

* . **

(* . , **)

. 『 』, 2002, 7 ,
 1 , 214-233. KHHIE (The Korean Hear-
 ing Handicap Inventory for the Elderly)
 가
 65 가
 308 (145 , 163) 73.05 .
 0.5, 1, 2, 4 kHz KHHIE
 Pearson 가
 가 가 가 ,
 KHHIE 2 kHz가 $r=0.75$ 가 , 4 kHz가 $r=0.62$ 가
 . SFPTA (Speech Frequency Puretone Threshold Average) HFPTA (High Frequency
 Puretone Threshold Average) SFPTA가 $r=0.75$. KHHIE
 18 SFPTA 69.7 % , 92.6 % , HFPTA
 67.8 % , 91.5 % .
 : , ,

2000 65 가 7 %가 ‘
 (aging society)’ . 7 % , 14
 % , 20 % .
 가 2022 가 14.3 %
 , 2032 20 % (, ,
 2000). 가 ,
 22 10 (71 15 , 24 12)
 (, 2000).
 . 60 10 1

2050 5 1 , 2150 3 1 가 (, 1999).
가
가 가
가 48 92 46 % 65 40 %
가 (Wiley et al., 2000). 가 가
가
가 . Marcus-Bernstein (1986) , ,
가
가 , ,
, , 30
(, 1996).
가 . Noble &
Atherly (1987) , 가
42 (The Hearing Measurement
Scale, HMS) , Bergner et al. (1991)
136 (Sickness Impact Profile, SIP) , Demorest &
Erdman (1987) 가
(Communication Profile for the Hearing Impaired, CPHI) , Weinstein & Ven-
try (1982) . 25
(The Hearing Handicap Inventory for the Elderly, HHIE)
. HHIE 가 , .
. HHIE 88-95 %
r = 0.30 r = 0.60

가 가 (Weinstein & Ventry, 1982).
 (Word Recognition Score, WRS) $r = -0.30$ $r = -0.40$
 (speech recognition threshold, SRT) $r = 0.39$ $r = 0.47$ SRT 가

가 HHIE SRT WRS 가
 (Matthews et al., 1990).
 Weinstein & Ventry (1983) HHIE
 $\pm \frac{1}{2}$ 18-42 (mild-
 to-moderate handicap) 0-16 (no handi-
 cap), 44 (significant handicap)가
 18 가
 . HHIE 18 (sensitivity) 68 %
 (specificity) 79 %

가 가
 가
 (Speech Frequency Puretone Threshold Average, SFPTA)
 0.5, 1, 2 kHz , (High Fre-
 Quency Puretone Threshold Average, HFPTA) 1, 2, 4 kHz . HHIE
 18 SFPTA 66 %, 79 % ,
 HFPTA 53 %, 84 % . SRT
 62 %, 72 % , WRS 63 %, 72 %
 (Lichtenstein, Bess & Logan, 1988).

HHIE KHHIE (The Korean
 Hearing Handicap Inventory for the Elderly) 가 (, 2000).
 KHHIE 65 HHIA (Hearing Handicap
 Inventory for the Adults) 가
 $r = 0.45$ (, 1998). HHIE 가 KHHIE 80 %
 $r = 0.67$
 (KHHIE)

KHHIE

KHHIE

(hearing screening test)

가

1.

325

17

308

65

가 145 (47.2 %), 가 163 (52.9 %) , 73.05 (Range: 65-91 , SD: 6.06) , 72.48 (Range: 65-91 , SD: 6.31)

73.55 (Range: 65-91 , SD: 5.80)

65-70

가 117 (38 %) , 71-75

85 (27.6 %), 76-80

68 (22.1 %), 81-85

30 (9.7 %), 86

8 (2.6 %) 가

308 135

, 73

100

2.

0.5, 1, 2, 4 kHz

KHHIE

(Qualiton Wide Range-C)

SFPTA HFPTA 25 dBHL
 가 가

1.

0.5-2 kHz 41.34-43.68 dB
 4 kHz 49.91 dB
 0.5 kHz 1 kHz
 4 kHz 61.76 dB
 (< - 1 >).

