

**USE OF A QUESTIONNAIRE TO IDENTIFY COMMUNICATIVE PROBLEMS IN
THE ELDERLY - A PILOT STUDY**

Reg.No.M9020

**AN INDEPENDENT PROJECT WORK SUBMITTED IN PART FULFILMENT FOR
FIRST YEAR M.Sc,(SPEECH AND HEARING) TO THE UNIVERSITY OF
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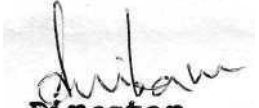
AMMA AND APPA ...

...THANKS FOR EVERYTHING

CERTIFICATE

This is to certify that the Independent Project entitled: **"Use of a questionnaire to identify communicative problems in the elderly - A Pilot study"** is the bonafide work in part fulfilment for the degree of Master of Science (Speech and Hearing) of the student with Reg.No.M-9020.

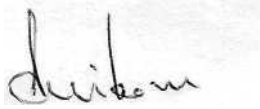
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1991


Director .
All India Institute
of Speech & Hearing
Mysore-6

CERTIFICATE

This is to certify that the Independent Project entitled: "Use of a questionnaire to identify coramunicative problems in the elderly - A pilot study" has been prepared under ray supervision and guidance.

**Mysore
1991**


**Dr.(Miss) S.Nikam,
GUIDE**

DECLARATION

I hereby declare that this Independent Project entitled: "Use of a questionnaire to identify communicative problems in the elderly - A pilot study" is the result of my own study under the guidance of Dr.(Miss) S.Nikam, Prof, and Head, Department of Audiology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for any other Diploma or degree.

Mysore, 1991.

Reg.No.M9020,

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INTRODUCTION

"Human communication is action; it is culture; it is the history of man; it is the fabric of all societies; its absence negates human existence".

(Toubbeh, 1973).

The complex mechanism by which we acquire knowledge and communicate with others can be likened to a computer. Hearing to a great extent, provides the input, the brain is programmed to store and interpret this information; behaviour including speech is the output.

It can thus be seen that a normal auditory system is a must for effective communication.

As we should know, there are some age related changes in the human body. The hearing apparatus is not omnipotent but must submit to the ravages of time, disease and genetically programmed absolescence.

Among the five most prevalent chronic conditions affecting the physical health of senior citizens, impairment of hearing or presbycusis, ranks second only to arthritis . (Harris, 1978). Rupp's data (1970) reflects the prevalence of impairment with advancing age. The rate of acquiring hearing loss, defined as elevated thresholds in the traditional speech frequencies of 500 Hz, 1000 Hz, 2000 Hz increases rather sharply after the age of 64 years and includes 25% of the population 75 years and older.

According to Glorig and Nixon (1960), the aging process reveals itself by changes in auditory sensitivity at 1000 Hz beginning at 30 years. The rate of decrease in auditory sensitivity for 1000 Hz is about 3 dB for every ten years of age through 70 years. For 6000 Hz, the decrease is approximately 10 dB for every ten years through 70 years.

A cross sectional study was done by Eisdorfer and Wilkie (1972). It was a 7 year follow-up, and the authors report on 92 individuals seen between 60-89 years. Auditory sensitivity decreased during the seven year period. The amount of decrease for the group from 67-74 years was equivalent to the decrease observed for the 75-82 year old group. Women had better hearing than men at higher frequencies.

Several estimates of the prevalence of the hearing impairment in the over 65 population exist. According to ASHA (1971) over 21/2 million elderly American citizens have a significant bilateral impairment. Hull and Traynor (1977) state that presbycusis in varying degrees affects approximately 60% of all individuals over 65 years of age. According to Chaffe (1967), 90% of person living in senior citizen homes have hearing impairment. The Senate committee on aging (1968) has suggested that hearing loss restricts the quality of life for 30-50% of the population over 65 years. According to Mosciki, et al. (1985) , the estimated prevalence was found

to be around 83% with the majority of the cases having sensori-neural hearing loss. There were no statistically significant sex differences at 1000 Hz or below. Women had better hearing than men at 2000 Hz and above. These studies implied that a significant number of older people have a serious hearing impairment and need rehabilitative assistance. Available statistics further indicate that hearing loss increased as a function of age. For eg. in the age range 25-44 years, the incidence of hearing impairment was 20.6/1000 persons; in the 45-64 years it was 52.2/1000; in the 65-74 age group it rose sharply to 129.2/1000 and in the 75 and over age group it was 256.4/1000 persons. (Metropolitan Life Insurance Company, 1959).

