Research Article

Comparison of Nursing Home Hearing Handicap Index with Audiological Findings: A Presbycusis Study

M. H. Nilforoush, A. A. Nasr Esfahani, R. Ishaghi, and M. Sepehrnejad

1 Audiology Department, School of Rehabilitation Sciences, Isfahan University of Medical Sciences, Isfahan 8174673461, Iran
2 Audiology Department, School of Rehabilitation Sciences, Tehran University of Medical Sciences, Tehran 141556559, Iran
3 Department of Community Medicine, School of Medicine, Isfahan University of Medical Sciences, Isfahan 8174673461, Iran

Correspondence should be addressed to M. H. Nilforoush, mhnilforoush@rehab.mui.ac.ir

Received 8 August 2012; Revised 4 October 2012; Accepted 5 October 2012

Copyright © 2012 M. H. Nilforoush et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Hearing evaluation usually includes hearing threshold assessment, middle ear function, and word recognition tests that lead to an accurate result of peripheral and central auditory system. However, they have some limitations because they cannot fully encompass all aspects of hearing loss problems. Using self-assessment approach, via a questionnaire or telephone survey, is one of the easiest methods to study hearing loss in population. In this research, 60 nursing home residents (27 females and 33 males) ranging from 55 to 85 years with a mean age of $71 \pm 5.5$ were studied via completing self-assessment questionnaire by the elderly cases (NHHI self-version) and the other one was filled by the nursing home personnel (NHHI staff-version). The effects of the hearing loss level on the self- and staff-version scores indicated that there is a significant relationship between self- and staff-version with hearing loss levels ($P < 0.05$) in male and female. Results from this study demonstrate the usefulness of NHHI questionnaire for evaluating hearing handicap of aged people and it may be a useful adjunct in setting up treatment and determining proper care.

1. Introduction

Hearing evaluation usually includes hearing threshold assessment, middle ear function, and word recognition tests that lead to an accurate result of peripheral and central auditory system [1–3]. However, they have some limitations because they cannot fully encompass all aspects of hearing loss problems. Communicative ability of patients with sensory-neural hearing loss heavily depends on important factors like acceptance or denial of hearing loss, general communication skills, emotional adaptation, friends and family condition. Because of these nonauditory factors; audiological tests could not evaluate individual ability for communication and participation. Therefore, this group of test in the best conditions can only provide some information of communicative handicap indirectly [4]. Using self-assessment approach, via a questionnaire or telephone survey is one of the easiest methods to study hearing loss in population [5–7]. Many of the self-assessment tools are designed for using in a particular population for instance hearing performance inventory (HPI) questionnaire [8] is appropriate for evaluation of noise induced hearing loss cases, hearing handicap inventory (HHIE) scale [9] is suitable for elderly patients with hearing loss, and communication profile for hearing impaired (CPHI) questionnaire [10] is considered for military studies. These scales are helpful in order to identify the problems and issues related to hearing handicap, understand the communication difficulties, and determine special needs of patients but NHHI focused specifically only on nursing home elderly. In fact, they are not only an objective evaluation method to monitor the progress of rehabilitation process but also provide invaluable information about awareness and consultation for individuals and their families [11]. Nursing home staffs just ask a few questions about hearing problems during completing every case profile and obviously it is not enough to find
The effects of the hearing loss level on the self- and staff-version scores indicated that there is a significant relationship between self- and staff-version with hearing loss levels \( (P < 0.05) \). In other words, the severity of hearing loss becomes greater as the questionnaire score goes up and followed by hearing handicap is also increasing in elderly. This relationship is not significant in male group \( (P > 0.05) \) however it is significant in the female group \( (P < 0.05) \) in the self-version. On the other hand, the relationship between the hearing loss levels and staff-version is significant in both men and women groups \( (P < 0.05) \) as can be found in Table 3.

In testing the relationship between NHHI results and audiological findings by using Chi-square and Pearson’s correlation coefficient, the results revealed significantly correlated with each other at a statistically significant level \( (P \text{ value}) < 0.05 \) as shown in Table 4.