< - 1 >

Sex	Age	0.5 kHz (dBHL)	1 kHz (dBHL)	2 kHz (dBHL)	4 kHz (dBHL)
Female (N = 163)					
Mean	73.55	42.39	41.34	43.68	49.91
SD	5.80	17.81	19.17	20.44	22.36
Range	65-91	5-105	0-100	0-115	5-120
Male (N = 145)					
Mean	72.48	42.28	44.76	49.52	61.76
SD	6.31	20.18	20.98	23.25	22.22
Range	65-91	5-115	0-120	0-120	10-120
Total (N = 308)					
Mean	73.05	42.33	42.95	46.43	55.49
SD	6.06	18.93	20.08	21.97	23.03
Range	65-91	5-115	0-120	0-120	5-120

SFPTA 가 3 dB , HFPTA 가 7 dB
 . SFPTA HFPTA가 2 dB, 6 dB,
 5 dB . KHHIE 30.71

0 52

가 0 94

가

/

/

2

. HFPTA

< - 4> HFPTA KHHIE

Hearing Loss	N (%)	HFPTA (dBHL)	Total	KHHIE (%)	
				Social	Emotional
Normal	47 (15.3)				
Mean		19.28	6.21	2.89	3.32
SD		5.91	12.01	4.25	8.01
Range		1.67- 25.00	0-60	0- 20	0-40
Mild	66 (21.4)				
Mean		33.46	13.67	6.79	6.88
SD		4.07	15.82	7.01	9.35
Range		26.67- 40.00	0- 68	0- 32	0- 36
Moderate	82 (26.6)				
Mean		47.84	29.66	15.22	14.44
SD		4.32	21.64	10.89	11.62
Range		41.67- 55.00	0- 84	0- 40	0- 44
Moderately - Severe	79 (25.6)				
Mean		62.68	47.29	24.73	22.56
SD		4.60	22.48	11.43	12.12
Range		56.67- 70.00	4- 94	2- 48	2- 48
Severe	25 (8.1)				
Mean		76.93	63.60	33.52	30.08
SD		4.24	22.97	10.97	13.01
Range		71.67- 85.00	18- 100	12- 36	6- 52
Profound	9 (2.9)				
Mean		103.33	81.33	42.89	38.44
SD		9.72	16.25	6.17	12.68
Range		91.67- 120.00	48- 98	30- 48	8- 50
Total	308 (100)				
Mean		48.20	31.44	16.27	15.18
SD		20.20	27.62	14.09	14.25
Range		1.67- 120.00	0- 100	0- 48	0- 52

HFPTA 47 15.3 %, 66
 21.4 %, 82 26.6 % 가 63.3 % SFPTA
 가 . 가
 1, 2, 4 kHz
 가 . 79 25.6 %, 25
 8.1 %, 9 2.9 % (< - 4>).
 HFPTA가 KHHIE ,
 KHHIE SFPTA . < - 3>
 /
 . / < - 3>
 / 가 .

3.

가. SFPTA

< - 5> SFPTA

Hearing Handicap / Hearing Loss (dBHL)	No (0-16)	Mild to Moderate (18-42)	Significant (> 42)	Total
No	50	3	1	54
Mild	51	26	11	88
Moderate	23	36	30	89
Moderately-Severe	3	16	34	53
Severe		1	16	17
Profound			7	7
Total	127	82	99	308

< - 5> SFPTA KHHIE ,
 54 50 (92.6 %) 가 44 가
 1 (1.9 %) . 88 51 (58 %) 가

, 26 (29.5 %) 가 11 (12.5 %)
 가 89 23 (25.8 %)
 가 , 36 (40.4 %) 가 30 (33.7 %)
 가 .
 ,
 .
 53 3 (5.7 %) 가 , 16 (30.2 %)
 가 34 (64.1 %) 가 .
 1 (5.9 %) 가 16 (94.1 %) 가
 , 7 (100 %) 가 가 .

. HFPTA

< - 6> HFPTA

Hearing Handicap Hearing Loss (dBHL)	No (0- 16)	Mild to Moderate (18- 42)	Significant (> 42)	Total
No	43	2	2	47
Mild	48	13	5	66
Moderate	28	33	21	82
Moderately- Severe	8	30	41	79
Severe		4	21	25
Profound			9	9
Total	127	82	99	308

