

## The impact of hearing loss in older adults: a tertiary care hospital based study

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### ABSTRACT

Hearing loss is the most common sensory deficit in the elderly, and is becoming a severe social and health problem. Presbycusis is the result of aging which can lead to communication problems compromising the quality of life (QoL). Since the elderly population is increasing worldwide, presbycusis is showing a similar trend. This study intended to identify the impact of hearing loss in the social life of the elderly. A total of 70 elderly patients attending Nepal Medical College Teaching Hospital who were found to have sensorineural hearing loss (SNHL) on pure tone audiometry (PTA) were recruited for this study. None of the patients had used hearing aids in the past. To assess their handicap due to hearing impairment a Hearing Handicap Inventory for the Elderly (HHIE) questionnaire was used and patients were graded as: no handicap, mild to moderate handicap and significant handicap. Pure-tone averages (PTA) were calculated for the thresholds at 0.5, 1 and 2 kHz in each ear. Patients with their PTA values between 26 to 40 dBHL were interpreted as having mild SNHL, those between 41 to 55 dBHL as moderate SNHL and those above 55 dBHL as severe SNHL. Out of 70 patients, 65 had some degree of handicap ranging from mild to severe. The severity of handicap was significantly associated with the degree of hearing loss in both ears.

**Keywords:** Elderly, hearing loss, Hearing Handicap Inventory for the Elderly (HHIE)

### INTRODUCTION

Presbycusis refers to hearing loss associated with the aging process. The Committee on Hearing, Bioacoustics and Biomechanics considers presbycusis to be the sum of hearing loss which is the result of a variety of physiological degenerations. These include insults due to noise exposure, ototoxic agents, polypharmacy, and medical disorders as well as the effects of physiological aging.<sup>1</sup> Irrespective of the etiology, the interference with communication created by presbycusis has profound negative effect on the lives of aged persons.

The term "QoL" (quality of life) is used to evaluate the general well-being of individuals. Considerable agreement exists regarding the idea that the evaluation of QoL is multidimensional: physical well-being, material well-being, social well-being, and emotional well-being.<sup>2</sup> Hearing loss is an increasingly important public health problem that has been linked to reduced QoL, as it can impair the exchange of information, significantly impacting daily life, especially for elderly people. Reported effects of presbycusis on QoL are:

emotional reactions, such as loneliness, isolation, dependence, frustration, depression, anxiety, anger, embarrassment, frustration and guilt.

behavioural reactions, such as bluffing, withdrawing, blaming and demanding.

cognitive reactions, such as confusion, difficulty focusing, distracting thoughts, decreased self-esteem and communication disorders.<sup>2,3</sup>

There is no general agreement on the age at which a person becomes old. The age of 60, roughly equivalent to retirement age in most developed countries, is said to be the beginning of old age.<sup>4</sup>

The prevalence of presbycusis is different in different parts of the world (44.3% in Egypt, 27.3% in Taiwan).<sup>5,6</sup> The prevalence of hearing disability in India is 41% over 60 years of age.<sup>7</sup> In our country only one study has been conducted to determine the prevalence and main causes of hearing impairment and it has reported the prevalence of hearing impairment to be 16.6% among all age groups.<sup>8</sup> In this century, hearing loss is becoming one of the most prevalent chronic diseases in the elderly as in the USA; hearing loss is the third most prevalent chronic disease in the elderly.<sup>9</sup> WHO has estimated that disability due to adult onset hearing loss will increase during the next two decades.<sup>10</sup> It has been firmly established that hearing loss is associated with poor quality of life among older people, and may even lead to poor general health and mood disorders such as depression and anxiety, as well as increased mortality risk.<sup>11-14</sup> This study was intended to assess the social and emotional impacts of hearing loss in an elderly population attending Nepal Medical College and Teaching Hospital ENT OPD.

## MATERIALS AND METHODS

This cross sectional study was conducted in Nepal Medical College and Teaching Hospital (NMCTH), a tertiary care centre in Nepal. Patients aged above 55 years were taken as elderly. Seventy elderly patients presenting to NMCTH ENT OPD over a period of 3 months (July 1st, 2013 – October 1st, 2013) and fulfilling the inclusion criteria were recruited in the study after taking informed consent. Ethical clearance was obtained from the Institutional Review Board of NMCTH. Preliminary ENT examination followed by Pure Tone Audiometry (PTA) test was done. Inclusion criteria were 1) Age above 55 years 2) Normal mental and physical health 3) Sensorineural Hearing Loss (SNHL). Exclusion criteria were 1) Conductive and Mixed Hearing Loss 2) Poor cognitive skill 3) Inability to complete the informed consent or questionnaire.