### 4. Discussion

Outcomes from a hearing handicap scale can give more information about the patient’s understanding of hearing loss effects on daily life. If the resident reports a considerable handicap, then auditory rehabilitation will be suggested. Nursing home staffs that are close to resident can also complete a hearing handicap scale. Results can provide essential information on how others distinguish the resident’s hearing loss and audiological rehabilitation necessitate. In the present study, we used NHHI questionnaire and compared its results with PTA findings. Moreover, we investigated the correlation of hearing impairment severity on NHHI (two versions) scores in nursing home elderly. Because of significant Pearson’s correlation coefficient results \( (P < 0.05) \) between both versions with hearing loss levels and as other studies suggested [17–19] it can be inferred in cases who were not able to respond scale, staff answers might be considered. In this study results indicated using self-report scale could be valuable in order to prepare rehabilitation needs of elderly before hearing handicap was grown up and its difficulties came out.

### 5. Conclusion

Results from this study demonstrate the usefulness of NHHI questionnaire for evaluating hearing handicap of aged people and it may be a useful adjunct in setting up treatment and determining proper care.

**Limitation of Study.** In spite of searching for new resources in this field and no newer-revised version of the NHHI

---

### Table 1: Hearing loss degree (male/female) \( n = 60 \).

| Hearing loss degree | Normal | Mild | Slight | Moderate | Moderately severe | Severe | Profound |
|---------------------|--------|------|--------|----------|-------------------|--------|----------|
| Male                | 9      | 6    | 5      | 7        | 3                 | 1      | 2        |
| Female              | 6      | 7    | 4      | 5        | 2                 | 2      | 1        |
| Total (%)           | 25     | 21.6 | 15     | 20       | 8.3               | 5      | 5        |

### Table 2: Mean and SD of NHHI results in both groups (male/female).

| Sex            | Self-version | Staff-version |
|----------------|--------------|---------------|
|                | Mean | SD   | Mean | SD   |
| Male           | 20.36| 22.20| 26.08| 23.26|
| Female         | 47.11| 28.91| 42.43| 37.79|
| Total (%)      | 33.80%| 27.01%| 34.54%| 29.48%|
Table 3: Mean values of self-version and staff-version (NHHI) (n = 60).

| Questionnaire | Male | Female | Male | Female |
|---------------|------|--------|------|--------|
| Self-version  | 3.50 | 1.10   | 7.03 | 2.40   |
|                | 16.08| 12.14  | 11.70| 1.80   |
|                | 28.01| 30.44  | 40.21| 8.07   |
|                | 27.15| 45.27  | 39.18| 62.44  |
|                | 39.01| 75.03  | 48.24| 71.08  |
|                | 40.00| 74.29  | 43.00| 80.00  |
|                | 42.00| 77.00  | 51.00| 82.00  |

Table 4: Pearson’s correlation coefficient results (r) in NHHI results with audiological findings.

|                  | Self-version | Staff-version | Hearing loss level |
|------------------|--------------|---------------|-------------------|
|                  | Self-version | Staff-version | Hearing loss level |
|                  | —            | 0.816         | 0.751             |
|                  | 0.816        | —             | 0.762             |
| Hearing loss level | 0.751       | 0.762         | —                 |
| P value          | <0.05        | <0.05         | <0.05             |

questionnaire, references might be somewhat old, but nevertheless they are reliable in this area.

References

[1] D. C. Garstecki and S. F. Erler, "Hearing care providers and individuals with impaired hearing: continuing and relationships in the new millennium," in *Rehabilitative Audiology*, J. G. Alpiner and P. A. McCarthy, Eds., pp. 27–59, Lippincott Williams & Wilkins, Baltimore, Md, USA, 3rd edition, 2000.

[2] N. Tye-Murray, *Foundation of Aural Rehabilitation*, Thomson, St. Louis, Miss, USA, 2nd edition, 2004.

