DOI: 10.7860/JCDR/2018/37466.12400

Original Article

Ear, Nose and Throat Section

Assessment of the Self Perceived Hearing Handicap and its Associated Factors in Elderly People with Hearing Loss

VALLI RAJASEKARAN[1], RB GURULAKSHMI[2]

ABSTRACT

Introduction: Hearing loss is one of the most common sensory deficits in elderly people. With an increase in life expectancy globally, presbycusis has become a major problem. The hearing loss can affect the social, emotional, psychological and functional well being of an individual. Determining the hearing handicap and the factors associated with the same becomes the major driving force for their health-seeking behaviour.

Aim: To assess the degree of hearing handicap in elderly patients with hearing loss, to correlate the severity of hearing handicap with the severity of hearing loss and to identify various factors associated with hearing handicap.

Materials and Methods: A cross-sectional study was conducted in 100 people more than 60 years of age with the sensorineural hearing loss. Hearing was assessed using pure tone audiometer. Hearing Handicap Inventory for the Elderly (HHIE) questionnaire was used to calculate the handicap scores from which the degree of handicap was assessed. The severity of handicap was correlated with the degree of hearing loss using chi-square test.

Results: From the study, it was found that hearing loss in elderly people causes some degree of handicap (69%). There was statistically significant correlation between the severity of hearing loss and the degree of handicap ($p<0.0001$). There was a statistically significant association between education statuses, marital status with the severity of hearing handicap.

Conclusion: From the findings in the study it can be concluded that older adults with hearing loss perceived social and emotional handicap. Any worsening in hearing will further impair the degree of handicap. People who were illiterate and living alone perceived significant handicap. Hence, identifying people with hearing handicap can help us in identifying and motivating people for further audiological screening and rehabilitation.

Keywords: Health-seeking behaviour, Older adults, Presbycusis

INTRODUCTION

Hearing impairment is one of the most common but still an under-reported chronic ailment in elderly population [1,2]. The age-related degeneration can also involve stria vascularis, the spiral ganglion [3], the cochlear nerve [4,5] or the central auditory processing of speech [6]. Hearing loss in elderly people is usually bilateral, symmetrical and progressive [7]. With changing demographic profile and increasing life expectancy, it is likely to become a major issue of concern. Hearing impairment has a considerable impact on their lifestyle. Presbycusis is the second most common cause of hearing loss following infective causes like Chronic Suppurative Otitis Media [8]. The prevalence of hearing disability in India is 41% in people over 60 years of age [9]. The prevalence of hearing loss is doubling, every 10 years [1].

There is an increasing need to study the impact of disease on daily activity and behaviour. Hearing difficulty in elderly interferes with communication and has a significant negative effect on the social and emotional aspect of life. Impaired communication causes a low self-esteem and poor self-perception of social skills. The hearing loss further adds to poor social life, impairing their day to day activities.

Hearing disability refers to the difficulties in hearing in a real environment such as hearing in noisy environments [10]. Hearing loss of more than 60 dB in the better ear is generally considered as a disabling hearing loss [11]. As most of the daily activities are dependent on hearing even lesser hearing loss can also interfere with certain activities restraining normal social or emotional well being. Hearing handicap, according to the WHO definition, refers to nonauditory consequences for an individual, such as experiences of emotional distress and restrictions on social engagement, directly due to hearing impairment [12-14]. Hearing impairment is measured using audiometry. However, hearing handicap is a more a complex phenomenon which can be measured using self-reported questionnaire on social and emotional aspects of life. There are various questionnaires to assess the hearing handicap in elderly people and only few of them are standardised. Of these, Hearing handicap Inventory for Elderly (HHIE) has been found to reliable, valid and simple to administer [15]. There is generally a tendency to ignore the hearing loss especially in elderly, which make it an under-reported condition. They neither seek medical advice nor use hearing assistive devices like hearing aid when prescribed leading to significant disability. In general, hearing of the people is assessed ignoring the handicap perceived by the people. Hearing handicap is a pivotal factor in influencing their health-seeking behaviour. Hence identifying people with self-perceived hearing handicap is more crucial that people with hearing impairment alone.

