

# Development and standardization of tinnitus handicap inventory in malayalam

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## Abstract

**Introduction:** Tinnitus is defined as the perception of sound mainly due to the activity within the central nervous system without any mechanical, vibratory activity within the cochlea. Administration of tinnitus related questionnaires along with the audiological test battery is recommended in routine clinical practice. Tinnitus Handicap Inventory (THI) is one of the useful and widely recognized tools for quantifying the impact of tinnitus on daily life. India, being a multilingual country with a multicultural background, there is no such inventories available in many of the local Indian languages except in Tamil and Kannada. **Materials & Methods:** The English THI was translated to Malayalam by a faculty who is qualified and proficient in Malayalam language. Then the translated THI was given to 40 native Malayalam speakers for content validity. The final THI-M was administered on 50 tinnitus patient. Obtained data was then subjected for statistical analysis using SPSS Statistics 17.0. **Results:** Reliability statistics revealed an alpha score of 0.855 for the overall inventory. Across the three subscales, i.e. emotional, functional and catastrophic, a global alpha score of 0.766, 0.693 and 0.630, respectively. The alpha score remained the same even after deleting any single item. **Conclusion:** The results of the current study conclude that, THI-M has a good reliability/internal consistency as per the Cronbach's alpha score. THI-M can be considered as a reliable tool that can be used across the State by Hearing Professionals in assessment and management.

**Keywords:** quality of life, questionnaires, tinnitus.

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## INTRODUCTION

Hearing sounds that do not originate in the world outside the body is an experience that probably every human has at one time or another in life. Tinnitus is defined as the perception of sound mainly due to the activity within the central nervous system without any mechanical, vibratory activity within the cochlea<sup>1</sup>. Tinnitus can accompany a wide array of serious and minor disorders of the ear and of the body in general. The tinnitus is one of the three most important otoneurological manifestations besides the sensorineural hearing loss and the vertigo. Tinnitus is a prevalent problem that remains poorly understood by healthcare professionals today. Tinnitus affects around 15% of the total world population<sup>2</sup>. It was also observed that, 20% of the tinnitus sufferers experience the disorder to a degree that, their quality of life has been impaired<sup>3</sup>.

Following an initial assessment, the client needing rehabilitation will require additional testing that may be referred to as the rehabilitation evaluation. As part of this evaluation, considerations should be given to difficulties encountered in the client's environment. This can be achieved by administration of tinnitus related questionnaires. Giolas<sup>4</sup> suggested that a self-assessment questionnaire can be a valuable part of the audiologist's equipment by conveying how an individual feels about the problem. A self-assessment screening questionnaire can alert professionals and the affected person to problems due to tinnitus and help in developing appropriate management focusing particularly on domains which is severely affected.

Tinnitus Handicap Inventory (THI) is widely recognized in many clinical practices and has become a useful tool for quantifying the impact of tinnitus on daily life. The first THI scale was developed by the British Association of Otolaryngologist, Head and Neck Surgeons which consists of 50 questions. Newman et al.<sup>5</sup> developed the 25-item inventory which was grouped appropriately into three subscales (functional, emotional, and catastrophic). The functional subscale includes 11 questions which evaluates the role limitations in the areas of mental, social, occupational and physical functioning. The emotional subscale includes 9 questions expressing a broad range of affective responses to tinnitus, including anger, frustration, irritability and depression. The catastrophic subscale has 5 questions which probe the most severe reaction to tinnitus, such as desperation, loss of control, inability to cope, inability to escape from tinnitus, and fear of having a grave disease.

India, being a multilingual country with a multicultural background, there is no such inventories available in many of the local Indian languages except in Tamil and Kannada. Most of the population in India still depends on local/regional languages for day to day

communication. In this context, administration of an English inventory will be of greater difficulty to quantify the real impact of any disorder on an individual. Also it is difficult for the clinician to efficiently translate the questionnaire to the patient's regional language with complete accuracy. Hence there was a need to develop such inventories in any of the local Indian languages. So the current study focused on developing and standardizing THI in Malayalam, a language spoken by the natives of Kerala.