There is extensive literature regarding the age-related changes in the human auditory system. Anatomical and physiological differences have been reported in the elderly (Sehuknecht, 1955? Goodhill, 1969? Glorig and Davis, 1961? Mayer, 1919? Crowe, Guilt, and Polvogt, 1934? Jorgenson, 1961? Fowler, 1944).

It is thus clear from the foregoing that the elderly face a variety of communication problems because of their hearing handicap. These people experience frustration because of an inability to understand what others are saying.

It becomes easier for these people to withdraw from such situations where communication with others may take place, rather than face embarrassment from frequent misunderstandings of statements or inappropriate responses. Many feel that perhaps they are losing their sanity, particularly when they may not know the cause for speech discrimination problems that they are experiencing. Their greatest concern is that their family may feel that they are losing the ability to function on an independent basis. The elderly may also have serious doubts about their own ability to maintain a responsible position in the family. Compounding these self-doubts may be a growing inability to understand what others are saying and the fear, anger and embarrassment that result.

According to Gaeth (1948), there are elderly individuals who have a more severe speech discriminating ability than what one would expect on the basis of their puretone threshold configuration.

Jerger's data (1973) showed that when the puretone threshold averages for 500 Hz - 2000 Hz are held constant, there is a systematic decrease in the speech discrimination scores as a function of age.

During group discussions or in the presence of noise, elderly people report that they have difficulty understanding.

This is correlated with the audiological findings ie, in the presence of noise, the elderly person's speech discrimination scores deteriorate more than what is seen in the younger person.

It can thus be understood why geriatric aural rehabilitation programmes are a must to improve their standard of living.

An aural rehabilitation programme should include: (i) identification and rehabilitation of the hearing handicapped, (ii) development and initiation of specific intervention procedures appropriate for these elderly citizens (iii) assessment of the impact of this intervention/on their life styles, (iv) investigation of social, economic and psychological problems associated with physically and mentally debilitating forms and degrees of hearing handicap.

A variety of such aural rehabilitation programmes are prevalent in the West (McCartney, Maurer and sorenson, 1974; Colton and O'Neill (1976)? Hull and Traynor (1977)).

There are very few, if any, such programmes in India. It is reported that hearing loss in the geriatric population in India sets in earlier than in the other countries. The life expectancy has also increased. Adding to this are the other

factors like exposure to loud traffic noise, intake of certain hazardous drugs and of course accidents. So it is imperative that something be done to alleviate the difficulties faced by these people.

India being a country of distances, it is difficult for the geriatric client to come all the way for a check-up to assess his hearing acuity. The way out of this situation would be to provide the adult with scales which could evaluate his hearing handicap. He or his family members could fill up the form and mail it to the audiologist. Based on the performance, it could be inferred as to whether he is in need of any rehabilitation (such as a hearing aid) or can manage without help.

Various scales to assess an adult's hearing handicap have been developed, as will be discussed later. These scales have been found useful on the western population, which is so very different from the Indian population in terms of the socio-cultural-economic factors, place and standards of living, facilities available etc. As of now, there is no single scale suitable for the Indian population which evaluates a person's hearing acuity and the problems he faces.

The purpose of this study is to prepare a questionnaire, a self report scale, to assess the effects of hearing loss on an individual's performance in everyday activities. The psychological problems faced by such individuals are also considered.

The questionnaire consists of formalized questions and standardized client responses. The scores can be quantified. The questionnaire also aims at finding out the correlation between the reported handicap and the determined handicap, and to realise its efficacy in determining the communication problems in the elderly.

REVIEW OF LITERATURE

Systematic investigation of hearing handicap has lagged far behind the development of technology for measurement of hearing impairment. While it is now possible to quantify many types of hearing disorders with a high degree of accuracy, the course of these hearing deficiencies in the everyday activities of patients is known largely through anecdotal reports. If so, both the need for therapy and the result of therapy can be assessed only with uncertainty. The need for accurate assessment is great in persons suffering from moderate degree of handicap. The impairment is assumed to bear some relationship to hearing handicap, a reasonable assumption, though the nature of the relationship is not known and thus cannot be specified. Thus, a direct measurement of hearing handicap approximates to a greater extent an ultimate test of hearing servicibility for an individual than does measurements of hearing impairment (High, Fairbanks, Glorig, 1964).

Recent research has focussed on the use of protocols other than standard puretone audlometry to facilitate the identification of hearing loss among older adults (Lichtenstein, Bess and Logan, 1988). A promising approach involves the use of a self-assessment questionnaire.

The traditional hearing evaluation seems inadequate to accurately reflect the client's perception of his difficulties.