[3] R. L. Schow and S. Gatehouse, "Fundamental issues in self-assessment of hearing," *Ear and Hearing*, vol. 11, no. 5, pp. 6s–16s, 1990.

[4] M. I. Gomez, S. A. Hwang, L. Sobotova, A. D. Stark, and J. J. May, "A comparison of self-reported hearing loss and audiometry in a cohort of New York farmers," *Journal of Speech, Language, and Hearing Research*, vol. 44, no. 6, pp. 1201–1208, 2001.

[5] T. G. Giolas, "The measurement of hearing handicap: revisited: a 20- year perspective," *Ear and Hearing*, vol. 11, no. 5, pp. 2s–5s, 1990.

[6] S. W. Choi, C. Peek-Asa, C. Zwerling et al., "A comparison of self-reported hearing and pure tone threshold average in the Iowa Farm Family Health and Hazard Survey," *Journal of Agromedicine*, vol. 10, no. 3, pp. 31–39, 2005.

[7] F. R. William, *A Volume in Perspectives Audiology Series: Hearing Assessment*, New York, NY, USA, 2nd edition, 1991.

[8] T. G. Giolas, E. Owens, S. H. Lamb, and E. D. Schubert, "Hearing performance inventory," *Journal of Speech and Hearing Disorders*, vol. 44, no. 2, pp. 169–195, 1979.

[9] M. Ventry and B. E. Weinstein, "The hearing handicap inventory for the elderly: a new tool," *Ear and Hearing*, vol. 3, no. 3, pp. 128–134, 1982.

[10] M. E. Demorest and S. A. Erdman, "Development of the communication profile for the hearing impaired," *Journal of Speech and Hearing Disorders*, vol. 52, no. 2, pp. 129–143, 1987.

[11] R. L. Schow, T. C. Smedley, and T. M. Longhurst, "Self-assessment and impairment in adult/elderly hearing screening—recent data and new perspectives," *Ear and Hearing*, vol. 11, no. 5, pp. 17s–27s, 1990.

[12] D. M. Nondahl, K. J. Cruickshanks, T. L. Wiley, T. S. Tweed, R. Klein, and B. E. K. Klein, "Accuracy of self-reported hearing loss," *Audiology*, vol. 37, no. 5, pp. 295–301, 1998.

[13] S. K. Voeks, C. M. Gallagher, E. H. Langer, and P. J. Drinka, "Self-reported hearing difficulty and audiometric thresholds in nursing home residents," *Journal of Family Practice*, vol. 36, no. 1, pp. 54–58, 1993.

[14] J. Cohen-Mansfield and J. W. Taylor, "Hearing aid use in nursing homes Part 2: barriers to effective utilization of hearing aids," *Journal of the American Medical Directors Association*, vol. 5, no. 5, pp. 289–296, 2004.

[15] M. B. Garahan, J. A. Waller, M. Houghton, W. A. Tisdale, and C. F. Runge, "Hearing loss prevalence and management in nursing home residents," *Journal of the American Geriatrics Society*, vol. 40, no. 2, pp. 130–134, 1992.

[16] R. L. Schow and M. A. Nerbonne, "Assessment of hearing handicap by nursing home residents and staff," *Journal of Academy of Rehabilitative Audiology*, vol. 10, no. 2, pp. 2–12, 1977.

[17] C. M. Valete-Rosalino and S. Rozenfeld, "Auditory screening in the aged: comparison between self-report and audiometry," *Revista Brasileira de Otorrinolaringologia*, vol. 71, no. 2, pp. 193–200, 2005.

[18] G. A. Gates, M. Murphy, T. S. Rees, and A. Fraher, "Screening for handicapping hearing loss in the elderly," *Journal of Family Practice*, vol. 52, no. 1, pp. 56–62, 2003.

[19] H. N. Gutnick, E. A. Zillmer, and C. B. Philput, "Measurement and prediction of hearing loss in a nursing home," *Ear and Hearing*, vol. 10, no. 6, pp. 361–367, 1989.