< - 6> HFPTA

KHHIE

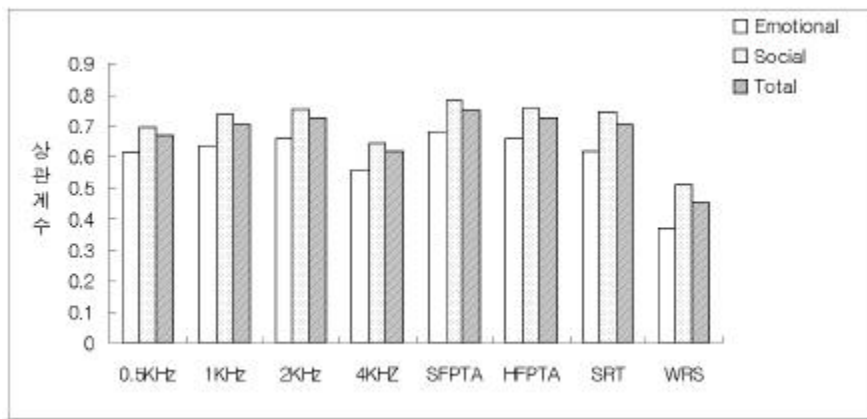
. SFPTA

47 43 (91.5 %) 가 , 가
 가 가 2 (4.2 %) . 66
 48 (72.7 %) 가 , 13 (19.7 %) 가
 5 (7.6 %) 가 . SFPTA HFPTA

82 28 (34.1 %) 가 , 33 (40.2 %) 가
 21 (25.6 %) 가
 SFPTA 가
 가 79 8 (10.1 %)
 가 , 30 (38 %) 가 41 (51.9 %)
 가 4 (16.0 %) 가
 21 (84.0 %) 가 , 9 (100 %) 가
 가

4.

< - 1> KHHIE , SFPTA, HFPTA, SRT, WRS
 $r = 0.56$ $r = 0.75$
 가
 가 가 / 가 가

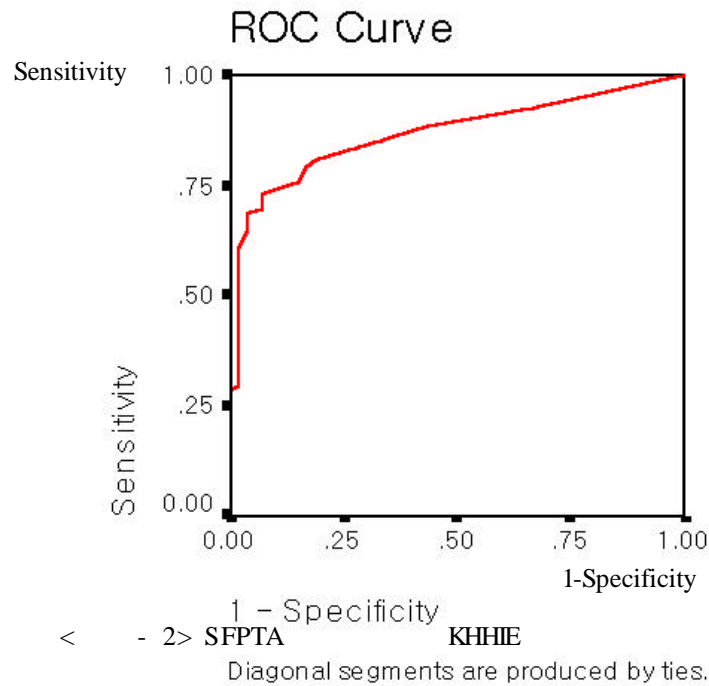


< - 1> KHHIE , PTA, SRT WRS

가 가 2 kHz 가 가
 4 kHz . 2 kHz $r = 0.72,$ /
 $r = 0.75,$ $r = 0.66$ 가 가 4 kHz

가 $r = 0.62$, / $r = 0.65$, $r =$
 0.56 . SFPTA 가 $r = 0.75$, /
 $r = 0.78$, $r = 0.68$. SFPTA
 HFPTA 가 $r = 0.72$, /
 $r = 0.76$, $r = 0.66$.
 308 137 SRT $r = 0.72$, /
 $r = 0.76$, $r = 0.64$ SFPTA, HFPTA, 2 kHz
 . 134 WRS
 KHHIE $r = -0.45$, / $r = -0.51$,
 $r = -0.37$ 가 .

5.