The amount of difficulty a client reports is often inconsistent with the amount of difficulty that would be predicted based on the audiogram alone, many factors will determine the impact of the hearing loss on the client's life. Hearing handicap scales offer a method of systematically assessing that handicap (Hawes and Niswander, 1935).

The social adequacy index was an early attempt by Davis (1943) to develop a scale based on the relation between speech reception threshold (SRT) and speech discrimination scores (SDS). Davis (1943) indicated that the scale was not effective because the phonetically balanced recording used had not been sufficiently standardized to measure discrimination as accurately as hearing thresholds levels may be measured. More knowledge was required about the relation between hearing and understanding connected speech. The dependence of this scale on numerical data lacked sufficient emphasis on differences in individual behavioral characteristics.

The Hearing Handicap Scale (HHS), Forms A and B (High Fairbanks and Glorig (1964) is a self-report designed to assess the effects of hearing loss on an individual's performance in everyday living activities. It consists of formalized and standardized questions and client responses.

The standardization enables to quantify the client's response. It may be employed as a screening device to assess hearing ability of aged individuals in cases where audiological evaluation cannot be performed. It can be used as a criterion measure against which audiological tests may be compared which might suggest the need for modification of materials to be employed in assessing the auditory capabilities of aged individuals. The scale offers a quantitative procedure for interpreting the implications of hearing impairment, providing counselling for the patient and periodically re-evaluating the person's hearing efficiency. It provides an additional measure for assessing the benefits of amplification and for systematically reviewing the various activities engaged in during an aural rehabilitation programme (Berkowitz and Hochberg, 1971).

According to High et al (1964) significant correlative co-efficients were obtained between the HHS scores and all measurements of auditory sensitivity of the subject's better ear.

Speaks, Jerger and Trammel 1 (1970) administered the HHS to a group of 60 hard of hearing patients. It was noticed that the correlations with HHS were much higher for sensitivity measures than for discrimination measures i.e. if the HHS is a valid index of the amount of handicap imposed by the presence

of a hearing loss, measures of sensitivity serve as the best predictors of the amount of hearing. Of these, the puretone average of 500, 1KHz, 2KHz seems to be optimal

Berkowitz and Hochberg (1971) report of the self-assessment of hearing handicap using the HHS. They found that the HHS significantly related to the audiologic measures of PTA, SRT and SDS among individuals between 60-69 years, especially the female subjects. It was significantly related to PTA and SRT for individuals between 70-79 years and for male subjects. There was no significant relation to any audiological measure for individuals between 80-87 years.

The HHS may also be used for assessing hearing aid benefit. According to Tannahill (1979), the subjects who demonstrated benefit from hearing aid use based on audiological tests also demonstrated benefit in everyday listening based on a reduction in HHS scores.

Speaks, Jerger and Trammel (1970) however are of the opinion that the HHS does not provide a particularly good validating criterion of actual speech understanding against which to compare the indices of performance using phonetically balanced (PB) list of monosyllabic words and synthetic sentence identification.

Another test procedure, the Hearing Measurement Scale (HMS) (Noble, 1972; Noble and Atherly, 1970) was devised for the assessment of handicap due to industrial noise. Although the scale was planned for use with an industrial population, the authors suggest that it can be used for any group of hearing impaired persons with sensorineural disorders. This has been supported by McCartney et al« (1976). The scale was modified from its original form to include a few other sub-categories. There is an attempt to include all possible areas of difficulty for the individual with hearing loss. The author stress that client reactions to hearing loss should have a definite place in an overall evaluation of each individual problem. Giolas (1970) discussed the need for a hearing handicap profile based on attitudes and problems experienced by the client in his everyday situations to give the audiologist greater insight into the relationships between the client's loss of hearing and psychological changes.

According to Noble and Atherley (1970), the HMS scores correlate well with the hearing sensitivity than with the SRT or SDS.

It was found that correlations between measures of sensitivity and the HMS was statistically significant. The speech discrimination scores showed a somewhat lower

correlation with the HMS scores than did the puretone measures (McCartney, et al. 1976). It is similar to the results reported by studies using the HHS.

Despite these findings, the HMS may not be the best scale to use with the elderly. First, many of the items are not relevant to the lifestyle of older individuals. Second, the questionnaire may be too complicated for the elderly. Third, the scale is lengthy and takes time to administer. It does not adequately assess the emotional or social consequences of hearing impairment (Weinstein and Ventry, 1983) •

The social hearing handicap (SHI) is defined as the decrease of a human beings efficiency in everyday life, due to his hearing impairment. The SHI social hearing handicap inventory reflects the patients hearing handicap in daily life. It consists of 21 questions, with which a patient's bias to answer in an affirmative or negative way is balanced out and scored. A high correlation of 90% was found between the SHI and the degree of hearing handicap as measured in terms of SRT. It has however been proved that other factors such as lip reading capacity, influences the social handicap (Eweresen, and Birk-Nielson (1973).

