ORIGINAL ARTICLES

PHILIPPINE JOURNAL OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY VOL. 41 NO. 2 JULY – DECEMBER 2026

Validity and Reliability of the Filipino Simplified Tinnitus Handicap Inventory in Evaluating Quality of Life Among Adult Filipino Hospital Staff at the Rizal Medical Center

Jeremiah M. Esguerra, MD, MBA
Anne Margaux V. Artates, MD, MS
Precious Eunice R. Grullo, MD, MPH, MSc

Department of Otorhinolaryngology
Head and Neck Surgery
Rizal Medical Center
Pasig City

ABSTRACT

Objective: To translate the English language Simplified Tinnitus Handicap Inventory (THI-S) into a Filipino Simplified Tinnitus Handicap Inventory (THI-SF) and to compare its validity and reliability in evaluating quality of life among hospital staff experiencing tinnitus at the Rizal Medical Center.

Methods:

Design: Psychometric Cross-Sectional Study
Setting: Tertiary Government Training Hospital
Participants: Sixteen (16) hospital staff of the Rizal Medical Center from September to November 2023 (3 months)

Results: Sixteen (16) participants (seven male, nine female) with a mean age of 34.4 years (range 26 to 50 years) completed the study. Ten had symptoms of tinnitus for less than five years; six for more than five years. Wilcoxon signed rank test was used to compare the two questionnaire scores, where total scores showed a significant difference, while subdomain analysis failed to detect a significant difference in scores. Cronbach alpha test of internal consistency showed a comparable overall result with an alpha value of 0.703 for the Filipino questionnaire. Further analysis showed that the *functional* and *catastrophic* subdomains had acceptable internal consistency with alpha values at 0.791, 0.717, respectively, while the *emotional* subdomain had excellent internal consistency at 0.922.

Conclusion: The Filipino version of the Simplified Tinnitus Handicap Inventory was an initial attempt in local translation of the English THI-S questionnaire. The questionnaire had acceptable levels of internal consistency and face validity but requires further construct validation and reliability testing.

Keywords: *tinnitus; surveys and questionnaires; adult; psychometrics; patient reported outcome measures; disability evaluation; quality of life; translating; language; Philippines*

Tinnitus is a symptom that is known to cause debilitating effects on both physical and mental health of a person, translating to a decrease in quality of life.[1] Defined as the perception of sound in the absence of an external source, it can be further classified as either subjective or objective, pulsatile or non-pulsatile, and primary or secondary. Of these, subjective non-pulsatile tinnitus is most seen in clinical practice.[2] There is limited understanding of the pathophysiology of subjective non-pulsatile tinnitus. Studies suggest that it may be due to aberrant neural changes in the central or peripheral auditory structures caused by different

Correspondence: Dr. Anne Margaux V. Artates
Department of Otorhinolaryngology
Head and Neck Surgery
Rizal Medical Center
Pasig Blvd., Pasig City 1600
Philippines
Phone: + 63 2 8865 8400 local 318
Email: orlhns@rmc.doh.gov.ph

The authors declared that this represents original material that is not being considered for publication or has not been published or accepted for publication elsewhere, in full or in part, in print or electronic media; that the manuscript has been read and approved by all authors, that the requirements for authorship have been met by each author, and that each author believes that the manuscript represents honest work.

Disclosures: The authors signed disclosures that there are no financial or other (including personal) relationships, intellectual passion, political or religious beliefs, and institutional affiliations that might lead to a conflict of interest.

Use of Artificial Intelligence: The authors declared that no artificial intelligence (AI) or AI-assisted technologies were used in the generation of this research, data analysis, or manuscript preparation.

Data Sharing and Availability Statement: Dataset for the study is publicly available in Zenodo at *https://doi.org/10.5281/zenodo.22425004*.

Creative Commons (CC BY-NC-ND 4.0)
Attribution - NonCommercial - NoDerivatives 4.0 International

© Philippine Society of Otolaryngology – Head and Neck Surgery, Inc.

forms of injury – commonly acoustic in origin. With extended exposure to loud sounds, apoptosis of cochlear hair cells and degeneration of spiral ganglion neurons result in poorer hearing, and occasionally the subsequent experience of tinnitus.[3,4] A direct cure has yet to be identified, but different psychometric instruments allow physicians to qualitatively assess how a patient's tinnitus affects their everyday lives.