Hearing Handicap Inventory for the Elderly (HHIE) questionnaire was used. Respondents were asked about the various problems caused due to hearing loss. The interview was done in private by an audiologist under the supervision of the principal investigator and patients

were graded as: No handicap, Mild to moderate handicap and Significant handicap. The HHIE questionnaire is a tool designed to measure the effects of hearing impairment on the emotional and social adjustment of elderly people. This inventory comprises of two subscales: a 13-item subscale that explores the emotional consequences of hearing impairment, and a 12-item subscale that describes both social and situational effects. The HHIE has been judged a reliable and valid tool, as well as an easy-to-use questionnaire.<sup>2,3</sup> The two sub components of handicap: Emotional and Situational were also assessed.

The particulars of the patients, PTA of both ears, HHIE total score (T), its emotional (E) and situational (S) components and handicap level were all tabulated in MS Excel and exported to SPSS Version 20 for analysis. Pure-tone averages (PTA) were calculated for the thresholds at 0.5, 1 and 2 kHz in each ear. Patients with their PTA values between 26 to 40 dBHL were interpreted as having mild SNHL and those between 41 to 55 dBHL as moderate SNHL. All patients above 55 dBHL were interpreted as severe SNHL for statistical analysis.

### The Hearing Handicap Inventory for the Elderly (HHIE) questionnaire

Instruction: The purpose of this scale is to identify the problems your hearing loss may be causing you. Answer YES, SOMETIMES, or NO for each question. Do not skip a question if you avoid a situation because of your hearing problem. If you use a hearing aid, please answer the way you hear without the aid.

Yes (4) Some-times (2) No (0)

|      |   |      |
|------|---|------|
| S-1  | Does a hearing problem cause you to use the phone less often than you would like?                           | ---- |
| E-2  | Does a hearing problem cause you to feel embarrassed when meeting new people?                               | ---- |
| S-3  | Does a hearing problem cause you to avoid groups of people?   | ---- |
| E-4  | Does a hearing problem make you irritable?  | ---- |
| E-5  | Does a hearing problem cause you to feel frustrated when talking to members of your family?                 | ---- |
| S-6  | Does a hearing problem cause you difficulty when attending a party?   | ---- |
| E-7  | Does a hearing problem cause you to feel "stupid" or "dumb"?  | ---- |
| S-8  | Do you have difficulty hearing when someone speaks in a whisper?  | ---- |
| E-9  | Do you feel handicapped by a hearing problem?   | ---- |
| S-10 | Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?                 | ---- |
| S-11 | Does a hearing problem cause you to attend religious services less often than you would like?               | ---- |
| E-12 | Does a hearing problem cause you to be nervous?   | ---- |
| S-13 | Does a hearing problem cause you to visit friends, relatives, or neighbours less often than you would like? | ---- |
| E-14 | Does a hearing problem cause you to have arguments with family members?                                     | ---- |
| S-15 | Does a hearing problem cause you difficulty when listening to TV or radio?                                  | ---- |
| S-16 | Does a hearing problem cause you to go shopping less often than you would like?                             | ---- |
| E-17 | Does any problem or difficulty with your hearing upset you at all?  | ---- |
| E-18 | Does a hearing problem cause you to want to be by yourself?   | ---- |
| S-19 | Does a hearing problem cause you to talk to family members less often than you would like?                  | ---- |
| E-20 | Do you feel that any difficulty with your hearing limits or hampers your personal or social life?           | ---- |
| S-21 | Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?                 | ---- |
| E-22 | Does a hearing problem cause you to feel depressed?   | ---- |
| S-23 | Does a hearing problem cause you to listen to TV or radio less often than you would like?                   | ---- |
| E-24 | Does a hearing problem cause you to feel uncomfortable when talking to friends?                             | ---- |
| E-25 | Does a hearing problem cause you to feel left out when you are with a group of people?                      | ---- |

**FOR CLINICIAN'S USE ONLY:** Total score? ..... Subtotal E: ..... Subtotal S: .....

Determine presence of perceived emotional and situational hearing handicaps based on E and S scores.

0-16: No Handicap 17-42: Mild to Moderate Handicap ≥43: Significant Handicap

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## RESULTS

A total of 70 patients were included in this study of which 38 (54.3%) were females and 32 (45.7%) males (Fig. 1).

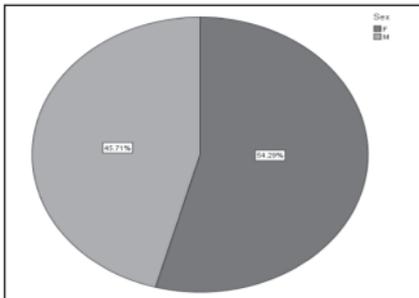


Fig.1: Sex distribution of study population

The minimum age of the participants was 56 years and maximum was 90 years with a mean age of  $68.4 \pm 8.5$  years. The mean PTA value for right ear was 52.0 dB HL and for left ear was 53.8 dB HL. The HHIE total score ranged from 6 to 90 with a mean of  $45.9 \pm 22.3$ .