The Hearing performance Inventory (Giolas, et al 1979) was developed to assess hearing performance in those problem

areas experienced in everyday listening. To achieve the comprehensive nature desired and to yield specific rehabilitative objectives, the inventory items were divided into six sections (i) Understanding speech; (ii) Intensity (iii) Response to auditory failure (iv) Social (v) Personal and (vi) occupational.

This inventory (HPI) helps in determining whether hearing impairment has manifested itself as a communication problem, a detailed analysis of the communication breakdown allowing a more tailored management program to emerge sooner than is now possible; a quantitative measure of performance both for initial assessment and evidence of progress (Giolas, et al. 1979).

The correlation between the scale and the measured handicap was $r=0.67$. The correlation of the HPI with discrimination measures while being relatively high were not significantly higher than the correlation with sensitivity measures. This indicates that the HPI does not appear to be tied to either sensitivity or discrimination aspects of hearing loss but reflects the handicapping effects of each equally well (Hawes and Niswander, 1935).

Although the HPI is much more extensive and explores many more situations other than self assessment scales.

it appears to correlate with audiologic measures to about the same extent as other scales. Also, review of existing literature reveals a consensus that, at best, half of the variance in audiological scores can be explained by these scales, regardless of the specific scale used (Hawes and Niswander, 1985).

The Hearing Handicap Inventory for the Elderly (HHIE) (Ventry and Weinstein, 1983) is a self assessment tool designed to assess the effects of hearing impairment on the emotional and social adjustment of elderly people. The primary purpose of the HHIE is to allow the clinician to obtain an estimate of self perceived handicap and use that estimate, along with other information to make decisions about the audiologic intervention (Weinstein and Ventry, 1983). It was originally developed for use in conjunction with pure-tone audiometry to provide information about the extent of handicap associated with hearing impairment. However, data provided by Lichtenstein et al. (1988) indicated that the inventory has the potential to be used alone as a primary means of identifying probable hearing loss among older adults. This is supported by Sever et al. (1989). They report that this questionnaire is a rapid and inexpensive method which has the potential to identify a large number of hearing

impaired older adults who might otherwise not seek assistance.

The inventory is composed of two sub-scales: a 13 item sub-scale explores the emotional consequences of hearing impairment, and a 12 item sub-scale explores both the social and situational effects (Weinstein and Ventry, 198a).

There is a substantial correlation ($r=0.87$) of the puretone sensitivity with the hearing handicap. This confirms that impairment as measured by the puretone sensitivity is an important component of handicap. The HHIE showed a weaker correlation with SRT than with PTA (Weinstein and Ventry, 1983).

In assessing the effectiveness of any diagnostic test, there is the question of choosing a definite standard for comparison (Feinstein, 1985). While pure tone audiometry is the standard procedure by many to assess hearing, there may be a number of definitions used. Weinstein and Ventry (1983), showed that the MHE performances well when aged persons were considered hearing impaired if they failed to hear a signal of 40 dB HL at (i) 1000 Hz or 2000 Hz in each ear or 1000 Hz or 2000 Hz in one ear.

In a study by Lichtenstein, Bess and Logan (1988), the HHIE LS Screening Version's diagnostic usefulness was evaluated against four

other commonly used definition/of hearing loss. Irrespective of the audiologic definition used, it was found that the HHIE-S is a valid screening test for the hearing impaired elderly.

The test-retest reliability of HHIE is very good. (Weinstein, Spitzer and Ventry, 1986).

Two methods may be used for the administration of the test. They are: the paper-pencil administration and face to face administration. The correlation was high for each of them ($r=0.84$) and ($r=0.96$) respectively). Whenever possible the face to face administration should be preferable, because more correlation is seen. Also this approach is more flexible and has a personal approach.

The HHIE- may be used to assess the benefit of amplification, though it is not a hearing aid inventory. It may be appropriate as a baseline measure against which success or failure of rehabilitative intervention with hearing aid may be judged in older adults (Newman and Weinstein, 1988).

Recently, a new questionnaire. The Hearing Handicap Inventory for Adults (HHIA) has been developed to be used for the people below 65 years of age (Newman et al.1990). It is a 25 item self assessment scale composed of 2 subscales (emotional and social/situational). This has a high

internal consistency, reliability and a low standard error. High correlation is seen between the scale and *the* objective measures of puretone audiometry and speech discrimination scores.