One such tool is the Tinnitus Handicap Inventory (THI) constructed by Newman *et al*., a 25-item self-reported questionnaire that probes the functional, emotional, and catastrophic response to tinnitus.[5] This English language questionnaire has been adapted in different languages with good validity and reliability including the Filipino language.[6-8] To further improve questionnaire engagement and utility, shorter forms for screening may be utilized by clinicians. Less items in questionnaires were observed to have more completion rates while longer questionnaires had increased nonresponse rates.[9] Newman *et al.* designed and validated an abridged 10-question screening version of the original THI to increase time-efficiency and improve clinic use.[10] To the best of our knowledge, based on a search of HERDIN Plus, the Western Pacific Region Index Medicus (WPRIM), the Directory of Open Access Journals (DOAJ), and MEDLINE (PubMed and PubMed Central), using the search terms "*tinnitus*," "*quality of life*," "*questionnaires*," "*screening*," "*Filipino language*," and "*translating*," there is no published English-language article establishing the validity and reliability of a Filipino-translated version of the Simplified Tinnitus Handicap Inventory Questionnaire.

This study aimed to translate the original Simplified Tinnitus Handicap Inventory Questionnaire (THI-S) into the Filipino language and to establish the validity and reliability of the newly translated Filipino Simplified Tinnitus Handicap Inventory Questionnaire (THI-SF) in evaluating quality of life among hospital staff experiencing tinnitus at the Rizal Medical Center.

METHODS

Questionnaire Development

For this study, the original English-language Tinnitus Handicap Inventory Screening Version (THI-S) by Newman *et al.*,[10] was translated with the aid of the Translation Division of the Commission on the Filipino Language (*Sangay ng Salin ng Komisyon sa Wikang Filipino*), the official government agency on Filipino translation. Secondary evaluation and back translation of the shortened questionnaire was then performed by the principal investigator, who is proficient in both the English and Filipino languages, to draft the initial version of the questionnaire. The draft initial version was pre-tested among 10 asymptomatic lay individuals who were also proficient in both the English and Filipino languages to further ensure face validity of the questionnaire's translation.[11] Initial evaluation of the pre-test scores showed consistent scores between both the English and Filipino versions. Inputs regarding the language translation were collated and considered for the development of the final version of the Filipino translated Tinnitus Handicap Inventory Screening Version (THI-SF). *(Figure 1)*

Translated Filipino Screening version of the Tinnitus Handicap Inventory (THI-SF)

Instruksiyon: Ang layunin ng questionnaire na ito ay upang matukoy ang mga problemang idinudulot ng iyong tinnitus. Bilugan ang Oo, Minsan, o Hindi para sa bawat tanong. Huwag laktawan ang isang tanong.

1.	Dahil sa iyong tinnitus, nahihirapan ka bang mag-concentrate?	Oo	Minsan	Hindi
2.	Lagi ka bang nagrereklamo tungkol sa iyong tinnitus?	Oo	Minsan	Hindi
3.	Pakiramdam mo ba ay hindi mo na matatakasan ang iyong tinnitus?	Oo	Minsan	Hindi
4.	Nakakaranas ka ba ng pagkalito dahil sa iyong tinnitus?	Oo	Minsan	Hindi
5.	Nakakaramdam ka ba ng pagkadesmaya o pagkabigo dahil sa iyong tinnitus?	Oo	Minsan	Hindi
6.	Pakiramdam mo ba ay hindi mo na makakayanan ang iyong tinnitus?	Oo	Minsan	Hindi
7.	Nahihirapan ka bang ma-enjoy ang buhay dahil sa iyong tinnitus?	Oo	Minsan	Hindi
8.	Nagdudulot ba sa iyo ng sama ng loob ang iyong tinnitus?	Oo	Minsan	Hindi
9.	Nahihirapan ka bang makatulog sa gabi dahil sa iyong tinnitus?	Oo	Minsan	Hindi
10.	Nakaramdam ka ba ng labis ng kalungkutan dahil sa iyong tinnitus?	Oo	Minsan	Hindi

Figure 1. The Filipino Translated Screening version of the Tinnitus Handicap Inventory (THI-SF)

With Rizal Medical Center Institutional Ethics Review Board approval (2023-ORL-#039-FM-3.I Panel 3), this psychometric cross-sectional study on the newly translated questionnaire considered including participants who were hospital staff of the Rizal Medical Center recruited through convenience sampling between the months of September 2023 and November 2023. Convenience sampling enabled the researcher to focus on high-risk areas for occupational noise-induced hearing loss and tinnitus. The dietary section was identified to have a higher potential for noise exposure due to industrial exhaust fans and other machine noise operating at varying intensity and duration during working hours. This section was comprised of kitchen staff (cooks, dishwashers, and dieticians) and administrative officers.

