Development and Validation of a Short Version of the Thai Five-Minute Hearing Test to Screen Hearing in the Community

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Objective: *To develop a rapid hearing test for community-based mass-screening.*
Material and Method: *The Thai version of the Five-Minute Hearing test (Thai-FMHT) was translated from the original English. The validity of the Thai-FMHT was evaluated then factor analysis was used to develop the Thai-FMHT short version. The validity and internal consistency of the short version were assessed between July and September 2011.*
Results: *We collected the results of the FMHT and audiometric data for 558 participants in the Phu Wieng, Khon Kaen, Thailand. Five representative items were selected from the 15 items in the Thai-FMHT for development of the short version. The short Thai-FMHT had high internal consistency (0.85) and a high correlation with the Thai-FMHT, for screening mild and moderate hearing loss (HL) (0.73 and 0.85, respectively). A score of 3 was designated a suitable cut-off for screening mild HL (sensitivity 67.6% (95% CI: 59.1 to 75.4), specificity 54% (95% CI: 49.1 to 58.9)). As for moderate HL, the short Thai-FMHT offered a sensitivity of 82.8% (95% CI: 64.2 to 94.2) and a specificity of 76.6% (95% CI: 72.7 to 80.1) at an optimized cut-off of 5.*
Conclusion: *The short version of the FMHT is suitable for community-based mass-screening for hearing loss. A score of 3 to 4 should see a general ENT doctor for early investigation; whereas, a score of 5 and above should get hearing evaluated with standard audiometric testing by a neurootologist.*

Keywords: *Validity, Screening, Five minute hearing test, Hearing loss, Community*

J Med Assoc Thai 2017; 100 (Suppl. 6): S165-S173
Full text. e-Journal: *http://www.jmatonline.com*

Hearing impairment is the most common sensory deficit[1]. In 2004, the WHO estimated that the population with adult-onset hearing loss was 124.2 million people, with the numbers in low and middle income countries being extremely high[1]. The prevalence of hearing loss increases with population age; it is 20% to 40% in populations 50 or older and more than 80% for those 80 or older[2-6]. The problems and consequences of hearing impairment include a reduced ability to detect, localize and interpret sounds, a communicative disability, and a quality of life made poorer because of isolation, reduced social interaction, and a feeling of being excluded, leading to increased symptoms of depression[7]. Hearing impairment should, thus, be detected early and corrected.

The diagnosis of hearing impairment should be made using standardized pure tone audiometry; unfortunately, this test requires expensive equipment and an audiologist, and it is time-consuming, so it is unsuitable for mass-screening. Screening questionnaires have been developed to identify hearing loss at an early stage. Weinstein and Ventry (1983) and Newman et al (1990) were the first to advocate use of self-reported questionnaires, the Hearing Handicap Inventory for the Elderly (HHIE-S)[8] and the Hearing Handicap Inventory for Adults[9], respectively. These tests were designed to measure the social and emotional handicaps caused by hearing impairment. There are also numerous variations of the self-reported single question screening test, including: "Do you feel you have a hearing loss?", "Do you have a hearing problem now?" or "Would you say you have

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any difficulty hearing?". All of these screening tests are useful but two significant limitations include, (a) the probability of hearing impairment in the absence of a hearing handicap (HHIE ≤8)[10] and (b) the unreliable prevalence of age-related hearing loss[11].

The five-minute hearing test (FMHT) comprising 15 items was developed by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). Its main advantages include, (a) a significant correlation of its results with all audiologic measures, and (b) a reasonable estimate of the degree of hearing loss[12]. The FMHT was translated into Thai and validated through a comparison with standardized pure-tone averages for mild (>25 dB) and moderate (>40 dB) hearing loss in the speech frequency range. At a cut-off of 8, it offers the most valuable screening for moderate hearing loss (93.1% sensitivity, 95% CI: 77.2 to 99.2%; 56.5% specificity, 95% CI: 55.1 to 64.7%), but it is less valuable for mild hearing loss (64.7% sensitivity, 95% CI: 56.1 to 72.7%; 60% Specificity, 95% CI: 55.1 to 64.7%). The area under the curve (AUC) of the Thai-FMHT for screening mild hearing loss was 0.67 (95% CI, 0.61 to 0.72), compared with 0.86 (95% CI, 0.80 to 0.93) for moderate hearing loss[13]. Since the less time-consuming a test is, the more practical it is for community-based screening, the aim of the current 7 study was to determine whether the Thai-FMHT could be made shorter while preserving the sensitivity and specificity of the test. We, therefore, modified the Thai-FMHT to create a shorter version then tested its validity against a single question.