The Denver scale of communication Function (Alpiner et al. 1971) is a 25 item scale designed to help the clinician make a subjective assessment of communication attitudes of adults with acquired hearing loss. The purpose of this tool is to focus attention on improving the client's communication function.

A study conducted by McNeill (1975) revealed an overall scale test-retest reliability of 0.73 and individual question test-retest reliability greater than 0.7. The overall reliability, according to Kaplan, Feely and Brown (1978) was 0.88. In 1980, Schow and Nerbone quantified a 25 item version of the measure and found that increasing handicap assessed by the quantified Denver scale of Communication function (QDS) was correlated with increasing puretone average ($r=0.58$) hearing loss. The QDS has 2 subscales: self isolation and communication. The internal reliability, reliability for the total measure and test-retest reliability were all high (r greater than 0.73).

The QDS and HHIE had a high correlation of 0.75. The accuracy of the NDS for correctly discriminating individuals with hearing loss from those without loss was 73%.

There is a revised QDS which consists of 5 items from the original questionnaire. There is a good reliability of 0.82. It is thus a reliable and valid measure for assessing hearing handicap in elderly individuals. It has both content and statistical validity. It also correlate well with the HHIE-S ($r=0.73$). (Tuley et al. 1990).

However, Brainerd and Frankel (1985) are of the opinion that the relation between audiometric formulae and self report measures of handicap are weak and appear Unlikely to be assessing the same issue. Their data revealed that the handicap calculated through arithmetic formulae and the hearing handicap measures by self reports are different. Many hearing specialists have recommended the addition of a self report inventory to the routine audiological battery if both the physical impairment and the effects on social functioning are to be determined. The authors found that for a general population of working adults who seek audiological services for acquired hearing loss, the better ear puretone average appears to have the best (albeit weak) relation to the

perceived handicap. Their data suggested that for the average adult patient in a hospital audiological clinic, the use of a complex handicap formula is unwarranted.

METHODOLOGY

The present study was undertaken to prepare a questionnaire which would help determine the problems; social; auditory and psychological, faced by an elderly individual. This questionnaire attempts to assess the effects of hearing loss on an individual.

Subjects: Adults who were 50 years and above were chosen for the study. The subjects were chosen randomly from the general population. For the present study, 25 subjects were chosen. There were 15 males and 10 females in the age range of 55 years - 87 years. The mean age was 72.88 years.

Questionnaire used in the study: A questionnaire was prepared in both English and Kannada to help reflect the communication problems of the elderly (Appendix-A), The questionnaire consisted of 16 questions with 3 alternative answers eg, I(a) Do you have difficulty in hearing during the following situations:

- i) While talking with one person when you can see the speaker's face.
- a) Most of the time (b) Sometimes (c) Never,

Scoring: Scores were rated as 0, 1, 2, A score of 0 meant that the person never had any problem, 1 if he had a problem sometimes and 2 if he had a problem most of the time in any of the situations given in the questionnaire.

Procedure: The questionnaire was given to all the subjects. They were asked to fill up the same and return it as soon as possible. Following this all the subjects had to undergo a detailed audiological evaluation.

Audiological evaluation: The audiological evaluations were carried out in sound treated air conditioned rooms. The ambient noise levels were within the specified limits as per the standards. Testing was done in a 2 room situation.

Instruments used: A two channel audiometer (Madsen OB 322) was used to obtain the air-conduction and bone-conduction thresholds and for speech audioraetry. Immittance audiometer (Madsen ZO-174) was used for determining the tympanogram, compliance and reflex measurements. All the instruments were calibrated as per the standards (IS:9098-19 83) .

Based on the above information, diagnosis was made as per ISO R-389-11970 classification.

The findings,the audiological evaluation and the scores obtained using the questionnaire were compared. Results were analysed and tabulated.

RESULTS AND DISCUSSION

The audiological findings and the scores obtained using the questionnaire was compared.

Many investigators (Speaks, Jerger and Trammel, 1970; Noble and Atherley, 1970) have reported a high correlation between the PTA values of the better ear and the reported subjective scores. Schow and Nerbone (1880) administered the quantified Denver scale of communication and found a relatively good correlation between the scale and the pure-tone average ($r=0.58$). Weinstein and Ventry (1985) found a substantial correlation of 0.87 of the pure tone sensitivity with the reported acuity as measured using the Hearing Handicap Inventory for the Elderly. Thus, for the present study, the PTA of the better ear was assumed to reflect the hearing of the individual.

The questionnaire had a total number of 16 questions with 3 alternative answers. eg.