The study had a projected sample size of 16 participants, based on the formula by Bonett *et al. (Figure 2)* with provisions for potential participant drop-out.[12]

$$n = \left[\left\{ \left(\frac{2k}{k-1} \right) \left(Z_{\alpha/2} + Z_{\beta} \right)^2 \right\} \Big/ \ln(\tilde{\delta})^2 \right] + 2$$

Where $\delta = (1\text{-}CA0)/(1\text{-}CA1)$

Figure 2. Sample size computation formula

In computing for the sample size, the power (1–β) was set at 0.9 and probability of type 1 error (α) at 0.05. Since the questionnaire includes 10 items, *k* was set at 10. *CA0* represents the value of Cronbach alpha at null hypothesis and was set at 0. This assumes that there is no internal consistency between the different items being tested. *CA1* represents

the value of Cronbach alpha at alternative hypothesis, and was set at 0.7, based on the general accepted alpha value showing reliable internal consistency. This assumes that there is some level of internal consistency between the different items being tested.[12] The number of participants included a 20% (3 participants) additional provision for potential participant drop-out during the duration of the study.

Recruitment commenced after Institutional Review Board approval. Considered for inclusion in the study were hospital staff from the dietary section of the Rizal Medical Center with subjective symptoms of tinnitus, who were also proficient in both the English and Filipino languages. Excluded were those with neurovascular co-morbidities, congenital or familial history of hearing loss, history of intake of ototoxic medications, and those using hearing amplification devices.

Potential participants were oriented about the study and asked to sign informed consent forms prior to participation. Each participant was provided with a printed copy of the original THI-S to answer and the answered copy was collected immediately. A 7-day interval period then followed to minimize recall bias. No intervention was done during the interval period, and participants were revisited in their respective workplaces after 7 days to answer the newly translated THI-SF, and the answered inventories were likewise collected immediately. Participants were given the option to withdraw from the study at any point if they wished, and those who did not completely answer either the original or translated questionnaire were excluded from the study and replaced with new participants, until the target sample size was achieved. Participant privacy was maintained through de-identification and storage of information in the author's personal computer with data encryption.

Data analysis was performed using IBM Statistical Package for Social Science (SPSS) for Windows and Mac OS, version 26.0 (IBM Corp., Armonk, N.Y., USA). Questionnaire face validity was established through expert translation with pre-testing and re-evaluation of multiple individuals proficient in both languages. Construct validity was determined by comparison of median scores for both the original and translated questionnaires using Wilcoxon signed rank test.

The level of significance, alpha, was set at 0.05. Internal reliability was evaluated using Cronbach alpha reliability estimates. The set acceptable value for internal consistency was an alpha greater than or equal to 0.70, with values closer to 1.0 showing higher internal consistency.

RESULTS

Participant Characteristics

The study had 16 participants, all of whom completed the questionnaires and were included in the study. There was no recorded participant drop out or withdrawal during the testing period. There were nine female and seven male participants with a mean age of 34.4 ± 1.6 years, ranging from 26 to 50 years old. Of the 16 participants, eight were noted to have prolonged direct exposure to loud dietary sounds, four worked mostly within the surrounding offices, and the remaining four had variable locations with partial exposure to loud kitchen and machine sounds. Ten participants had symptoms of tinnitus for less than five years, with one experiencing tinnitus for as short as one year, while six had symptoms for more than five years, with one intermittently experiencing tinnitus for as long as 10 years. Mean overall scores were seen to be higher in the THI-S English questionnaire compared to the mean overall scores in the THI-S Filipino questionnaire (13.4 vs. 12.5).

Questionnaire Validity and Reliability

Wilcoxon signed rank test compared the scores between the original English and the translated Filipino questionnaire for each participant through paired analysis. Total score comparison showed a significant difference between the two questionnaires (W = 62.5, z = 2.68, p = .008, r = .894). Sub-domain analysis was then done based on the classification of Newman *et al*[10], which categorized the questions into three groups, namely, *Functional Handicap* (questions 1, 4, 7, and 9); *Emotional Handicap* (questions 2, 5, 8, and 10); and *Catastrophic Handicap* (questions 3 and 6). Comparison of scores at this level failed to detect significant differences between the two questionnaires. *(Table 1)*