## SUBJECTS AND METHODS

### Development of the questionnaire

This is a single centered study. The English version of Tinnitus Handicap Inventory (beta version of THI) which was developed by Newman et al.<sup>5</sup> was translated to Malayalam using the standard translation-back-translation method<sup>6</sup> by a Malayalam Professor with a postgraduation in Malayalam. The translated Tinnitus Handicap Inventory-Malayalam (THI-M) was then given to 40 native Malayalam speakers whose first language was Malayalam for content validity. The speakers were asked to rate the questions on a 5-point rating scale where 1 being 'very familiar' and 5 being 'not at all familiar'. The questions which were rated as 1 and 2 were adapted to the THI-M and questions which were rated above 2 were reframed and tested again for content validity. The final version of THI-M consisted of questions which were rated as 1 or 2.

### Participants and Procedure

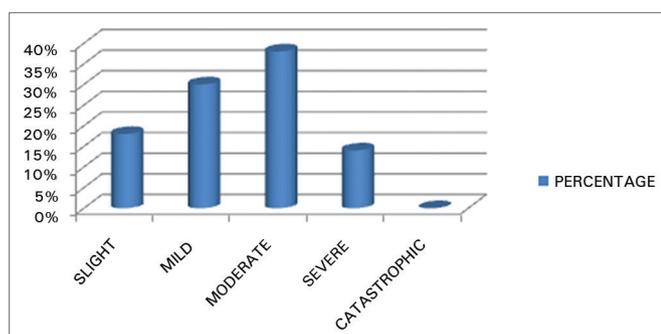
A total of 50 participants with a mean age of 46.02 years and a standard deviation of 12.47 years were selected for the study based on the inclusion and exclusion criteria. Among 50 participants, 27 (54%) were females and 23 (46%) were males. Participants having any neurological or psychological disturbances were excluded from the study. All the participants who have been experiencing tinnitus for more than 3 months associated with or without hearing impairment were included in the study. All the participants had a minimum qualification of SSLC (Secondary School Education) and they were proficient in reading and writing in Malayalam language. They were instructed to read the questionnaire thoroughly and complete the questionnaire comfortably in a given time on individual basis.

### Analysis

All the completed inventories were analyzed by the principle investigator to check and reject the incomplete questionnaires. The obtained data was then converted to numerical data as given in the English version of THI. The data was then subjected to statistical analysis using SPSS statistics 17.0 (SPSS Inc. Chicago).

## RESULTS

The total scores for the questionnaire rated by all the participants ranged from 8 to 60. When total points of the questionnaire were evaluated for severity of tinnitus, it was observed that THI-M could classify the entire population under various severities such as slight, mild, moderate and severe. It was found that, out of 50 participants, 18% of participants fall under the severity of slight, 30% under the severity of mild, 38% under the severity of moderate and 14% under the severity of severe as shown in Figure 1. The scale has an overall mean of 33.96 with a standard deviation of 13.84 and variance of 191.59. The mean and variance of the scale if a single item is deleted is shown in Table 1. Reliability analysis was carried out using the same software. Statistics such as Cronbach's alpha score and item-total correlation were obtained. The scale has a global alpha of 0.857 and on standardized item, a global alpha score of 0.855. The scale has got a maximum global alpha score of 0.861 for item 13 and a minimum global alpha score of 0.844 for item 15. The alphascore was listed if a single item is deleted from the questionnaire as shown in Table 2.



**Figure 1.** Percentage of participants falling under various severities of tinnitus.

The global alpha score individually for 3 domains were obtained. Functional domain has a global alpha score of 0.698 and on standardized item a global alpha score of 0.693. Emotional domain has a global alpha score of 0.768 and on standardized item, a global alpha score of 0.766. The catastrophic domain has a global alpha score of 0.613 and on standardized item, a global alpha score of 0.630. The result of item total correlation is given in Table 3.

## DISCUSSION

Tinnitus is a common symptom of otological as well as other conditions and due to its clinical characteristics, it affects the social, professional, emotional aspects of a human being thereby has an effect on the quality of life of an individual<sup>7</sup>. Most of the tinnitus patients