Of the 70 patients, only 5 (7.1%) were found to have a HHIE total score less than 17 and hence, were categorised as no handicap. Thirty three patients (47.1%) fell in the significant handicap group and 32 (45.7%) in mild to moderate handicap group.

Gender was cross tabulated with handicap level. On applying Chi square test, its value came out to be 1.829 with a p value of 0.25 which showed that handicap level did not have a gender predilection.

PTA values on both right and left ears were interpreted as mild, moderate and severe and cross tabulated with handicap level (Fig. 2 and 3).

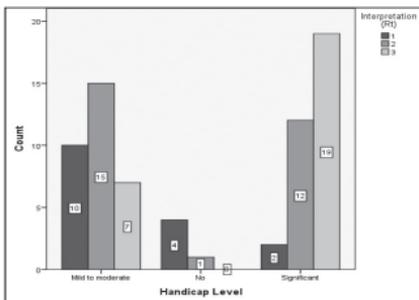


Fig.2: Distribution of study population into various handicap groups on the basis of interpretation of their right ear PTA values

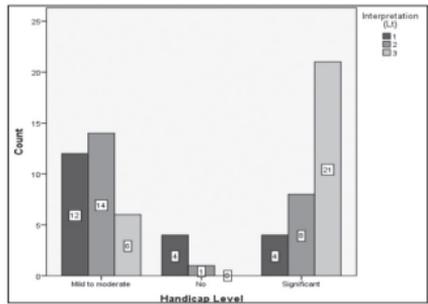


Fig.3: Distribution of study population into various handicap groups on the basis of interpretation of their left ear PTA values. On applying Chi square test, the p values for both sides were 0.0005. Higher PTA values were significantly associated with greater degree of handicap.

On applying Pearson Correlation to assess the distribution of hearing loss on both sides, left PTA values and right PTA values showed significant correlation at the 0.01 level of significance.

## DISCUSSION

This study was designed to assess the social and emotional impacts of hearing loss on the quality of life (QoL) of the 70 elderly patients attending Nepal Medical College and Teaching Hospital ENT OPD. The Hearing Handicap Inventory for the Elderly (HHIE) is a hearing-related instrument that incorporates a question specifically designed to assess QoL.<sup>15</sup> Using the HHIE questionnaire, the patients were graded as: No handicap, Mild to moderate handicap and Significant handicap. The two sub components of handicap: Emotional and Situational were also assessed.

As seen in the results, the patients were divided into 3 groups: no handicap (7.1%), mild to moderate handicap (45.7%) and significant handicap (47.1%). The United States National Council on Aging (1999) reported that among the people with hearing loss, 39% perceived that they had an excellent global QoL level, indicating no handicap.<sup>16</sup> Our result showed only 7.1% patients with no handicap patients, which is less. This discrepancy may have been observed because ours was a hospital based study, where persons attending hospital tend to have a negative mind-set regarding health. Most other studies were large population based studies conducted in their own homes.

In our study, gender was not found to be a statistically significant factor for determining handicap level amongst the elderly. Similar results were observed in an Italian study by Quaranta et al and a Danish study by Bech et

al.<sup>17,18</sup> Some other studies however do not match with our results. In the UK, the Royal National Institute for Deaf People (RNID) reported that above 40 years of age, men were affected more than women, probably because men were exposed to industrial noise. However, over the age of 80 there was a greater number of women who were hard of hearing than men, because the life expectancy of women is higher than that of men.<sup>19</sup> Many other studies have reported that men are affected more than women.<sup>20,23</sup>

PTA values on right and left ear were interpreted as mild, moderate and severe and cross tabulated with handicap level. On both sides the severity of hearing loss significantly affected the handicap level. Similar association was found in a large population based study by Dalton *et al.*<sup>24</sup>

In our study, PTA values of left and right side showed significant correlation indicating that age related hearing loss is a bilateral process. The bilateral nature of presbycusis is approved in various studies.<sup>6, 7, 23, 24</sup>

None of the patients in the study population had used hearing aids despite having a serious hearing handicap. This may be due to lack of awareness, financial constraints among the patients and failure of the health personnel to address this major issue.

This study concludes that hearing impairment and social handicap was high in the elderly of our community. Due to low degree of suspicion among health workers it may not be picked up. Proper assessment and interventional methods like providing hearing aids will help reduce their social handicap and thus improve their quality of life. Hence, health care professionals involved in hearing and others involved in geriatric health care must strive to identify individuals with hearing impairments in order to correct the permanent impact of hearing loss. This includes special attention in areas like proper manpower training, raising funds and equipments and spreading health awareness.

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