Material and Method

Participants

The study held between July and September 2011 included participants living in the Phu Wieng District of Khon Kaen Province, Thailand: (a) 18 or older, (b) having a good understanding of the Thai, (c) not having Brocha's aphasia, and (d) not having any severe psychiatric problems or other disorders which might prevent their undergoing audiometric examination. All participants provided written informed consent. The study was approved by the Ethics Committee of Khon Kaen University (HE541135).

Data collection

Public health personnel interviewed the participants using the questionnaires. Audiologists performed pure-tone audiometry without knowing the results of the FMHT. The audiometric tests were performed in portable soundproof booths. Air conduction hearing in the 250 to 8,000 Hz range was tested. Bone conduction thresholds were determined in participants suspected of having a conductive or mixed hearing loss. The hearing examination comprised (a) a history (including the single question "Do you feel you have a hearing loss?"), and (b) otoscopic examination by an otorhinolaryngologist. Complete hearing examination data were obtained for all 558 participants in the study.

Data analysis

Development of the short version of the Thai-FMHT was performed by factor analysis. The validity and internal consistency of the short version were examined using the Spearman rank order correlation and Cronbach's alpha, respectively. The discriminative ability of each version of the Thai-FMHT was determined. The receiver operating characteristic (ROC) curve was produced by plotting sensitivity against 1 minus the specificity rate. Each point on the ROC plot represents a $\frac{\text{sensitivity}}{\text{1-specificty}}$ pair corresponding to a cutoff value. The optimal cutoff value is a ROC plot that is close to the upper left hand corner. Statistical analyses were performed using STATA software version 10.

Results

A total of 558 participants were recruited (1,116 ears) who all underwent hearing examination. The mean age was 54 (range, 18 to 87), and most were female (68%). Hearing loss was the most common complaint (21.8%); about half of which was sensorineural hearing loss (52.6%) (Table 1). The results of pure tone audiometry indicated that 61% presented with an air conduction threshold >25 dB at any frequency, and 38.4% with pure-tone average air conduction threshold >25 dB in the speech frequency range (0.5, 1and 2 kHz)[13]. A respective 14% and 24.4% of participants

Table 1. Demographic data

Baseline data	Number	Percentage (%)
Sex		
Male	176	32
Female	382	68
Age (years)	Mean 54.5	Range (18 to 87)
Diagnosis	Ears	
Normal	497	44.5
SNHL	587	52.6
CHL	14	1.3
Mixed HL	19	1.7

reported unilateral and bilateral hearing loss.

Five-minute hearing test

The respective response frequencies for each question in the FMHT are presented in Table 2. The internal consistency of the Thai-FMHT was about 0.90, assessed by using Cronbach's alpha (Table 3). A factor analysis was calculated with a minimum eigen value of one, using the principal factors method. The analysis of the 15-item FMHT demonstrated that it is a uni-dimensional test A5-item short version of Thai-FMHT was developed by selecting questionnaire items 4, 8, 11, 13, and 15 for a representation of the previous 15 items (Table 3). The internal consistency of the short version is 0.85.