Several studies have demonstrated that hearing loss in elderly has a significant negative effect on quality of life [16,17]. The hearing impairment also affects psychosocial and emotional well being. They feel upset, isolated and frustrated [18]. People with hearing impairment also face significant difficulties in the presence of ambient noise like in restaurants, and in parties [18]. They also experience physical exhaustion on attempts to listen in challenging situations [19]. Not much-published literature is available on hearing handicap in elderly patients with hearing loss in rural population in India. Understanding the changes in social and emotional health of the individuals can help us focus on these aspects of health as well, thereby providing a holistic care for the patient.

MATERIALS AND METHODS

A cross-sectional study was conducted in Shri Sathya Sai Medical College and Research Institute, Tamil Nadu, India, for a period of two months (June, July 2017). The sample size was calculated from a previous study where the prevalence of hearing handicap in elderly people with hearing loss was 92 % [16]. The precision error was taken as 6% (6 X 92/100) which was 5.5. The sample size was calculated using the formula 4 pq/r^2; 4 X 92X 8/$(5.5)^2$=97. So, the sample size was taken as 100.

Subjects

People ≥60 years of age, both sexes and with bilateral symmetrical sensorineural hearing loss were included in the study. People with pre-existing ear disease like Chronic Suppurative Otitis Media, Conductive/mixed hearing loss and patients with cognitive impairment who cannot appropriately respond to questionnaire were excluded from the study. Patients using hearing aid were also not included in the study as the hearing status will improve with the use of hearing aid and the impact cannot be clearly assessed [19].

Data Collection

The study was conducted after clearance from Institutional Ethical Committee in May 2017 prior to collection of data (IEC NO: 2017/375). Patients ≥60 years of age attending the OPD of various departments were explained about the procedure and the purpose of the study. Patients who were willing to participate in the study were included after obtaining an informed written consent.

Patients ≥60 years of age with hearing loss were initially examined-to rule out any underlying external or middle ear conditions like Secretory Otitis Media/Chronic Suppurative Otitis Media. Hearing was initially assessed using tuning fork test. A 512 HZ tuning fork was used to assess hearing. Rinne's, Weber's and Absolute Bone Conduction tests were done. Rinne's test was positive, Weber's test was centralised and absolute bone conduction was reduced in patients with bilateral symmetrical sensorineural hearing loss [20]. Hearing status was confirmed by doing a pure tone audiometry.

Audiogram was performed using pure tone audiometer-Arphi Model 500 MK III. Audiogram was plotted from the values obtained. Pure tone average was calculated for both ears for 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz. Based on the audiogram, the type of hearing loss was identified. WHO classification was used to calculate the degree of hearing loss [21].

HHIE Questionnaire [15,16,22,23]

HHIE is a self-assessment questionnaire devised by Weinstein and Ventry. This questionnaire is freely available and was used for the study. The questionnaire has 25 questions with 12 on social or situational aspects and 13 on emotional aspects. Each question has three responses; yes, sometimes and no with 4, 2, 0 point scoring respectively. The total scores were calculated for 100 which include both social and emotional aspects. The maximum social scores was 48 and the emotional scores was 52. The total score of 0 is no handicap and 100 indicating total handicap. A total score of 0-16 was considered as no handicap, 18-42 as considered as mild to moderate handicap and more than 44 was considered as severe handicap. The questionnaire was translated in the regional language (Tamil) and its correct translation was confirmed. The translated Tamil version was retranslated back into English by a third person who was not a part of the study. The retranslated version was in concordance with the original questionnaire. The questions were read and marked by the patients. If the participants were illiterate the questions were read and the responses were marked. After filling the questionnaire the total, social and the emotional scores were calculated.