I. Do you have difficulty in hearing during the following situations.

i) While talking with one person when you cannot see the speaker's face.

a) Most of the time (b) sometimes (c) never. The scoring pattern was 2,1, 0 for a, b and c respectively. Thus, the

scores obtained using the questionnaire could range from a minimum of 0 to a maximum of 32.

No .of subjects	PTA (for better ear)	Total scores obtained using the questionnaire
1	11.3	0
2	11.6	2
3	13.3	3
4	13.3	1
5	20.0	3
6	20.0	1
7	38.3	6
3	40.0	5
9	40.0	7
10	43.3	14
11	43.8	7
12	48.3	12
13	53.3	10
14	53.3	13
15	58.8	20
16	60.0	18
17	63.3	13
18	68.3	20
19	73.3	17
20	78.3	17
21	78.3	18
22	85.0	17
23	88.6	25
24	90.0	23
25	98.6	24

Table-1 represents the PTA of the better ear and the scores obtained using the questionnaire. The minimum score obtained was 0 and the maximum score was 23 when administered to 25 elderly people. Pearson¹'s coefficient of correlation

was used to determine the degree of relationship between the objective findings and the subjective evaluations. The correlation was found to be 0.9427. Thus, there exists a substantial correlation between the audiometric findings and the communication difficulty experienced as revealed through this questionnaire.

Using the ISO:R-389-11970 classification, the subjects hearing acuity was divided into the following, based on the pure tone average of the better ear.

PTA between 0- 25 = normal hearing

PTA between 26 - 40 = mild hearing loss.

PTA between 41 - 55 = moderate hearing loss.

PTA between 56 - 70 = moderately severe hearing loss.

PTA between 71 - 90 = severe hearing loss

PTA of 91 and above = profound hearing loss.

Based on this, 6 subjects were found to have normal hearing (PTA = 0-25).

3 had a mild hearing loss (PTA = 26-40).

5 were diagnosed as having a moderate hearing loss (PTA= 41-55)

9 subjects had their hearing sensitivity in the moderately severe/severe group.(PTA = 56-90).

2 had profound hearing loss (PTA = 91 and above).

No.of subjects	PTA of better ear	Arbitrary values assigned for the scores obtained using the questionnaire
1	11.3	0
2	11.6	0
3	13.3	
4	13.3	0
5	20.0	0
6	20.0	0
7	38.3	1
8	40.0	1
9	40.0	1
10	43.3	2
11	43.8	2
12	48.3	2
13	53.3	2
14	53.3	2
15	58.8	3
16	60.0	3
17	63.3	3
18	68.3	3
19	73.3	3
20	78.3	3
21	78.3	3
22	85.0	3
23	88.6	3
24	90.0	4
25	98.6	4

Table-2: Showing the relationship between the PTA of the better ear and the values assigned arbitrarily for the scores of the questionnaire.

Table-2 denotes the relationship between the PTA of the better ear and the arbitrary values assigned to the scores obtained using the questionnaire.

A value of 0 indicates normal hearing (PTA= 0-25 dB).

The arbitrary of 1 indicates mild hearing loss (PTA=26 - 40 dB)

The value of 2 denotes moderate hearing loss (PTA = 41-55 dB)

The value of 3 denotes moderately severe/severe hearing loss (PTA = 36 - 90 dB)

The value of 4 denotes profound hearing loss (PTA greater than 90 dB) .

The relationship between the objective evaluation of hearing sensitivity (using PTA of the better ear) and the arbitrary values (0, 1, 2, 3, 4) of the scores obtained using the questionnaires was determined. The correlation was found to be 0.9684 using Pearson's correlation coefficient.

PTA	Score of questionnaire	Rating of severity
0 - 25	0 - 4	Normal hearing
26 - 40	5 - 9	Mild hearing loss
41 - 55	10 - 15	Moderate hearing loss
56 - 90	16 - 22	Moderate severe/severe hearing loss
91 and above	23 - 32	Profound hearing loss*

Table-3 Denoting the ISO classification of hearing sensitivity, the scores on the questionnaire and severity of hearing impairment.

The above table gives us at a glance the expected hearing sensitivity for a particular score on the questionnaire. A score of 0-4 indicates normal hearing.

A score of 5-9 reflects mild hearing loss,

A score of 10-15 is indicative of moderate degree of hearing loss.

A score of 16-22 reflects moderately severe-severe hearing loss.

A score of 23-32 indicates profound hearing loss.

