

The importance of self-awareness of age-related hearing loss and development of simple screening test

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Abstract

I. Introduction

In Japan, the number of elderly persons aged 65 years or older was 31.86 million in 2013 and the population aging rate reached 25.0% for the first time.¹⁾ Along with the aging of the population, the number of persons with hearing loss increases. According to Uchida et al.,²⁾ approximately 70% of elderly persons aged 75 or above have hearing loss. It has been estimated that the number of elderly persons with hearing loss in Japan exceeds 15 million.²⁾ Therefore, especially in Japan, where extreme aging of the population is progressing, hearing loss is a serious health problem.

II. Literature Review: Issues Concerning Hearing Loss in Elderly Persons

Age-related hearing loss is one of the most common sensory impairments that has a serious impact on elderly persons.^{1,2)} Leaving age-related hearing loss untreated not only has the potential to cause disuse of hearing,³⁾ it also has a serious effect on the lives of elderly persons. Previous studies have shown a relationship between age-related hearing loss and decreased communication,⁴⁾ social isolation,^{4,5)} decreased health-related quality of life (QOL),⁶⁾ increased risk of becoming depressed,^{7,8)} decreased cognitive function,⁹⁾ and so on. It has also been reported that hearing loss is an independent risk factor for dementia.¹⁰⁾ Although there is currently no method to restore age-related hearing loss, it is possible to improve hearing through the use of hearing aids or cochlear implants.¹¹⁾ Previously, worsened speech intelligibility due to the use of hearing aids by elderly persons has also been reported.¹²⁾ In addition, it has been shown that wearing a hearing aid not only prevents the disuse of hearing, but also reduces psychological stress, such as anxiety, depression, and anger,^{13,14)} and improves cognitive function.¹⁵⁾ Therefore, early detection of hearing loss in elderly persons and early use of hearing aids are important factors that can lead to auditory rehabilitation.¹⁶⁾ At the same time, it has been indicated that it is important to provide guidance on communication to elderly persons with hearing loss and to their family members.¹⁷⁾

However, it has also been indicated that as age-related hearing loss gradually progresses, persons with hearing loss are often unaware of their own hearing loss, which tends to prevent them from visiting hospitals. It has been reported that even when persons are aware of their hearing loss, it does not lead to hospital visit. Issues regarding the extent of elderly persons' self-aware of hearing loss, frequency of hospital visits by those who are aware of their own hearing loss, and the reasons why persons with hearing loss do not visit a hospital despite being aware of symptoms have not been sufficiently examined to date. Furthermore, elderly persons have few opportunities to undergo audiometry and become aware of their

own hearing abilities, which is considered one of the reasons for the lack of self-awareness of hearing loss.

III. Purpose and Significance of the Present Study and Overall Structure of Study

The principal aims of the present study were to examine the relationship between self-awareness of hearing loss and hospital visits and to investigate screening methods for early detection that can be performed by elderly persons.

This paper consists of three studies. In Study 1, we examined the relationship between self-awareness of hearing loss and hospital visits among elderly persons residing in the local community. In Study 2, we proposed a simple screening method for early detection of age-related hearing loss: the finger rub/finger tap (FRFT) screening test. Additionally, we examined the validity of the screening test. In Study 3, we examined the possibility of self-checks performed by elderly persons.

IV. Study 1: Relationship between Self-Awareness of Hearing Loss and Hospital Visits of Elderly Persons Living in the Local Community

The principal aim of the present study was to elucidate factors related to self-awareness of hearing loss and hospital visits. The subjects were 45 elderly persons aged 65 years or above who lived in the local community. We inquired about basic attributes, presence of tinnitus, difficulty in hearing, self-awareness of hearing loss, use of hearing aids, subjective evaluation of hearing using a visual analog scale, and history of visiting a department of otolaryngology. Additionally, pure tone audiometry was performed.

The results revealed that of the 21 persons who were classified as having hearing loss with average hearing ability in the good ear, 16 had self-awareness of hearing loss and 5 did not. When subjects had no self-awareness, they did not visit the department of otolaryngology. It was found that no hospital visit was made even if there was self-awareness of the condition in approximately half of the cases. They visited doctors only when they experienced unpleasant hearing conditions, such as tinnitus. Therefore, it is important that elderly persons have awareness of their own hearing difficulties, as noticing symptoms leads to medical care.

□. Study 2: Investigation of Validity of FRFT Test for Early Detection of Age-Related Hearing Loss

The principal aim was to examine the validity of the newly proposed screening test, the FRFT test.

We performed FRFT testing and pure tone audiometry in 35 elderly persons aged 65 years or above in A City, performed receiver operating characteristic (ROC) curve analysis, and calculated the sensitivity and specificity. Furthermore, we performed acoustic analysis and examined the acoustic characteristics of the sounds of finger rubbing and finger tapping. The results revealed that it was possible to detect hearing loss of 26 dB or higher (sensitivity, 97.6%; specificity, 71.4%) and moderate hearing loss of 41dB or higher (sensitivity, 82.4%; specificity, 67.9%). Although the present study has limitations related to the fact that the number of subjects was small and there was only one examiner, the results suggest that FRFT testing

may be an extremely simple and effective screening method.

□. Study 3: Concerning the Possibility of Self-Checks Using FRFT Test

The principal aim was to examine whether self-checks can be performed using this test. The subjects were 26 elderly persons (14 men and 12 women) who were members of a longevity social group in B City. For the FRFT test, a self-check manual was distributed, and responses were obtained according to the implementation guidelines. Furthermore, in a separate room, the examiner utilized an audiometer (Rion Co., Ltd., AA-77A) and individually measured pure tone hearing ability by having subjects raise their hands. There was one examiner, but in order to avoid bias, the examiner was blinded to the study conditions. Screening for the FRFT test was performed in accordance with the above scoring criteria. In addition to the results of pure tone audiometry, sensitivity and specificity were calculated.

In the case of mild hearing loss (pure tone hearing ability above 25dB), sensitivity and specificity were 88.9% and 68.8%, respectively. All five ears with moderate hearing loss were correctly determined to be positive. In the case of moderate hearing loss, sensitivity was 100.0% and specificity was 66.7%. Thus, these findings suggest the possibility of elderly persons conducting self-checks using this manual.

□. Conclusion

We developed the FRFT test for screening age-related hearing loss. The results of ROC demonstrated acceptable validity. The FRFT test could be a simple, useful, and economical assessment tool in practice and research. By using the FRFT test, an early detection and early treatment can be possible.