires with an adult population experiencing hyperacusis

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Introduction

Hyperacusis is a hypersensitivity hearing disorder characterized by reduced tolerance to everyday sounds, often perceived as normal by most people or by the affected individual prior to onset [1].

Hyperacusis can affect physical and psychological well-being, leading to disruptions in daily life, including being isolated and avoiding social interactions [2].

Despite its prevalence, hyperacusis remains underdiagnosed due to inconsistent diagnostic tools and limited awareness [3].

Even though questionnaires are the main tool used for assessing hyperacusis, their reliability has been debated [4]. They have not yet been assessed for online use or validated for capturing symptom changes and providing reliable outcomes to guide treatment plans.

Aims

This study aims to evaluate the reliability and validity of four commonly used hyperacusis questionnaires:

- Hyperacusis Questionnaire (HQ) [5]
- Inventory of Hyperacusis Symptoms (IHS) [6]
- Hyperacusis Impact Questionnaire (HIQ) [7]
- Sound Sensitivity Symptoms Questionnaire (SSSQ) [7]

Methods

An online survey was conducted with adults experiencing hyperacusis:

1. Data was collected in 2 sessions, 2 weeks apart, where participants completed questionnaires measuring hyperacusis, tinnitus (Tinnitus Functional Index (TFI)) depression, and anxiety (Patient Health Questionnaire (PHQ) and Generalised Anxiety Disorder (GAD)).
2. Test-retest reliability analysis were conducted in SPSS and the following were calculated:
 - Means and standard deviations (SD), to summarize the central tendency and variability of the scores at both time points.

- Intraclass Correlation Coefficient (ICC), to assess consistency of scores across 2 time points
- Standard Error of Measurement (SEM), to determine score precision and estimate the variability in individual measurements

Participant Characteristics

The participant group included **110** individuals with hyperacusis, with an average age of 50 years and 58% being female.

- 93% were of white ethnicity.
- 55% reported never experiencing vertigo, while 33% experienced at least one episode annually.
- 54% had no other ear-related conditions.

External sounds were a problem for most participants: with 34.15% rating external sounds as a "big problem."

Tinnitus was common with 66.22% experiencing tinnitus "most or all of the time."

Results

For **110** participants, mean scores across all questionnaires were consistent between T1 and T2 (see Table 1).

As seen in Figure 1:

HQ: Mean score at T1 = 27.2; most participants scored above the clinical threshold (>28).

HIQ: Mean score at T1 = 13.6; scores varied, reflecting differences in the impact of hyperacusis across participants.

SSSQ: Mean score at T1 = 8.4; scores ranged from 1 to 14, with many participants reporting frequent symptoms.

IHS: Mean score at T1 = 75.7; with the widest range and highest average.

The higher the score the more significant the hyperacusis is.

According to the **Clinical Global Impression (CGI) scale**, 66% of participants (**n = 73**) reported "no change" in their hyperacusis severity between T1 and T2 this group were used for the test-retest reliability analysis.

See Table 2 for test-retest results.

- **HQ** and **IHS** had the highest reliability (ICC = 0.85 and 0.92, respectively).
- **HIQ** and **SSSQ** showed moderate to good reliability (ICC = 0.78 and 0.76, respectively).

SEM values indicated acceptable measurement precision for all tools, ranged from 2.1 (SSSQ) to 5.3 (IHS).

Table 1 Descriptive statistics of questionnaire measures for 110 participants at time 1 (T1) and time 2 (T2).

N = 110	T1		T2	
	Mean	SD	Mean	SD
Hyperacusis Questionnaire (HQ)	27.2	9.1	27.7	7.9
Hyperacusis Impact Questionnaire (HIQ)	13.6	7.5	12.4	7.5
Inventory of Hyperacusis Symptoms (IHS)	75.7	17.9	74.8	18.1
Sound Sensitivity Symptoms Questionnaire (SSSQ)	8.4	4.2	8	4.1
Tinnitus Functional index (TFI)	40	30.1	40	31
Patient Health Questionnaire (PHQ)	10.3	7.3	10.9	7.4
Generalised Anxiety Disorder (GAD)	8.4	6.5	8.6	6.2

SD = standard deviation.