SUMMARY AND CONCLUSIONS

25 adults in the age group 50 -87 years were chosen for the study. A questionnaire which reflected the amount of hearing sensitivity was prepared, administered and scored, This was compared to the objective audiological evaluation findings. A high correlation of $r = 0.9427$ was found between them. Based on this, the cut off scores in the questionnaire were determined which would reflect the severity of hearing loss. The correlation between the cut off scores and the audiological findings again had a high correlation of 0.9684.

The questionnaire can thus be used as a tool to help in the assessment of the degree of hearing acuity. It is of utmost use in:

- a) those instances where instruments are not easily available.
- b) in old age homes to determine which of the elderly inmates require detailed audiological evaluation.
- c) in rural areas where the adults are far away from the required facilities. Based on the scores of the questionnaire, only those adults in need of help need to be guided for further evaluations.
- d) in camps and hospitals to help screen the individuals and only those having a problem can be referred for further testing. This serves a dual purpose of considerably reducing the work load of the audiologist and also increasing the time devoted to each individual.

e) It can also be used to assess the benefit of aural rehabilitation.

However, using this questionnaire, only the severity of the handicap and severity of the loss may be assessed. This gives us no idea about the kind of hearing loss or whether the loss is unilateral or bilateral. Studies need to be done on a larger population to substantiate the findings of this study and to assess the efficiency of this questionnaire in determining the communication problems in the elderly.

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APPENDIX

Scale of communicative function

Date Case No.
Names Ages sex:
Addresss

Educations

Income/annum

Living alone/with family:

Retired

Occupation prior to retirements

I. Do you have difficulty in hearing during the following situations?

i) While talking with one person when you can see the speaker's face

a) most of the time

b) sometimes

c) never

ii) While talking with one person when you cannot see the speaker's face

a) most of the time

b) sometimes

c) never

iii) **While conversing with a group of people**

- a) most of the time
- b) sometimes
- c) never

iv) While conversing in a noisy environment

- a) most of the time
- b) sometimes
- c) never

II. Do you feel uncomfortable in the following situations?

i) Where you have to speak and understand others

- a) most of the time
- b) sometimes
- c) never

ii) **While communicating in noisy situations**

- a) **most of the time**
- b) sometimes
- c) never

iii) In group conversation

- a) most of the time
- b) sometimes
- c) never

III. When you compare your present life style, to your life style when you did have hearing problem, do you notice the following changes.

- i) You tend to be negative about your life
 - a) most of the time
 - b) sometimes
 - c) never
- ii) You do not socialize much
 - a) most of the time
 - b) sometimes
 - c) never
- iii) You take less interest in what is going on around you
 - a) most of the time
 - b) sometimes
 - c) never
- iv) You hesitate to meet new people
 - a) most of the time
 - b) sometimes
 - c) never
- v) You do not enjoy watching TV/listening to radio
 - a) most of the time
 - b) sometimes
 - c) never

IV. Reaction of family members

- 1)- Do they get annoyed with your hearing loss?
 - a) most of the time
 - b) sometimes
 - c) never

- ii) Do they leave you out of conversation?
 - a) most of the time
 - b) sometimes
 - c) never
- iii) Do they get annoyed when you ask them to repeat what was said?
 - a) most of the time
 - b) sometimes
 - c) never
- iv) Do they make decisions for you because you find it difficult to follow discussions?
 - a) most of the time
 - b) sometimes
 - c) never.

ಕಾರಿಖು

ಸಂಖ್ಯೆ

ಹೆಸರು

ಗಂಡಸು: ಹೆಂಗಸು

ವಿಳಾಸ:

ವಯಸ್ಸು:

ವಿದ್ಯಾಭ್ಯಾಸ

ವಾರ್ಷಿಕ ಆದಾಯ

ನೂಚನೆ: ಸರಿಂದಾದ ಉತ್ತರಕ್ಕೆ (✓) ಗುರುತು ಮಾಡಿ.

I.

1) ಒಬ್ಬರೇ ವಾಸಿಸುತ್ತೀರಾ? ಸಂಸಾರದ ಜೊತೆಗೆ ಇದ್ದೀರಾ?

2) ನಿವೃತ್ತಿ ಆಗಿದೆಯಾ?

3) ಮುಂಜೆ ಯಾವ ಉದ್ಯೋಗ ಮಾಡುತ್ತಿದ್ದೀರಿ?