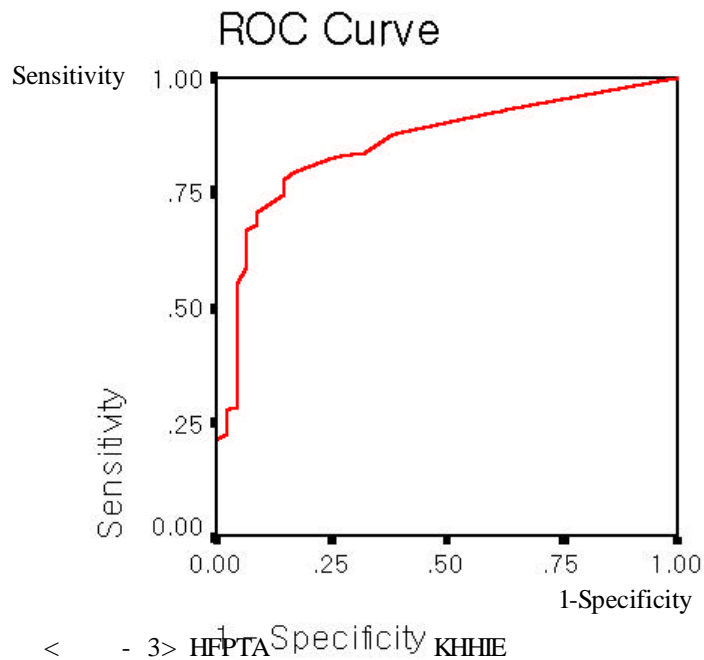


< - 2> Receiver-Operating Curve (ROC)
 SFPTA KHHIE 18

69.7 % , 92.6 % 가 가
 가
 16 72.8 % 18
 , 92.6 % 18 가 .

. HFPTA

< - 3>
 18 67.8 % ROC HFPTA KHHIE
 91.5 % . SFPTA
 가 가
 가 16 , 70.9 % 18
 91.5 % 18 . SFPTA
 HFPTA 가 SFPTA
 가 . 가 Weinstein &
 Ventry (1982)가 18 가
 가 16 .



Diagonal segments are produced by ties.

SFPTA가 43.90 dB, HFPTA가 48.19 dB

31.44 . Weinstein & Ventry (1983) KHHIE
 29.9 37.6 dB HHIE
 100 가 308
 , 가 가
 가
 (, 1994)
 가 KHHIE 가 , 가
 / 가 13 /
 1 /
 가
 , 가
 /
 (, 2000; Weinstein & Ventry, 1983) 가
 KHHIE 가 ,
 가
 가
 2
 가
 SFPTA HFPTA
 HFPTA KHHIE
 4 kHz 가 0.5, 1, 2 kHz 1, 2, 4
 kHz HFPTA SFPTA 가
 SFPTA HFPTA

가

SFPTA 54 (17 %) , HFPTA 47 (15 %) , KHHIE
가 308 127 (41 %)

Popelka et al. (1998) , 20.7 %

Weinstein & Ventry (1983)

Weinstein & Ventry (1983) ,
, Matthews et al. (1990)

2 kHz가 가 , 4 kHz가 가

Matthews et al. (1990)
4 kHz 가 가
. 4 kHz가

가
4 kHz HFPTA SFPTA
, Newman et al. (1990) SFPTA 가
가 SFPTA 가 가
SFPTA SFPTA

가 가
SFPTA KHHIE 가 가

HHIE Weinstein & Ventry (1982)가
± ½ . 16
가 , 18-42 가 , 44

가 , 18 .

KHHIE 31.44 27.62 ½ 가
17.63 - 45.25 18-42 가

Weinstein & Ventry (1982)가 18

Weinstein & Ventry (1983) SFPTA
HFPTA Lichtenstein, Bess &
Logan (1988) . 18 Weinstein & Ventry (1982)
KHHIE 18
가

SFPTA HFPTA 16
가 . 18 16 16
18
가 , 16

McBride et al. (1994) HHIE
, 60 %가 HHIE .

