

Original Research Article

# Self-Assessed Hearing Handicap and Quality of Life in Elderly Population

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## ABSTRACT

Hearing loss can occur throughout the life span. Presbycusis is the most common cause of hearing loss in elderly individuals. There is large individual variability in perceived hearing handicap, quality of life and the amount of change with age. This study aimed to study the effect of hearing loss on self-assessed hearing handicap and on quality of life in elderly population. The sample included one hundred twenty elderly individuals with hearing loss. After pure tone audiometry, the participants completed Hearing Handicap Inventory for the Elderly and World Health Organization Quality of Life - Short version. The results revealed higher level of self-assessed handicap and poorer quality of life with increase in degree of hearing impairment. This article will help audiologists and other health professionals in measuring amount of hearing loss with reference to perceived handicap and quality of life for healthy ageing process.

**Keywords:** Presbycusis, Hearing Handicap, Quality of Life, Elderly

## INTRODUCTION

World Health Organization defined hearing loss as abnormal functioning of the auditory system and any loss in hearing ability refers to hearing impairment. Handicap is the functional disadvantage imposed by impairment. <sup>[1]</sup> Presbycusis refers to age-related hearing loss and is the most common cause of hearing impairment in elderly individuals. By characteristics, presbycusis is bilateral, slowly progressive, symmetrical and sensorineural loss resulting from degeneration of the inner ear structures, which mainly affects high frequencies, making perception of speech sounds very difficult, especially in noisy environments. It is a multifactorial disorder which involves environmental and genetic factors. <sup>[2]</sup>

Ageing can show its affect in any part of the ear starting from outer ear to the inner ear and also any stage of sound stimulus to its perception. Ageing also results in the collapsing of cartilaginous external auditory meatus, tympanic membrane and the ossicular chain stiffening. The sensory, neural, vascular, synaptic, supporting and the mechanical structures in the peripheral and central auditory structures are also affected by the process of ageing. Ageing also affects the central auditory structures resulting in a decrease in the number of neurons to the cochlear nucleus and the auditory centers of the brain. <sup>[3]</sup>

Although hearing impairment is not life-threatening and does not directly restrict physical activity, it mostly limits the

independence and reduces the quality of lives for elderly people. Hearing loss also confines one's ability to interact socially, particularly to receive and interpret information. And, for this, a need for formal and informal long-term care services arises to deal with hearing impaired elderly individuals. However, hearing impairment causes psychological and social difficulties because it interferes with a person's ability to communicate effectively.<sup>[4]</sup> Hearing loss acquired in old age demands a change in communication pattern. Since communication plays an essential role in maintaining relationships and the quality of life, hearing loss deprives them in every front starting from family to friend. Repeated instances of unheard or incorrectly heard communication become frustrating for the individual which leads to lessen the frequency of initiation of conversation from the other end. When these frustrating situations occur over prolonged periods, relationships with family members and friends can be severely strained.

To evaluate the degree of handicap an individual with hearing impairment experiences in the real world, a self-assessment tool is used. The self-assessment data provide insight about an individual's response to hearing-impairment, an insight that cannot be gleaned from audiometric data alone.<sup>[5]</sup> Self-assessment of hearing handicap was introduced in the 1980's but became popular as a method for gaining information about hearing handicap. Subsequent to the advocacy of the concept of social adequacy index, attempts to assess hearing handicap moved away from computations based on quantified measures of hearing. Investigators aimed at investigating the degree of handicap an individual had while meeting the communication demands in his daily life. Such an approach permitted the generation of an individualized picture of difficult situations as perceived by the hearing impaired. A number of such self-assessment scales have been devised for diagnostic and rehabilitative purpose in audiology.

Ventry and Weinstein developed hearing handicap inventory for elders (HHIE). This self-reported questionnaire consists of twenty-five items, divided into two subscales (emotional and social/situational), to assess the effects of hearing impairment in the elderly. The emotional subscale consisted of thirteen items purporting to evaluate the emotional impact of hearing impairment. The twelve items in the social/situational subscale were directed at evaluating the effects of hearing loss on social life. The scale was standardized on 100 non-institutionalized individuals over the age of sixty-five years. A high split-half reliability (0.94 to 0.95), a high correlation of 0.87 between the two subscales and high internal consistency for each half was reported (Ventry and Weinstein, 1982).<sup>[6]</sup>

The World Health Organization in 1997 described health-related quality of life (QoL) as individual's perceptions of their perceptions of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. The WHO quality of life questionnaire (WHOQOL-BREF) was developed in 1998 to assess the subjective perception of health by the individual.<sup>[7]</sup> The questionnaire has four main domains; physical health, psychological health, social relationships and environment, associated with quality of life. This questionnaire, developed using data from 30 international field centers, has been found to be an effective cross-cultural assessment of QoL with good to excellent psychometric properties of reliability and validity.<sup>[8]</sup>

### **Objectives**

Most of the studies in literature have reported the perceived hearing handicap and quality of life in elderly western population. However, there is dearth of studies in Indian population regarding hearing loss caused by presbycusis in elder individuals. The following objectives were aimed for this study

1. To identify different level of self reported hearing handicap in elderly adults with hearing impairments.
2. To study the relation between degree of hearing loss with self assessed hearing handicap scores
3. To assess the effects of hearing loss on the quality of life of elderly individuals with hearing impairments.