The degree of hearing loss among all of the participants was determined by using the pure-tone audiometric hearing threshold of the better ear in the speech frequency range, according to the classification of the ASHA guideline[14,15] and the correlation between the audiometry and Thai-FMHT (Fig. 1A, Table 4). A respective score of 3 and 5 was designed as the cutoff on the short version for screening mild vs. moderate hearing loss (67.6% sensitivity, 95% CI: 59.1 to 75.4%; 54% specificity, 95% CI: 49.1 to 58.9% vs. 82.8% sensitivity, 95% CI: 64.2 to 94.2%; 76.6% specificity, 95% CI: 72.7 to 80.1%) (Fig. 1B, Table 5). The validity of the short version of the test was assessed by testing for correlations with the 15-item Thai-FMHT using the Spearman rank order correlation (rho), which was 0.73 vs. 0.85 for screening mild vs. moderate hearing loss. The area under the curve (AUC) was calculated to indicate the discriminative ability of each version, which was comparable between the Thai FMHT and short version. At the level of mild hearing loss, both versions have an AUC of 0.67 (95% CI: 0.61 to 0.72), while both are better for detecting moderate hearing loss (AUC of 0.86; 95% CI: 0.80 to 0.93).

Discussion

Many tools have been developed to screen for hearing loss and the FMHT is an example of a

Table 2. Frequency of responses to each question in the FMHT

Question	Almost always No. (%)	Half the time No. (%)	Occasionally No. (%)	Never No. (%)
1) I have a problem hearing over the telephone.	31 (5.6)	32 (5.7)	166 (29.7)	329 (59)
2) I have trouble following the conversation when two or more people are talking at the same time.	27 (4.8)	33 (5.9)	182 (32.8)	315 (56.5)
3) People complain that I turn the volume too high.	49 (8.8)	27 (4.8)	113 (20.3)	368 (66.1)
4) I have to strain to understand conversations.	37 (6.6)	40 (7.2)	161 (28.9)	320 (57.4)
5) I miss hearing some common sounds like the phone ring or doorbell ringing.	18 (3.2)	14 (2.5)	113 (20.3)	413 (74.0)
6) I have trouble hearing conversations in a noisy background such as a party.	51 (9.1)	47 (8.4)	218 (39.1)	242 (43.4)
7) I get confused about where sounds come from.	58 (5.0)	21 (31.8)	211 (37.8)	298 (53.4)
8) I misunderstand some words in a sentence and need to ask people to repeat themselves.	47 (8.4)	55 (5.9)	298 (53.4)	158 (28.3)
9) I especially have trouble understanding the speech of women and children.	19 (3.4)	13 (2.3)	127 (22.8)	399 (71.5)
10) I have worked in noisy environments (assembly lines, jackhammers, jet engines, etc)	50 (9.0)	33 (5.9)	94 (16.8)	381 (68.3)
11) Many people I talk to seem to mumble (or don't speak clearly).	23 (4.1)	27 (4.8)	194 (34.8)	324 (56.3)
12) People get annoyed because I misunderstand what they say.	25 (4.4)	25 (5.0)	166 (29.8)	339 (60.8)
13) I misunderstand what others are saying and make inappropriate responses.	25 (4.5)	27 (4.8)	245 (43.9)	261 (46.8)
14) I avoid social activities because I cannot hear well and fear I'll reply improperly.	19 (3.4)	16 (2.9)	88 (15.8)	435 (78.0)
15) To be answers by a family members or friends: Do you think this person has a hearing loss?	27 (4.8)	28 (5.0)	168 (30.1)	335 (60.0)

Table 3. Factor analysis and internal consistency of the Thai FMHT

Question	Factor	Conbrach's alpha
1) I have a problem hearing over the telephone.	0.5798	0.8916
2) I have trouble following the conversation when two or more people are talking at the same time.	0.6776	0.8882
3) People complain that I turn the volume too high.	0.4613	0.8965
4) I have to strain to understand conversations.	0.7463	0.8853
5) I miss hearing some common sounds like the phone ring or doorbell ringing.	0.6128	0.8909
6) I have trouble hearing conversations in a noisy background such as a party.	0.6418	0.8895
7) I get confused about where sounds come from.	0.5731	0.8921
8) I misunderstand some words in a sentence and need to ask people to repeat themselves.	0.7580	0.8850
9) I especially have trouble understanding the speech of women and children.	0.6400	0.8902
10) I have worked in noisy environments (assembly lines, jackhammers, jet engines, etc)	0.1196	0.9108
11) Many people I talk to seem to mumble (or don't speak clearly).	0.7119	0.8869
12) People get annoyed because I misunderstand what they say.	0.6959	0.8878
13) I misunderstand what others are saying and make inappropriate responses.	0.7105	0.8874
14) I avoid social activities because I cannot hear well and fear I'll reply improperly.	0.6184	0.8910
15) To be answers by a family members or friends: Do you think this person has a hearing loss?	0.7296	0.8861