STATISTICAL ANALYSIS

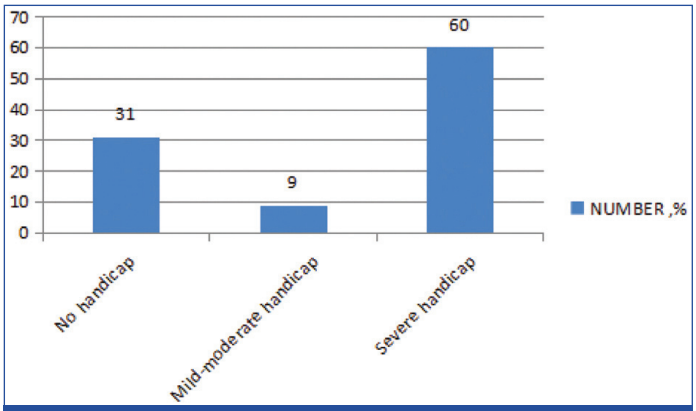
The collected data were compiled and statistically analysed using Statistical Package for Social Sciences (SPSS) software-version 23.0. The mean and standard deviation was calculated for the total, social and emotional scores. The correlation between the age, sex, employment, literacy, marital status and degree of hearing loss with the severity of handicap scores was statistically studied using chi-square test.

RESULTS

The study sample had 100 patients who visited the present hospital. All the participants were ≥60 years of age. The mean age of presentation was 66.05 years. The age distribution ranged from 60-93 years. The sex distribution was 53% males, 47% females.

The handicap score was calculated from the questionnaire. The mean and the standard deviation for the total scores were 52.72±38.30. The mean and the standard deviation of the social and the emotional sub-scores were 25.94±17.80 and 26.86±20.84 respectively.

In the study population, 31 (31%) did not perceive any handicap. A total of 69 (69%) of the study population showed some handicap [Table/Fig-1].



[Table/Fig-1]: Distribution of handicap levels in the study population (N=100).

The degree of hearing loss was correlated with the severity of handicap. Most patients had 'mild' (40%) to 'moderate' (44%) hearing loss. Most people with mild hearing loss (n=30, 75%) did not perceive any handicap. Most people with moderate hearing loss (n=37, 84.1%) perceived severe handicap. A 14% of the people had severe hearing loss and only 2% had profound hearing loss. All the patients with severe and profound hearing loss perceived severe handicap [Table/Fig-2]. There was statistically significant correlation between degree of hearing loss and the severity of hearing handicap. (p=0.0001). There was no statistically significant relationship between the age, sex, employment status and the severity of handicap scores [Table/Fig-3].

Degree of Hearing Loss	N	No Handicap	Mild to Moderate Handicap	Severe Handicap	
Mild	40	30 (75%)	3 (7.5%)	7 (17.5%)	χ^2=67.771 df=6 p=0.0001
Moderate	44	1 (2.3%)	6 (13.6%)	37 (84.1%)	
Severe	14	0	0	14 (100%)	
Profound	2	0	0	2 (100%)	

[Table/Fig-2]: Distribution of study population based on degree of hearing loss and handicap scores.
Chi-square test

People who could read and write in any language were taken as literates. People who could not read or write were considered as illiterate. As the study was done in a rural population most patients were illiterate (n=57, 57%). There was statistically significant association between the education status and the severity of handicap scores (p=0.001). People who were living alone had a higher level of auditory handicap than people who were living with spouse (p=0.0001).