Table 1. Total and Sub-Domain analysis using Wilcoxon signed rank test

Domain	THI-S median	THI-SF median	Test statistic (W)	z	p-value*	Effect size (r)
Total	12.5	11.0	62.5	2.68	.008*	.894
Functional	5.50	5.00	12.00	-1.645	.100	.410
Emotional	5.00	5.00	7.00	-.816	.414	.200
Catastrophic	2.00	2.00	6.00	-.447	.655	.110

*The significance level is <.050

The translated questionnaire's internal consistency was evaluated in comparison to the original English questionnaire using Cronbach alpha. The evaluation of each questionnaire, excluding items without variance, showed that the English THI-S analysis, which consisted of 9 items (α = .713), and the Filipino THI-SF analysis, which consisted of 8 items (α = .703), resulted with similar acceptable alpha-values. Combined subdomain analysis was done as well. *(Table 2)* The functional subdomain, consisting of 8 items (α = .791), and the catastrophic subdomain, consisting of 4 items (α = .717), both showed acceptable alpha-values. The emotional subdomain analysis, consisting of 6 items (α = .922), was found to have an excellent alpha-value.

DISCUSSION

Our study was able to develop a Filipino translated Screening Tinnitus Handicap Inventory with face validity and acceptable internal consistency on both overall and subdomain levels. Construct validity analysis, however, detected a significant difference in paired overall scores when compared to the original English version. Subdomain analysis, on the other hand, failed to detect a significant difference amongst the paired scores.

Table 2. Summary of Cronbach alpha analysis

Questionnaire/Subdomain	*alpha-value*	*Interpretation*
Functional subdomain (English and Filipino)	.791	Acceptable
Emotional subdomain (English and Filipino)	.922	Excellent
Catastrophic subdomain (English and Filipino)	.717	Acceptable
THI-S (English)	.713	Acceptable
THI-SF (Filipino)	.703	Acceptable

In evaluating validity, expert translation, forward and backward translation, and pre-testing were used to establish face validity, similar to methods present in other translation studies.[6,7,11] Construct validity analysis showed a statistically significant difference between total questionnaire scores suggestive of possible linguistic discrepancies that may have affected subject perception and understanding of the terms and questions. This was observed in the lower mean overall scores of participants when answering the Filipino translated version. Findings at the subdomain level ran contrary to this, where our study failed to detect a significant difference. Inconsistencies between overall and subdomain significances were similarly described in other studies.[7,13] It was previously suspected that these differences may have come from mislabeling of questions into the wrong categories of the original Tinnitus Handicap Inventory questionnaire.[13] Additional modification and validation of the translated THI-SF questionnaire might then be required, as total overall scores were observed to have better representation and value in analytical studies.[7,13]

Internal consistency was found to be acceptable in overall and subdomain analysis. These findings are again shared by other translation studies of the long form THI, however, those present with generally higher scores.[6,7,8] The lower scores of the THI-SF may be attributed to the lesser number of questions inherently found in the screening questionnaire compared to the unabridged version.[14,15] Similarly, subdomain analysis noted the catastrophic category to have the lowest score among the three subdomains, probably due to the lesser number of items. This finding is observed in other translation studies as well.[6,7,8]

Several limitations of the study were noted when interpreting the results. For one, the study was not able to compare THI-SF scores with other established quality-of-life evaluation questionnaires to further compare and validate their translated versions.[8,10] The absence of such comparisons in this study limited the ability to establish further construct validity. Secondly, only internal consistency was established in this study's statistical testing. The lack of a test-retest reliability analysis in this study meant that ensuring consistency and reproducibility of results could not be established.

Recommendations for future studies include questionnaire adjustments with additional overall and subdomain validation, performance comparison with previously published Filipino translated long form of the Tinnitus Handicap Inventory, the use of locally translated and validated quality-of-life tools to compare instrument validity and measurement accuracy, and inclusion of a test-retest protocol in the study framework to determine reproducibility of results.

In conclusion, this study is an initial attempt to develop a locally translated questionnaire that measures tinnitus handicap. The translated instrument demonstrated acceptable internal consistency and face validity but requires further construct validity testing and test-retest analysis. Further studies that will utilize a larger sample size with more factor comparisons and test-retest analysis could better establish the questionnaire's validity and reliability.