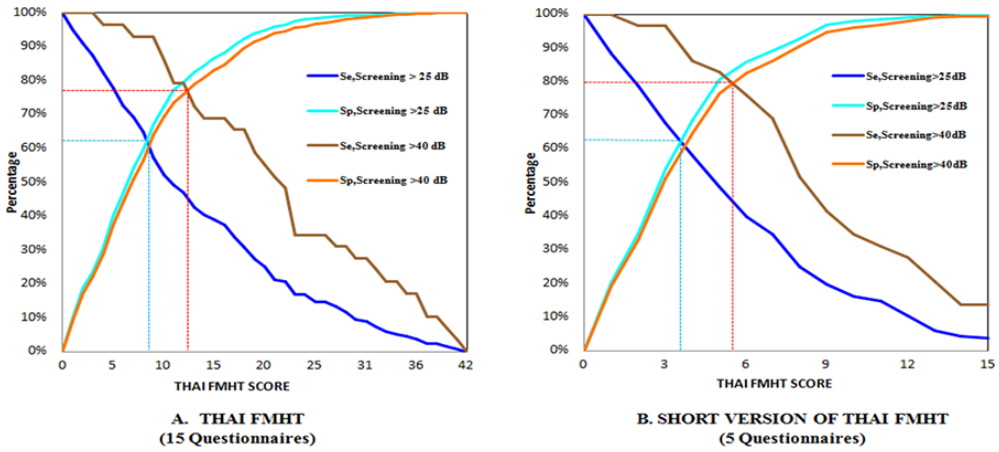

Fig. 1 ROC presented the optimized cutoff for theThai-FMHT (A) and Short version (B) at the hearing thresholds >25 dB and >40 dB. Scores of 8 and 12 on the Thai-FMHT represent the optimized cutoff at >25 dB and >40 dB, respectively. Scores of 3 and 5 on the short version offer optimized cutoffs at >25 dB and >40 dB, respectively. The short version seems to have better discriminative ability than the full Thai-FMHT.

screening questionnaire. The FMHT correlates with an audiogram (coefficient of 0.26 with SDS; 0.24 with SRT; 0.59 with air-conduction SFPTA and 0.65 with air-conduction HFPTA). A cutoff score of 15 on the FMHT provides a reasonable ROC with a sensitivity of 80% and a specificity of 55.2%[12]. The authors, therefore, chose and translated the FMHT questionnaire into Thai. The Thai-FMHT was analyzed but it was not as effective as the original due to confounding factors, including the different language and culture, the situation and surroundings, and the location for audiometric examinations. The short version, however, seems to be superior to the long version, especially for screening moderate hearing loss as it has a higher ROC curve (Fig. 2).

Brief questionnaires are needed for community-based, mass-screening of hearing impairment. The aim of this study was to develop a simple and compatible hearing questionnaire for mass-screening. The authors developed a short version of

Table 4. Diagnostic values and cutoff points for the Thai-FMHT at Hearing level >25 dB and >40 dB