	No Handicap	Mild to Moderate Handicap	Severe Handicap	p-value
Age				
60-70 years	27 (33.7%)	7 (8.8%)	46 (57.5%)	χ^2=2.596 df=4 p=0.624
71-80 years	3 (20%)	1 (6.7%)	11 (73.3%)	
80 and above	1 (20%)	1 (20%)	3 (60%)	
Sex				
Female	18 (33.96%)	5 (9.4%)	30 (56.6%)	χ^2=0.610 df=4 p=0.788
Male	13 (27.7%)	4 (8.5%)	30 (63.8%)	
Employment				
Employed (N=25)	8 (32%)	0	17 (68%)	χ^2=3.301 df=2 p=0.198
Dependent (N=75)	23 (30.7%)	9 (12%)	43 (57.3%)	
Education Status				
Literate, N=43	20 (46.5%)	5 (11.6%)	18 (41.9%)	χ^2=10.534 df=2 p=0.001
Illiterate, N=57	11 (19.3%)	4 (7%)	42 (73.7%)	
Marital Status				
Living with spouse, N=45	2 (48.9%)	6 (13.3%)	17 (37.8%)	χ^2=64.809 df=9 p=0.0001
Living alone (single/ widowed), N=55	9 (16.4%)	3 (5.5%)	43 (78.1%)	

[Table/Fig-3]: Distribution of study population based on the demographic details. Chi-square test

DISCUSSION

This study was conducted among 100 subjects who were 60 years and above with hearing loss. The mean age of presentation was 66.02 years. The study group had 53% females and 47% males. Based on the scores obtained from the questionnaire the handicap scores were calculated. The mean total score, emotional and social sub-scores were 52.7, 26.86 and 25.94 respectively. The hearing loss in these individuals causes communication difficulties which interfere with day to day activities. These people have less social activities, poor social relations and emotional disturbances as indicated by high social, emotional and total scores. Similar high scores were documented in study by Shrestha KK et al., and Iwasaki S et al., [16,24]. However, lower scores were documented in study by Moser S et al., [25].

Among people with hearing loss of varying degree, about 31% of people did not perceive any handicap. This could be because of mild hearing loss in most of the patients. This is in accordance with findings by de Araújo PG et al., and Moser S et al., [18,25]. Chang HP et al., in their study documented higher percentage (78.6%) of people with hearing loss without any perceived handicap [23]. This could be because this was a study on the community dwellers where most people could have been asymptomatic due to minimal or mild hearing loss. However, in study by Shrestha KK et al., only 7.1% had no handicap [16]. This could be because the study was done on population visiting ENT department and most people come for consultation only when they perceive their problem.

As the severity of hearing loss increases, the perceived handicap also increases. All patients with severe and profound hearing loss had severe handicap. There was high statistical significance for the same. The higher the hearing loss, the more it impairs their social and emotional life. Similar results were reported by Shrestha et al., Chang HP et al., Iwasaki S et al., Moser S et al., Tatović M et al., [16,23-26]. This is further supported in study by Manchaiah V [27], where self-predicted handicap scores were significant predictors of participation restriction and health-related quality of life.

With increasing age, the degree of hearing loss increases. As seen in [Table/Fig-3], with increasing age the proportion of people with severe handicap was also increasing up to 80 years of age. There was no statistical significance between age and severity of handicap. This could be because of the number of people were less with increasing age (5% in more than 80 years of age). As it was a hospital-based study, people >80 years of age who visited the hospital were less, probably due to physical limitations. This finding finds support from study by Moser S et al., [25]. However, in study done by Chang HP et al., there was increasing handicap with increasing age [23]. This could be because more population was screened at the community level and were good number of patients in all the age groups.

There was no gender difference in determining handicap levels in elderly people. This finding is consistent with findings of study by Shrestha KK et al., Chang HP et al., Moser S et al., [16,23,25]. Other studies by Iwasaki S et al., showed more hearing loss in males [24]. This could probably be because men are exposed more to industrial and environmental noise. However, in study by de Araújo PG females had greater handicap than males [18]. This could be because females have more emotional liability than males impairing their emotional health.

The employment status of the people did not show any association with handicap scores. This could be because people included in the study were ≥60 years of age and most of them were dependent on the family members. The type of work was not taken into consideration. As the study was done in a rural population, the nature of work might not require significant social interaction.