가 . Nondahl et al. (1998) 가
“ ?” 가
(71 %) 가 가

KHHIE가 . Wiley
et al. (2000) 가 가
. Marcus-Bernstin (1986)
가 ,

- 가
가 308
- (2000) HHIE
- KHHIE가
가 . KHHIE
가
- (2000). , 7 11 .
- (1994). 『 』. : .
- (2000). (KHHIE) - . 『
』, 5(1), 133- 154.
- (1999). . *Korean Journal
of Audiology*, 2(1), 60-63.
- (1996). . 『 』, 16, 151- 161.
- (1999). 『 News+』, 182, 40-51.
- (2000). 『 』.
- Bergner, M., Robbitt, R., Carter, W. & Gilson, B. (1991). The sickness impact profile: Development and final revision of a health status measure. *Medical Care*, 14, 57-67.
- Demorest, M. & Erdman, S. (1987). Development of the communication profile for the hearing impaired. *Journal of Speech and Hearing Disorders*, 52, 129- 143.
- Lichtenstein, M. J., Bess, F. H. & Logan, S. A. (1988). Diagnostic performance of the hearing handicap inventory for the elderly (screening version) against differing definitions of hearing loss. *Ear & Hearing*, 9(4), 208- 211.
- Marcus-Bernstein, C. (1986). Audiologic and nonaudiologic correlates of hearing handicap in black elderly. *Journal of Speech and Hearing Research*, 29(3), 301-312.
- Matthews, L. J., Lee, F. S., Mills, J. H. & Schum, D. J. (1990). Audiometric and subjective assessment of hearing handicap. *Archives of Otolaryngology-Head and Neck Surgery*, 116(11), 1325- 1330.
- Mcbride, W. S., Mulrow, C. D., Aguilar, C. & Tuley, M. R. (1994). Methods for screening for hear-

- ing loss in older adults. *American Journal of the Medical Sciences*, 307(1), 40-42.
- Newman, C. W., Weinstein, B. E., Jacobson, G. P. & Hug, G. A. (1990). The hearing handicap inventory for adults: Psychometric adequacy and audiometric correlates. *Ear & Hearing*, 11(6), 430-433.
- Noble, W. & Atherly, G. (1987). The hearing measurement scale: A questionnaire for the assessment of auditory disability. *Journal of Audiological Research*, 10, 229-250.
- Nondahl, D. M., Cruickshanks, K. J., Wiley, T. L., Tweed, T. S., Klein, R. & Klein, B. E. (1998). Accuracy of self-reported hearing loss. *Audiology*, 37(5), 295-301.
- Popelka, M. M., Cruickshanks, K. J., Wiley, T. L., Tweed, T. S., Klein, B. E. K. & Klein, R. (1998). Low prevalence of hearing aid use among older adults with hearing loss, *Journal of American Geriatric Society*, 46, 1075-1078.
- Weinstein, B. E. & Ventry, I. M. (1982). The hearing handicap inventory for the elderly: A new tool. *Ear & Hearing*, 3(3), 128-134.
- Weinstein, B. E. & Ventry, I. M. (1983). Audiometric correlates of the hearing handicap inventory for the elderly. *Journal of Speech and Hearing Disorders*, 48, 379-384.
- Wiley, T. L., Cruickshanks, K. J., Nondahl, D. M. & Tweed, T. S. (2000). Self-reported hearing handicap and audiometric measures in older adults. *Journal of American Academy of Audiology*, 11, 67-75.

ABSTRACT

Hearing Threshold and Hearing Handicap
of the Elderly with Presbycusis

Binna Hong

(Onnuri Hearing Aid Center)

Junghak Lee

(Dept. of Otolaryngology, Hallym University)

The purpose of this study was to examine the audiometric correlates of hearing handicap as measured by The Korean Hearing Handicap Inventory for the Elderly (KHHIE). The KHHIE and audiometric tests were performed on 308 elderly subjects aged 65-91 years (mean age: 73.05 years) with normal and sensorineural hearing losses. The audiometric tests included puretone thresholds, speech recognition threshold (SRT) and word recognition scores (WRS). The mean speech frequency puretone average (SFPTA) of 0.5, 1 and 2 kHz was 43.90 dB and the mean high frequency puretone average (HFPTA) of 1, 2 and 4 kHz was 48.20 dB at the better ear. The mean KHHIE score was 31.44 (emotional = 15.18, social/ situational = 16.27). Pearson product-moment correlations between the KHHIE scores and SFPTA, HFPTA, SRT, and WRS of the better ear were 0.75, 0.72, 0.72, and -0.45, respectively. Using a score of 16 as a cut-off point of the KHHIE, the sensitivities were 70.9 % for the HFPTA and 72.8 % for the SFPTA. The specificities was 92.6 % for both the SFPTA and the HFPTA. These results support the finding that the use of self-report measures is meaningful to understand the hearing handicap of the elderly. Furthermore, the audiometric measures alone were found to be insufficient in describing a patient's reaction to their hearing loss.

▶ : 2002 1 30
▶ : 2002 2 25

▶ (1): , e-mail: habina2@chollian.net
▶ (): , e-mail: leejh@hallym.ac.kr