Cut-off point	Thai - FMHT (15 Items) to Screen Better Hearing Ear											
	Sensitivity(%) (95%CI)		Specificity(%) (95%CI)		LH(+) (95%CI)		LH(-) (95%CI)		PPV(%) (95%CI)		NPV(%) (95%CI)	
	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB
5	77.9 (70.0-84.6)	96.6 (82.2-99.9)	40.0 (35.3-44.9)	37.4 (33.3-41.7)	1.3 (1.2-1.5)	1.5 (1.4-1.7)	0.6 (0.4-0.8)	0.1 (0.01-0.6)	29.5 (24.9-34.5)	7.8 (5.3-11.1)	84.9 (79.2-89.6)	99.5 (97.2-100)
8	64.7 (56.1-72.7)	93.1 (77.2-99.2)	60.0 (55.1-64.7)	56.5 (55.2-60.8)	1.6 (1.4-1.9)	2.1 (1.9-2.5)	0.6 (0.5-0.8)	0.1 (0.03-0.5)	34.2 (28.5-40.4)	10.5 (7.0-14.9)	84.1 (79.4-88.0)	99.3 (97.6-99.9)
10	52.2 (43.5-60.8)	86.2 (68.3-96.1)	72.5 (68.0-76.7)	69.4 (65.3-73.3)	1.9 (1.5-2.4)	2.8 (2.3-3.4)	0.7 (0.6-0.8)	0.2 (0.1-0.5)	38.0 (31.0-45.3)	13.4 (8.8-19.1)	82.5 (78.2-86.2)	98.9 (97.3-99.7)
12	47.1 (38.4-55.8)	79.3 (60.3-92.0)	79.6 (75.5-83.4)	76.0 (72.1-79.6)	2.3 (1.8-3.0)	3.3 (2.6-4.2)	0.7 (0.6-0.8)	0.3 (0.1-0.6)	42.7 (34.6-51.0)	15.3 (10.0-22.1)	82.4 (78.3-85.9)	98.5 (96.8-99.5)
15	39.0 (30.7-47.7)	69.0 (49.2-84.7)	86.7 (83.1-89.8)	83.2 (79.7-86.3)	3.0 (2.1-4.1)	4.1 (3.0-5.6)	0.7 (0.6-0.8)	0.4 (0.2-0.6)	48.6 (38.9-58.4)	18.3 (11.6-26.9)	81.5 (77.6-85.0)	98.0 (96.2-99.1)
20	25.0 (18.0-33.1)	55.2 (35.7-73.6)	95.0 (92.5-96.9)	92.6 (90.1-94.7)	5.0 (3.0-8.4)	7.5 (4.8-11.7)	0.8 (0.7-0.9)	0.5 (0.3-0.7)	61.8 (47.7-74.6)	29.1 (17.6-42.9)	79.7 (75.9-83.2)	97.4 (95.6-98.6)
25	14.7 (9.2-21.8)	34.5 (17.9-54.3)	98.3 (96.6-99.3)	96.8 (94.9-98.1)	8.9 (3.8-20.5)	10.7 (5.4-21.3)	0.9 (0.8-0.9)	0.7 (0.5-0.9)	74.1 (53.7-88.9)	37.0 (19.4-57.6)	78.2 (74.4-81.6)	96.4 (94.5-97.8)
30	9.6 (5.2-15.8)	27.6 (12.7-47.2)	99.3 (97.9-99.9)	98.5 (97.0-99.3)	13.4 (3.9-46.5)	18.2 (7.4-45.1)	0.9 (0.9-1.0)	0.7 (0.6-0.9)	81.3 (54.4-96.0)	50.0 (24.7-75.3)	77.3 (73.5-80.8)	96.1 (94.1-97.6)
35	4.4 (1.6-9.4)	17.2 (5.9-35.8)	99.8 (98.7-100)	99.6 (98.6-100)	18.6 (2.3-NA)	45.6 (9.2-NA)	0.9 (0.9-1.0)	0.8 (0.7-1.0)	85.7 (42.1-99.6)	71.4 (29.0-96.3)	76.4 (72.6-79.9)	95.6 (93.6-97.2)
40	1.5 (0.2-5.2)	6.9 (0.9-22.8)	100 (99.0-100)	100 (99.3-100)	NA	NA	1.0 (0.97-1.0)	0.9 (0.8-1.0)	100 (15.8-100)	100 (15.8-100)	75.9 (72.1-79.4)	95.1 (93.0-96.8)

Table 5. Diagnostic values and cutoff points for the Short version and diagnostic values of the single question test with hearing thresholds at levels >25 dB and >40 dB