There was significant association between education status and handicap severity. The handicap scores were more among illiterate patients. The understanding of the hearing loss and the measures to prevent and avoid damage due to noise could have been better in an educated patient. The social and emotional adjustments are also probably better in a literate. Similar findings were reported in study by Dalton DS et al., [17].

The perceived hearing handicap by people with hearing loss was more in people living alone than among those living with spouse. This could be because people alone have to meet their daily needs on their own. They would require more communication with others in comparison with people living with spouse. This finding is akin to findings in study by Chang HP et al., [23].

Identifying factors associated with hearing handicap like illiteracy and people who live alone can help us in identifying people in need for further audiological workup. These people can be motivated for rehabilitation which might help them to decrease the handicap.

LIMITATION

The hearing handicap assessed in the study is only a self-perceived handicap score based on the response given for the standard questionnaire. The handicap scores obtained are subjective. There is no objective way of assessing hearing handicap. There might be some under-reporting as the hearing loss in elderly people is of insidious onset and the person might take some significant time before realising the hearing loss. Likewise, there is a possibility of over-reporting of the auditory handicap in elderly people especially if they are living alone or dependant on their family members. Moreover, the aftermath of hearing loss on the psychological and the functional facets was not assessed in the study.

CONCLUSION

From the findings of the present study, it can be concluded that hearing impairment in elderly is associated with hearing handicap. The severity of hearing loss correlates with the severity of hearing handicap. There is no significant association between age, sex and employment status of the individual with the severity of handicap. There is significant association between the education status and whether they are living alone with the handicap scores.

The study prompts few recommendations; Early identification of hearing loss by the first contact physicians and referral to higher centre for further evaluation, creating awareness among the

people about the availability of hearing assistive devices and for the policymakers to allocate appropriate financial resources for rehabilitation of the people with hearing handicap.