## METHODS

This study included a purposive sample of 120 elderly individuals aged above sixty years with mean age of 67.3 years. Participants were 74 males and 46 females from rural and urban background of Odisha. These individuals were referred to the hearing evaluation centre of Swami Vivekananda National Institute of Rehabilitation Training and Research (SVNIRTAR), Cuttack with the complaint of reduced hearing sensitivity. All participating hearing impaired individuals were examined by an audiologist after obtaining informed consent. Pure tone audiometry, tympanometry, and reflexometry tests were carried out for all of them. None of the subjects had used a hearing aid before. Participants with other medical and neurological illness were excluded from the study.

### Procedures:

#### Hearing Threshold Evaluation:

All the participants were evaluated for air and bone conduction hearing thresholds prior to the questionnaire. Hearing thresholds were measured at 250, 500, 1000, 2000, 4000 and 8000 Hz using a calibrated diagnostic audiometer. Pure tone averages (PTAs) was calculated for both the ears separately by averaging air conduction

hearing threshold at 500, 1000, 2000, 4000 Hz. The type of hearing loss for the participants were determined on the basis of both air and bone conduction thresholds and based on the air bone gap. The following WHO audiological classification for degree of hearing loss was adopted to determine the degree of hearing loss.

Table 1. WHO classification of degree of hearing loss<sup>[9]</sup>

| Degree of Hearing Loss | Pure tone averages (in deciBel hearing level) |
|------------------------|---|
| Normal hearing         | 0-25  |
| Mild hearing loss      | 26-40   |
| Moderate hearing loss  | 41-60   |
| Sever hearing loss     | 61-80   |
| Profound hearing loss  | >= 81   |

## HHIE & WHOQOL-BRIF

### Questionnaires:

The participants were asked to complete the Hearing Handicap Inventory for the Elderly (HHIE) questionnaire to determine the severity of the perceived hearing loss and specific communication problems. A response of "yes" was given four points, "sometimes" was given two points, and "no" was given zero points. The WHOQOL-BREF was used to assess the quality of life of the investigated individuals. This tool consists of 26 questions, of which 24 items address four domains: physical health, psychological, social relationships, and environment. The two remaining are about general QoL. WHOQOL-BREF comprised of 115 questions accompanied by a point 5 point rating scale (0, 1, 2, 3, 4). The questions are framed such that higher scores indicated a better quality of life in a hierarchy. The participants were instructed to select with correct response.

## RESULTS & DISCUSSIONS

Table 2: Self assessed hearing handicap based on HHIE score and the degree of hearing loss obtained by pure tone audiometry for 120 elderly individuals, tested at the hearing evaluation centre of SVNIRTAR, Cuttack.

| HHIE                           | Degree of hearing loss |                       |                    |                       | Total      |
|--------------------------------|------------------------|-----------------------|--------------------|-----------------------|------------|
|                                | Mild hearing loss      | Moderate hearing loss | Sever hearing loss | Profound hearing loss |            |
| Self assessed hearing handicap | N (%)                  | N (%)                 | N (%)              | N (%)                 | N (%)      |
| Absence of handicap            | 9 (38%)                | 3 (9%)                | 0 (0%)             | 0 (0%)                | 12 (10%)   |
| Mild/Moderate handicap         | 13 (54%)               | 26 (74%)              | 11 (24%)           | 1 (7%)                | 51 (42%)   |
| Sever handicap                 | 2 (8%)                 | 6 (17%)               | 35 (76%)           | 14 (93%)              | 57 (48%)   |
| Total                          | 24 (100%)              | 35 (100%)             | 46 (100%)          | 15 (100%)             | 120 (100%) |

Comparing the scores obtained from the HHIE questionnaire and the degree of hearing loss, it was observed that among the 24 individuals with mild hearing loss, 9 (38%) reported having no perception of hearing handicap. 13 (54%) individuals with mild hearing loss had mild to moderate perception of hearing handicap and only two individuals perceived severe hearing handicap. In moderate hearing loss group, 9 % of hearing impaired individuals had no perception of hearing handicap. 74% and 17% of individuals with moderate hearing

loss reported moderate and severe level of hearing handicap respectively based on HHIE scores. All the individuals with severe or profound hearing loss had perceived hearing handicap. In Severe hearing loss group, 24% individuals had perceived mild to moderate hearing handicap where as 76% of individuals had reported to perceive severe hearing handicap. Except one, all individuals with profound degree of hearing loss according to the audiometric examination, had perceived severe hearing handicap.