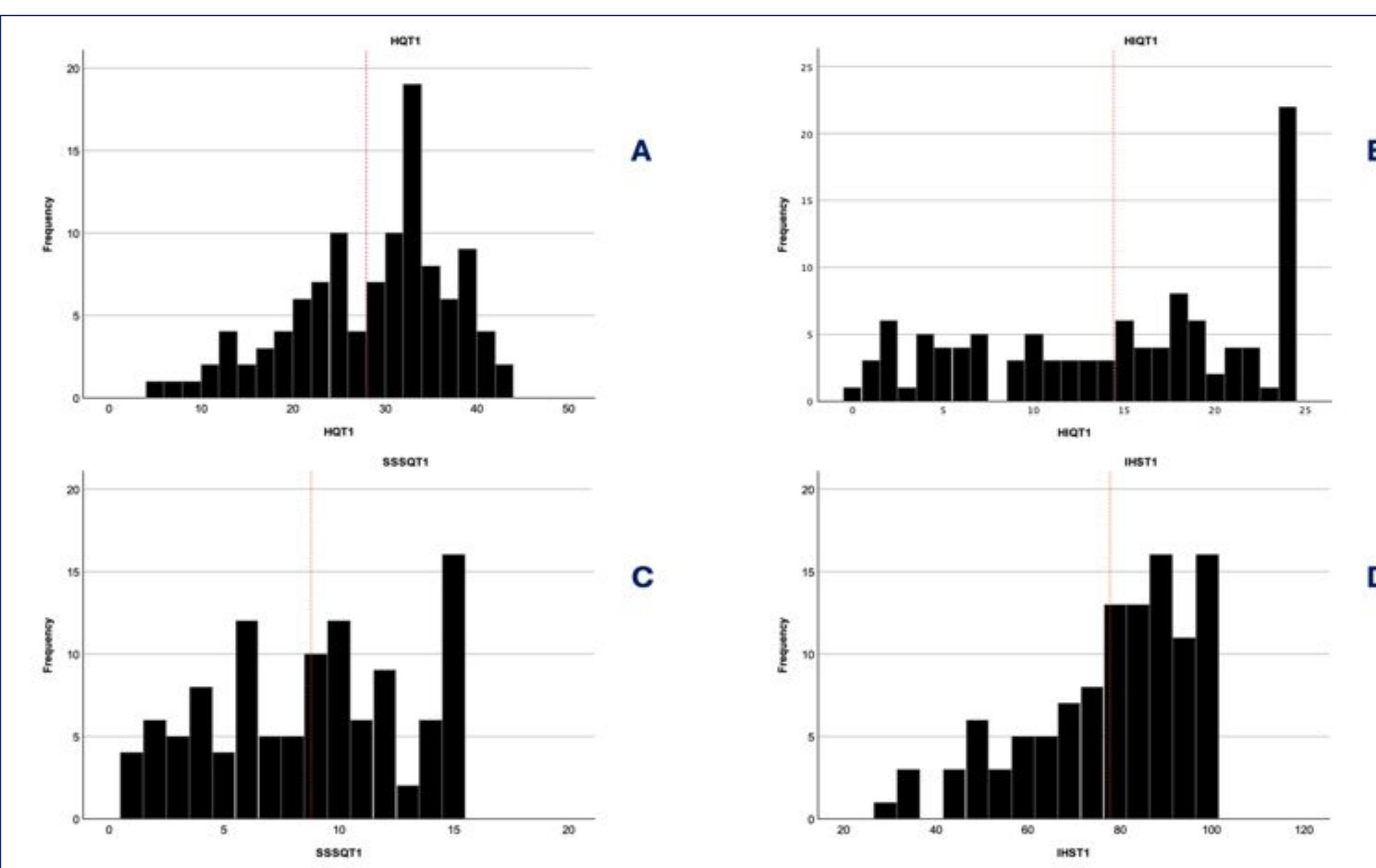


Figure 1. Histograms displaying T1 data for the 4 main Hyperacusis Questionnaires. The red line indicates where the mean value lies.

Table 2 Reliability table for the 73 "no change" participant group for time 1 (T1) and time 2 (T2) results.

Scale	Mean (SD)		Reliability		Mean diff*2	SEM
	T1	T2	ICC (95% CI)			
Hyperacusis Questionnaire (HQ)	27.2 (9.1)	27.7 (7.9)	0.85 (0.76 – 0.90)		0.5	3.4
Hyperacusis Impact Questionnaire (HIQ)	13.6 (7.5)	12.4 (7.5)	0.78 (0.67 – 0.86)		-1.2	3.5
Inventory of Hyperacusis Symptoms (IHS)	75.7 (17.9)	74.8 (18.1)	0.92 (0.87 – 0.95)		-0.9	5.3
Sound Sensitivity Symptoms Questionnaire (SSSQ)	8.4 (4.2)	8.0 (4.1)	0.76 (0.64 – 0.84)		-0.3	2.1

SD = standard deviation, ICC = intraclass correlation coefficient, CI = confidence interval, SEM = standard error of measurement

Conclusion

✓ **HQ** was highly reliable, with mean scores clustering around the threshold of 28, as initially proposed by Khalfa et al. (2002) for clinically significant hyperacusis. **IHS** is best suited for assessing symptom severity due to its broader scoring range.

✗ Mean IHS score was 75.7, higher than 71.4 reported by Aazh et al. (2022), likely due to differences in sample characteristics.

✗ Link between tinnitus and hyperacusis: emotional and functional impacts of tinnitus may inflate hyperacusis scores, so there is a need to differentiate these conditions.

✗ **HIQ** and **SSSQ** had lower reliability, making them less suitable for precise monitoring of symptom changes over time.

✗ Study had limited participant diversity (predominantly female and white), which may reduce the generalisability of findings.

✗ Variability in test-retest intervals (10–62 days) could have influenced reliability analyses.

References

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