REFERENCES

[1] Gopinath B, Rochtchina E, Wang JJ, Schneider J, Leeder SR, Mitchell P. Prevalence of age-related hearing loss in older adults: Blue Mountains Study. Archives of internal medicine. 2009;169(4):415-18.
[2] Mitchell P, Gopinath B, Wang JJ, McMahon CM, Schneider J, Rochtchina E, et al. Five-year incidence and progression of hearing impairment in an older population. Ear and Hearing. 2011;32(2):251-57.
[3] Nelson EG, Hinojosa R. Presbycusis: a human temporal bone study of individuals with downward sloping audiometric patterns of hearing loss and review of the literature. The Laryngoscope. 2006;116(S112):1-2.
[4] van Ruijven MW, de Groot JC, Klis SF, Smoorenburg GF. The cochlear targets of cisplatin: an electrophysiological and morphological time-sequence study. Hearing Research. 2005;205(1-2):241-48.
[5] Linthicum Jr FH, Fayad J. Spiral ganglion cell loss is unrelated to segmental cochlear sensory system degeneration in humans. Otology & neurotology: official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology. 2009;30(3):418.
[6] Bernstein LR. Auditory processing of interaural timing information: new insights. Journal of Neuroscience Research. 2001;66(6):1035-46.
[7] Gates GA, Mills JH. Presbycusis. Lancet. 2005;366(9491):1111-20.
[8] Bisht RS, Sikarwar V, Mina R, Arya A. An epidemiological study on hearing loss and its demographic characteristics within Garhwal region of Uttarakhand. Indian Journal of Otology. 2016;22(2):105-09.
[9] Raju SS. Situational analysis of elderly in India. In Voice of the elderly in India, edited by S. Siva Raju. India. BR Publishing Co;2011:1-29.
[10] Stephens D, Hetu R. Impairment, disability and handicap in audiology: Towards a consensus. Audiology. 1991;30:185-200.
[11] Hearing impairment-rehabilitation council of India. http://www.rehabcouncil.nic.in/writereaddata/hi.pdf accessed on 14/10/2018.
[12] World Health Organization. International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of disease, published in accordance with resolution WHA29. 35 of the Twenty-ninth World Health Assembly, May 1976.
[13] Schow RL, Gatehouse S. Fundamental issues in self-assessment of hearing. Ear and hearing. 1990;11(5 Suppl):6S-16S.
[14] Noble W, Tyler R, Dunn C, Bhullar N. Hearing handicap ratings among different profiles of adult cochlear implant users. Ear and Hearing. 2008;29(1):112-20.
[15] Ventry IM, Weinstein BE. The hearing handicap inventory for the elderly: a new tool. Ear and Hearing. 1982;3(3):128-34.
[16] Shrestha KK, Shah S, Malla NS, Jha AK, Joshi RR, Rijal AS, et al. The impact of hearing loss in older adults: a tertiary care hospital based study. Nepal Med Coll J. 2014;16(2-4):131-34.
[17] Dalton DS, Cruickshanks KJ, Klein BE, Klein R, Wiley TL, Nondahl DM. The impact of hearing loss on quality of life in older adults. The Gerontologist. 2003;43(5):661-68.
[18] de Araújo PG, Mondelli MF, Lauris JR, Richiéri-Costa A, Feniman MR. Assessment of the auditory handicap in adults with unilateral hearing loss. Brazilian Journal of Otorhinolaryngology. 2010;76(3):378-83.
[19] Niemensivu R, Manchaiah V, Roine RP, Kentala E, Sintonen H. Health-related quality of life in adults with hearing impairment before and after hearing-aid rehabilitation in Finland. International Journal of Audiology. 2015;54(12):967-75.
[20] Stankiewicz JA, Mowry HJ. Clinical accuracy of tuning fork tests. The Laryngoscope. 1979;89(12):1956-63.
[21] World Health Organization Grades of hearing impairment http://www.who.int/pbd/deafness/hearing_impairment_grades/en/index.html. accessed on 12/10/2017
[22] Weinstein BE, Spitzer JB, Ventry IM. Test-retest reliability of the Hearing Handicap Inventory for the Elderly. Ear Hear. 1986;7(5):295-99.
[23] Chang HP, Ho CY, Chou P. The factors associated with a self-perceived hearing handicap in elderly people with hearing impairment-results from a community-based study. Ear and Hearing. 2009;30(5):576-83.
[24] Iwasaki S, Sano H, Nishio S, Takumi Y, Okamoto M, Usami SI, et al. Hearing handicap in adults with unilateral deafness and bilateral hearing loss. Otology & Neurotology. 2013;34(4):644-49.
[25] Moser S, Luxenberger W, Freidl W. Perception of hearing problems in the older population. HNO. 2017;65(8):671-79.
[26] Tatović M, Babac S, Đerić D, Aničć R, Ivanković Z. The impact of hearing loss on the quality of life in adults. Srpski Arhiv Za Celokupno Lekarstvo. 2011;139(5-6):286-90.
[27] Manchaiah V. Role of self-reported hearing disability and measured hearing sensitivity in understanding participation restrictions and health-related quality of life: a study with hundred and three older adults with hearing loss. Clinical Otolaryngology. 2017;42(4):924-26.

PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Ear, Nose and Throat, Shri Sathya Sai Medical College and Research Institute, Sri Balaji Vidhyapeeth University, Chennai, Tamil Nadu, India.
2. MBBS Student, Department of Ear, Nose and Throat, Shri Sathya Sai Medical College and Research Institute, Sri Balaji Vidhyapeeth University, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Valli Rajasekaran,
Associate Professor, Department of Ear, Nose and Throat, Shri Sathya Sai Medical College and Research Institute,
Sri Balaji Vidhyapeeth University, Chennai, Tamil Nadu, India.
E-mail: valli_rajasekaran@yahoo.co.in

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jun 08, 2018**
Date of Peer Review: **Aug 06, 2018**
Date of Acceptance: **Sep 27, 2018**
Date of Publishing: **Dec 01, 2018**