**Table 3: Mean score and standard deviation of social, emotional domain and total score for males and females in different hearing loss groups**

| HHIE Score       |        | Mild hearing loss | Moderate hearing loss | Sever hearing loss | Profound hearing loss |
|------------------|--------|-------------------|-----------------------|--------------------|-----------------------|
| Social Domain    | Male   | 16.78 (8.3)       | 22.45 (9.6)           | 36.70 (10.1)       | 46.81 (11.2)          |
|                  | Female | 14.65 (9.1)       | 21.28 (8.5)           | 33.41 (9.8)        | 48.23 (9.9)           |
| Emotional Domain | Male   | 18.54 (7.9)       | 24.36 (7.9)           | 31.57 (8.7)        | 45.12 (8.4)           |
|                  | Female | 16.67 (8.6)       | 25.42 (9.2)           | 34.33 (10.6)       | 43.37 (11.5)          |
| Total            | Male   | 27.23 (11.4)      | 41.7 (12.3)           | 49.29 (13.2)       | 64.63 (12.6)          |
|                  | Female | 25.38 (12.7)      | 38.19 (10.7)          | 46.32 (11.6)       | 67.45 (10.4)          |

The HHIE questionnaire scores for males and females in different hearing loss groups is listed in Table 3. The results showed that the difference HHIE scores were statistically significant across hearing loss groups. The questionnaire scores were compared between males and females for each group and the results showed no significant difference between them. However, the severity of hearing loss had effects on social and emotional scores. Because of hearing deficiency, the social and emotional life of such elderly was severely affected as they showed inability for effective communication, emotional instability, irritability, tenseness, frustration, stress, embarrassment. Depression due to loneliness was also revealed by their

responses to the items in emotional domain. The current findings are in accord with the earlier findings of Midha & Malik; Dayna et al. [10,11]

**Table 4: Correlation between PTA and HHIE scores among elderly hearing impaired**

| Variables         | Mean & SD      | r     |
|-------------------|----------------|-------|
| Pure tone Average | 56.700 (15543) | 0.967 |
| HHIE score        | 58.43 (20.34)  |       |

From Table 4 it is clearly evident that the degree of hearing loss had a positive correlation with HHIE score. The social and emotional aspects of life were negatively affected by hearing loss in elderly. High HHIE scores indicated more perceived hearing handicap with increase in degree of hearing loss.

**Table 5: Mean and standard deviation of the scores on quality of life among different hearing loss groups**

| WHOQOL-BREF Domains     | Mild hearing loss | Moderate hearing loss | Sever hearing loss | Profound hearing loss | F     | P    |
|-------------------------|-------------------|-----------------------|--------------------|-----------------------|-------|------|
| Physical Health         | 73.81 (9.7)       | 67.9 (7.1)            | 61.7(10.3)         | 56.4(8.2)             | 13.81 | 0.01 |
| Psychological           | 77.72 (8.5)       | 70.4 (9.3)            | 62.6(10.6)         | 45.2 (9.0)            | 17.72 | 0.01 |
| Social Relationships    | 74.19 (11.3)      | 71.3 (10.5)           | 67.1(9.2)          | 51.6 (11.2)           | 14.19 | 0.01 |
| Environmental           | 76.21 (10.4)      | 74.6 (9.7)            | 63.6 (11.3)        | 48.3(7.6)             | 16.21 | 0.01 |
| Overall Quality of Life | 82.34 (7.6)       | 73.5 (8.4)            | 67.8 (7.9)         | 37.5 (8.4)            | 22.34 | 0.01 |

Regarding QoL, the four hearing loss groups differed significantly in all domains of the WHOQOL-BREF.

Application of the Bonferroni *post hoc* test verified statistically significant differences between the hearing loss groups for all

domains of the WHOQOL-BREF, namely, physical health ( $p<0.01$ ), psychological ( $p<0.01$ ), social relationships ( $p<0.01$ ), and environment ( $p<0.01$ ), as well as for overall QoL ( $p<0.01$ ).

It has now been reported by several researchers that hearing loss is an increasingly important public health problem that has been linked to reduce QoL, as it can impair the exchange of information, significantly impacting daily life, especially for elderly people. Reported effects of presbycusis on QoL are more of psychological reactions such as loneliness, isolation, dependence, frustration, depression, anxiety, anger, embarrassment, frustration, and guilt. Moreover, in old age, people grow reluctant to change or adapt their usual means of communication. Also, they find it extremely hard to adjust with the new situation after being unable to hear the natural words/languages those are used since their childhood for effective communication. For them, it becomes an insurmountable obstacle to cope with the loss of hearing. The extent to which a hearing impairment poses problem in everyday communication varies from person to person and cannot be predicted from the audiogram alone. Individuals with identical audiograms and word identification experience different degrees of handicap.

## CONCLUSIONS

This study compared existing self-assessment hearing handicap questionnaires with perceived quality of life. The results showed negative impacts of hearing loss on social, emotional aspects of life. The inability for effective communication due to hearing loss, affects the quality of life of those individuals. Higher the degree of hearing loss, more perceived hearing handicap and poorer quality of life. Hence,

utmost efforts should be made to prevent hearing loss in old age.

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