**Table 1.** Scale mean and variance if an item is deleted.

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted
Q1	32.28	171.267
Q2	32.52	180.704
Q3	32.44	174.251
Q4	32.48	173.969
Q5	32.64	171.664
Q6	32.92	176.687
Q7	31.92	184.973
Q8	32.84	182.382
Q9	32.56	172.088
Q10	32.48	173.806
Q11	32.88	184.516
Q12	32.40	171.755
Q13	32.72	185.920
Q14	32.60	175.551
Q15	32.76	170.594
Q16	32.48	176.418
Q17	32.88	179.781
Q18	32.64	186.031
Q19	32.80	176.653
Q20	32.76	181.370
Q21	32.52	172.214
Q22	32.52	175.153
Q23	32.60	177.510
Q24	32.80	186.122
Q25	32.60	179.143

develop successful adaptation to this phantom sound and those who do not get adapted; tinnitus may become a source of significant disability<sup>8</sup>. There is a strong relationship between the perceived severity of tinnitus and depressive and anxiety disorder. Hearing status, gender and age do not have a relation with the severity of the tinnitus<sup>9</sup>. According to Zoger et al.<sup>10</sup>, majority of the tinnitus sufferers without severe hearing impairment has lifelong psychiatric illness, the most frequent being anxiety disorder and mood disorder. Insomnia is reported to be another frequent impediment associated with tinnitus which affects the physical, psychological, social and environmental quality of life of tinnitus sufferers<sup>11</sup>. Nondahl et al.<sup>12</sup> investigated the impact of tinnitus on quality of life in older individuals. He concluded that there is a strong relationship between the tinnitus severity and reduced quality of life.

The traditional assessment tools used to clinically diagnose tinnitus are not sensitive enough to measure the impairment caused by it. So developing an instrument which assesses the tinnitus related problems is very

**Table 2.** Cronbach's alpha if an item is deleted.

Items	Cronbach's Alpha if Item Deleted
Q1	.847
Q2	.857
Q3	.850
Q4	.851
Q5	.850
Q6	.852
Q7	.857
Q8	.856
Q9	.847
Q10	.848
Q11	.857
Q12	.845
Q13	.861
Q14	.850
Q15	.844
Q16	.849
Q17	.855
Q18	.858
Q19	.850
Q20	.856
Q21	.847
Q22	.849
Q23	.850
Q24	.859
Q25	.853

**Table 3.** Corrected item-total correlation.

Items	Corrected Item-Total Correlation
Q1	.547
Q2	.269
Q3	.478
Q4	.428
Q5	.475
Q6	.410
Q7	.222
Q8	.275
Q9	.558
Q10	.517
Q11	.222
Q12	.606
Q13	.128
Q14	.471
Q15	.660
Q16	.502
Q17	.313
Q18	.178
Q19	.482
Q20	.290
Q21	.561
Q22	.499
Q23	.477
Q24	.164
Q25	.381

important for better option of treatment and for monitoring these patients. Few of such inventories used for this includes, Tinnitus Handicap Questionnaire<sup>13</sup>, Tinnitus Severity Questionnaire, Tinnitus Handicap Inventory.

Lim et al.<sup>14</sup> did a study to investigate the impact of tinnitus on tinnitus sufferers using Tinnitus Handicap Inventory as found out that, there was no significant difference in THI scores in patients perceiving single tone tinnitus. But there was a significantly higher overall and sub scale scores for patients perceiving multiple tone tinnitus. Kim et al.<sup>15</sup> used THI to assess tinnitus in children and its association between anxiety and trait anxiety. He observed that, THI scores showed significant difference according to the frequency of the tinnitus.

Statistical results obtained for the Malayalam version of THI shows a good reliability/internal consistency as indicated by the Cronbach's alpha score. The English version of THI has a global alpha score of 0.93 with an item-total correlation ranging from 0.22 to 0.77<sup>16</sup>. While recalling emotional, functional and

catastrophic sub scales, it has a global alpha score of 0.87, 0.86, and 0.68 respectively. THI-M has an overall global alpha score of 0.857 and on standardized item a global alpha score of 0.855. Across three sub scales, a global alpha score of 0.693, 0.766 and 0.630 was obtained for functional, emotional and catastrophic domains. While recalling the Kannada version of THI, a global alpha score of 0.855 and across the sub scales a global alpha score of 0.78, 0.79 and 0.68 were obtained for emotional, functional and catastrophic sub scales<sup>17</sup>. Global alpha score of 0.855 for both the Malayalam and Kannada version of THI indicated good reliability. Thus, THI-M can be used as a reliable tool to classify tinnitus sufferers according to the perceived severity.

## CONCLUSION

The aim of the current study was to translate and standardize THI to Malayalam, the native language of Kerala. As per the results, the Malayalam

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version of THI can successfully classify tinnitus patients according to their perceived tinnitus severity and proved to be a reliable tool. Hence, this inventory can be used in assessment, management and monitoring of tinnitus sufferers by audiologist as well as otologists working in various clinical settings across the state.

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