REFERENCES

1. Choi JS, Yu AJ, Voelker CCJ, Doherty JK, Oghalai JS, Fisher LM. Prevalence of tinnitus and associated factors among Asian Americans: results from a national sample. *Laryngoscope*. 2020 Dec;130(12):E933-E940. DOI:10.1002/lary.28535; PubMed PMID: 31977073.
2. Worrall DM, Cosetti MK. Tinnitus and hyperacusis. In: Flint PW, Francis HW, Haughey BH, Lesperance MM, Lund VJ, Robbins KT, et al. (editors). Cummings Otolaryngology: Head & Neck Surgery. 7th ed. Philadelphia, PA: Elsevier/Saunders; 2021. p. 2328.
3. Wang TC, Chang TY, Tyler R, Lin YJ, Liang WM, Shau YW, et al. Noise induced hearing loss and tinnitus - new research developments and remaining gaps in disease assessment, treatment, and prevention. *Brain Sci.* 2020 Oct 13;10(10):732. DOI:10.3390/brainsci10100732; PubMed PMID: 33066210; PubMed Central PMCID: PMC7602100.
4. Rubak T, Kock S, Koefoed-Nielsen B, Lund SP, Bonde JP, Kolstad HA. The risk of tinnitus following occupational noise exposure in workers with hearing loss or normal hearing. *Int J Audiol.* 2008 Mar;47(3):109-114. DOI:10.1080/14992020701581430; PubMed PMID: 18307090.
5. Newman CW, Jacobson GP, Spitzer JB. Development of the tinnitus handicap inventory. *Arch Otolaryngol Head Neck Surg*. 1996 Feb;122(2):143-8. DOI:10.1001/archotol.1996.01890140029007; PubMed PMID: 8630207.
6. Tobias CA, Llanes EGDV, Chiong C. Validity of a Filipino translation of the Tinnitus Handicap Inventory. *Int Tinnitus J*. 2012;17(1):64-9. PubMed PMID: 23906830.
7. Monzani D, Genovese E, Marrara A, Gherpelli C, Pingani L, Forghieri M, et al. Validity of the Italian adaptation of the Tinnitus Handicap Inventory: focus on quality of life and psychological distress in tinnitus-sufferers. *Acta Otorhinolaryngol Ital*. 2008 Jun;28(3):126-134. PubMed PMID: 18646574; PubMed Central PMCID: PMC2644986.
8. Lee JH, Ra JJ, Kim YH. Adequacy of the simplified version of the Tinnitus Handicap Inventory (THI-S) to measure tinnitus handicap and relevant distress. *Korean J Audiol*. 2014 Apr;18(1):19-27. DOI:10.7874/kja.2014.18.1.19; PubMed PMID: 24782947; PubMed Central PMCID: PMC4003733.
9. Sharma H. How short or long should be a questionnaire for any research? Researchers' dilemma in deciding the appropriate questionnaire length. *Saudi J Anaesth*. 2022 Jan-Mar;16(1):65-68. DOI:10.4103/sja.sja_163_21; PubMed PMID: 35261591; PubMed Central PMCID: PMC8846243.
10. Newman CW, Sandridge SA, Bolek L. Development and psychometric adequacy of the screening version of the tinnitus handicap inventory. *Otol Neurotol*. 2008 Apr;29(3):276-81. DOI: 10.1097/MAO.0b013e31816569c4; PubMed PMID: 18277308.
11. Tsang S, Royse CF, Terkawi AS. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi J Anaesth*. 2017 May;11(Suppl 1):S80-S89. DOI:10.4103/sja.SJA_203_17; PubMed PMID: 28616007; PubMed Central PMCID: PMC5463570.
12. Bonett DG. Sample size requirements for testing and estimating coefficient alpha. *J Educ Behav Stat*. 2002;27(4):335-340. DOI:10.3102/10769986027004335.
13. Boecking B, Brueggemann P, Kleinjung T, Mazurek B. All for one and one for all? - examining convergent validity and responsiveness of the German versions of the Tinnitus Questionnaire (TQ), Tinnitus Handicap Inventory (THI), and Tinnitus Functional Index (TFI). *Front Psychol*. 2021 Mar 12;12:596037. DOI: 10.3389/fpsyg.2021.596037; PubMed PMID: 33776834; PubMed Central PMCID: PMC7994766.
14. Gliem JA, Gliem RR. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Refereed Paper, 2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education, The Ohio State University, Columbus, OH, October 8-10, 2003. [cited 2023 Dec 12]; Available from: https://hdl.handle.net/1805/344.
15. Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res Sci Educ*. 2017 Jun 7;48(1): 1273-1296. DOI:10.1007/s11165-016-9602-2.