Cut-off point	Short version Thai - FMHT(5 Items) to Screen Better Hearing Ear											
	Sensitivity(%) (95%CI)		Specificity(%) (95%CI)		LH(+) (95%CI)		LH(-) (95%CI)		PPV(%) (95%CI)		NPV(%) (95%CI)	
	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB	> 25dB	>40 dB
1	88.2 (81.6-93.1)	100 (88.1-100)	20.4 (16.6-24.5)	19.3 (16.0-22.9)	1.1 (1.0-1.2)	1.2 (1.2-1.3)	0.6 (0.4-0.9)	NA	26.3 (22.3-30.6)	6.4 (4.3-9.0)	84.3 (75.8-90.8)	100 (96.4-100)
3	67.6 (59.1-75.4)	96.6 (82.2-99.9)	54.0 (49.1-58.9)	51.2 (46.9-55.6)	1.5 (1.3-1.7)	2.0 (1.8-2.2)	0.6 (0.5-0.8)	0.1 (0.01-0.5)	32.2 (26.8-37.9)	9.8 (6.6-13.8)	83.8 (78.9-88.0)	99.6 (98.0-100)
5	48.5 (39.9-57.2)	82.8 (64.2-94.2)	80.6 (76.5-84.2)	76.6 (72.7-80.1)	2.5 (1.9-3.2)	3.5 (2.8-4.4)	0.6 (0.5-0.8)	0.2 (0.1-0.5)	44.6 (36.4-53.0)	16.2 (10.7-23.2)	82.9 (78.9-86.4)	98.8 (97.2-99.6)
10	16.2 (10.4-23.5)	34.5 (17.9-54.3)	97.9 (96.0-99.0)	96 (94-97.5)	7.6 (3.6-16.1)	8.7 (4.5-16.7)	0.9 (0.8-0.9)	0.7 (0.5-0.9)	71.0 (52.0-85.8)	32.3 (16.7-51.4)	78.4 (74.6-81.8)	96.4 (94.4-97.8)
15	3.7 (1.2-8.4)	13.8 (3.9-31.7)	99.5 (98.3-99.9)	99.4 (98.5-99.9)	7.8 (1.5-39.5)	24.3 (5.7-NA)	1.0 (0.9-1.0)	0.9 (0.8-1.0)	71.4 (29.0-96.3)	57.1 (18.4-90.1)	76.2 (72.4-79.7)	9.5 (93.4-97.0)
Single question	33.8 (25.9-42.4)	41.4 (23.5-61.1)	71.6 (67.0-75.8)	70.9 (66.8-74.7)	1.2 (0.9-1.6)	1.4 (0.9-2.2)	0.9 (0.8-1.0)	0.8 (0.6-1.1)	27.7 (21.1-35.2)	7.2 (3.7-12.3)	77.0 (72.6-81.1)	95.7 (93.1-97.5)

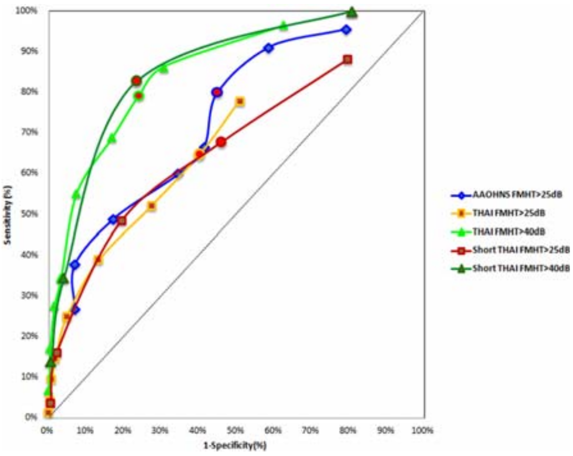

Fig. 2 Comparison of the ROC curve between the AAO-HNS and various versions of the Thai-FMHT (at hearing threshold >25 dB, >40 dB). ROC plots present the sensitivity values as a function of the false positive rate (1-Specificity) at varying cut-offs, starting from the top right. The recommended cut-off for each version is presented with a red dot.

the FMHT from the Thai-FMHT by using factor analysis. The correlation between each item of the short version of the Thai-FMHT indicated that all of the items were homogeneous. Furthermore, the short version had a high correlation with the full-length Thai-FMHT. The short version includes 5 of the questionnaire items from the 15-item FMHT and the short version can be completed in less than 5 minutes. This short examination duration makes it suitable for mass-screening. Although a single question offers a simple and brief examination, it yielded a poor validity in our study (33.8% sensitivity, 71.6% specificity for mild hearing loss screening; 41.4% sensitivity, 70.9% specificity for moderate hearing loss screening) (Table 4). Previous studies have reported the validity of single questions: sensitivity ranges between 14 and 100%; specificity between 50 and 95%; PPV between 5 and 97%; and, NPV between 3 and 100%[16-18]. These ranges are wide and depend on patient age and the definition of hearing loss used in each study. A single global question with good performance has been recommended for identifying elderly people with hearing loss[19].

The current study demonstrates that the short version of the Thai-FMHT offers better validity in all age groups of adults. The authors, therefore, designed a test to screen mild and moderate hearing loss. The cutoff for mild hearing loss screening is 3 and this provides a sensitivity of 67.6%, a specificity of 54.0%,

and a false positive of 46.0%. These results support the use of a cutoff of 3 to identify early possible hearing loss. Moderate hearing loss is more of a concern due to its effect on communication and quality of life. It must be corrected with surgery and/or rehabilitation (e.g. hearing aids). A score of 5 was the optimized cutoff for moderate hearing loss as it had a sensitivity of 82.8%, a specificity of 76.6%, and a false positive of 23.4%. The current study suggests that a score of 5 and above indicates probable hearing loss.

The participants in the current study were screened in a primary care unit. It is suggested that persons who present with a score lower than 3 are less likely to keep appointments with a hearing center for further investigation. Conversely, those with scores of 3 to 4 should be advised to see an ENT doctor to rule out a hearing problem, while those with a score of 5 and above should be advised to see a neurootologist and undergo examination with standard audiometry.

Conclusion

The short version of the FMHT includes 5 items. It offers a high correlation with audiometry, internal consistency, and good discriminative ability. This modified questionnaire is suitable for use as a community-based mass screening tool for identifying hearing loss in adults. The short version of the FMHT provides useful information which can be used in the assistant counseling process and to facilitate decisions regarding candidacy for hearing aids.

What is already known on this topic?

The diagnosis of hearing impairment must be made using standardized pure tone audiometry. This test, however, requires expensive equipment, audiologists, and time, so it is unsuitable for mass-screening. Screening questionnaires have, therefore, been developed to identify hearing loss at an early stage: such tests are useful but limitations include the probability of hearing impairment in the absence of a hearing handicap, and an unreliable prevalence of age-related hearing loss. For screening in a community-based setting, questionnaires should be simple (with relatively few questions) and have excellent validity. The authors, thus, developed the short version of the Thai-FMHT for facilitating mass-screening.

What this study adds?

The short version comprises 5 items, representing a condensation of the 21 items in the long version, with an internal consistency score of 0.85. A score of 3 was designated as a suitable cutoff for screening mild hearing loss; this yielded a sensitivity of 67.6 % (95% CI: 59.1 to 75.4%), specificity of 54% (95% CI: 49.1-58.9%), and a positive likelihood ratio of 32.2% (95% CI: 26.8-37.9). As for screening, moderate hearing loss, an optimized cutoff of 5 offered a sensitivity of 82.8% (95% CI: 64.2-94.2%), a specificity of 76.6% (95% CI: 72.7-80.1%), and a positive likelihood ratio of 16.2% (95% CI: 10.7-23.3). The scoring of the short version suggests that patients who score 3 to 4 points may have hearing loss and should see a general ear nose throat doctor for early investigation. A score of 5 and above suggests probable hearing loss. Patients should see a neurootologist so that their hearing level can be determined by standard audiometric testing.

Acknowledgements

The authors thank (a) the research assistants, Sirinan Jamsuwan and Namthip Saengprasert, who were essential in conducting this study; (b) Kaewjai Thepsuthammarat for assistance with the data analysis; (c) Prakongluck Jaglang and Saengjun Onla for their contributions in the community; (d) the Center of Cleft Lip-Cleft Palate and Craniofacial Deformities, Khon Kaen University under Tawanchai Royal Grant Project; (e) Professor Robert Mills for editorial input; and (f) Mr. Bryan Roderick Hamman under the aegis of the Publication Clinic Research Affairs for assistance with the English-language presentation.

Potential conflicts of interest

The authors have no personal, financial, or institutional interest in any of the materials and/or devices described in this article. The authors identified no conflict of interest.

This research was supported by The Institute of Health Promotion for People with Disability, Thailand, and the Faculty of Medicine, Khon Kaen University, Thailand.

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การพัฒนาและความถูกต้องของแบบประเมินการได้ยินห้านาทีภาษาไทยฉบับย่อเพื่อคัดกรองการได้ยินในชุมชน

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__วัตถุประสงค์:__ เพื่อพัฒนาแบบประเมินการได้ยินที่เหมาะสมใช้เวลาในการตรวจน้อย

__วัสดุและวิธีการ:__ แบบประเมินการได้ยินห้านาทีภาษาไทยได้ถูกแปลจากต้นฉบับหลังจากนั้นได้ประเมินความถูกต้องและได้มีการวิเคราะห์ข้อคำถามเพื่อปรับให้เป็นฉบับย่อ นอกจากนั้นได้ประเมินความถูกต้องและความสอดคล้องของเนื้อหาของแบบประเมินฉบับย่อ งานวิจัยนี้ได้ทำการศึกษาตั้งแต่เดือนกรกฎาคม ถึง เดือนกันยายน พ.ศ. 2554

__ผลการศึกษา:__ ผลของแบบประเมินการได้ยินห้านาทีภาษาไทยและผลของการตรวจการได้ยินรวบรวมได้ 558 คน จากอำเภอภูเวียง ได้คัดเลือกข้อคำถาม 5 ข้อที่เหมาะสมจากข้อคำถามทั้ง 15 ข้อ นำมาพัฒนาเป็นแบบย่อ ซึ่งมีความสอดคล้องทางเนื้อหาเท่ากับ 0.85 และพบว่ามีความสัมพันธ์ที่ดีกับฉบับเต็มโดยให้ค่าเท่ากับ 0.73 และ 0.85 เมื่อประเมินคัดกรองผู้สูญเสียการได้ยินเล็กน้อย และปานกลางตามลำดับ เมื่อค่าคะแนนเท่ากับ 3 จะคัดกรองผู้สูญเสียการได้ยินเล็กน้อยโดยมีค่าความไวร้อยละ 67.6 (95% CI: 59.1 ถึง 75.4%) ความจำเพาะร้อยละ 54 (95% CI: 49.1 ถึง 58.9%) ส่วนการตรวจคัดกรองผู้สูญเสียการได้ยินปานกลางแบบประเมินฉบับย่อคัดกรองได้ดีกว่าผู้ที่สูญเสียการได้ยินเล็กน้อยโดยให้ค่าความไวร้อยละ 82.8 (95% CI: 64.2 ถึง 94.2%) ความจำเพาะร้อยละ 76.6 (95% CI: 72.7 ถึง 80.1%) เมื่อค่าคะแนนแบบทดสอบเท่ากับ 5

__สรุป:__ แบบประเมินการได้ยินฉบับย่อเหมาะกับการตรวจคัดกรองในชุมชน ซึ่งหากผู้ป่วยประเมินแล้วได้คะแนน 3 ถึง 4 คะแนนควรพบแพทย์หู คอ จมูก ทั่วไปเพื่อตรวจเพิ่มเติม หากได้คะแนนมากกว่า 5 คะแนนควรได้รับการตรวจการได้ยินด้วยเครื่องตรวจที่มาตรฐาน และควรปรึกษาแพทย์เฉพาะทางโสตประสาท