II. ಕೆಳಗೆ ಕಾಣಿಸಿದ ಸಂದರ್ಭಗಳಲ್ಲಿ ನಿಮಗೆ ಕೇಳಿಸಿಕೊಳ್ಳುವಲ್ಲಿ ತೊಂದರೆ ಆಗುತ್ತದೆಯೇ?

1) ಒಬ್ಬರ ಮುಖ ನೋಡುತ್ತಾ ನೀವು ಮಾತನಾಡುತ್ತಿರುವಾಗ

(ಅ) ಯಾವಾಗಲೂ

(ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ

(ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

2) ಒಬ್ಬರ ಮುಖ ನೋಡದೇ ಅವರ ಜೊತೆ ಮಾತನಾಡುತ್ತಿರುವಾಗ

(ಅ) ಯಾವಾಗಲೂ

(ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ

(ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

3) ನೀವು ಒಂದು ಗುಂಪಿನ ಜೊತೆ ಮಾತನಾಡುತ್ತಿರುವಾಗ,

(ಅ) ಯಾವಾಗಲೂ

(ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ

(ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

4) ನೀವು ತುಂಬಾ ಶಬ್ದ ಇರುವಲ್ಲಿ ಸಂಭಾಷಣೆ ನಡೆಸುತ್ತಿರುವಾಗ

(ಅ) ಯಾವಾಗಲೂ

(ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ

(ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

III. ನಿಮಗೆ ಕೆಳಗಿನ ಸಂದರ್ಭಗಳಲ್ಲಿ ತೊಂದರೆ ಅನಿಸುತ್ತಿದೆಯೇ?

1) ನೀವು ಮಾತನಾಡಿ ಇತರರ ಮಾತನ್ನು ಅರ್ಥ ಮಾಡಿಕೊಳ್ಳದೇ ಕಾದಲ್ಲಿ,

(ಅ) ಯಾವಾಗಲೂ

(ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ

(ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

2) ಶಬ್ದ ಇರುವಲ್ಲಿ ಮಾತುಡುವಾಗ,

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

3) ಗುಂಪಿನ ಜೊತೆ ಸಂಭಾಷಿಸುತ್ತಿರುವಾಗ

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

IV. ನಿಮ್ಮ ಮೊದಲಿನ ಜೀವನ ವಿಧಾನಕ್ಕೂ, ಅಂದರೆ ಕಿವಿ ಬೆನ್ನಾಗಿ ಕೇಳಿಸುತ್ತಿದ್ದಾಗ, ನಂತರದ ಜೀವನ ವಿಧಾನಕ್ಕೂ, ಅಂದರೆ ಕಿವಿ ಕೇಳಿಸದ ನಂತರ ಜೀವನಕ್ಕೂ ಹೋಲಿಸಿದಾಗ ಈ ಕೆಳಗಿನ ವ್ಯತ್ಯಾಸಗಳನ್ನು ಕಾಣಿಸುತ್ತೀರಾ?

1) ನಿಮಗೆ ಜೀವನದ ಮೇಲೆ ಜಿಗುಪ್ಸೆ ಅನಿಸುತ್ತದೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

2) ನೀವು ಇತರರ ಜೊತೆಗೆ ಹೊಂದಿಕೊಳ್ಳಲು ಸುಲಭವಾಗಿ ಸಾಧ್ಯವಾಗುತ್ತದೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

3) ನಿಮ್ಮ ಸುತ್ತಮುತ್ತ ನಡೆಯುವ ಘಟನೆಗಳಿಗೆ ನೀವು ಹೆಚ್ಚಿನ ಗಮನ ಕೊಡುತ್ತೀರಾ, ಅಸಹ್ಯ ಇಲ್ಲ ಎನಿಸುತ್ತದೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

4) ಹೊಸಬರನ್ನು ಭೇಟಿಯಾಗಲು ಹಿಂದೇಟು ಹಾಕುತ್ತೀರಾ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

5) ನಿಮಗೆ ಟಿ.ವಿ. ನೋಡಲು: ರೇಡಿಯೋ ಕೇಳಲು ಇಷ್ಟವಾಗುತ್ತದೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

V. ನಿಮ್ಮ ಕುಟುಂಬದವರ ಅನಿಸಿಕೆಗಳು.

1) ನಿಮಗೆ ಕಿವಿ ಕೇಳಿಸದೆ ಇರುವುದು ಅವರಿಗೆ ಬೇಜಾರು ಉಂಟು ಮಾಡುತ್ತದೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

2) ಅವರ ಸಂಭಾಷಣೆಯಲ್ಲಿ ನಿಮ್ಮನ್ನು ಸೇರಿಸಿ ಕೊಳ್ಳುತ್ತೀರಾ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

3) ನೀವು ಅವರು ಕೇಳಿದುದನ್ನು ಮತ್ತೆ ಹೇಳಲು ಕೇಳಿದರೆ ಅವರಿಗೆ ಕೋಪ ಬರುತ್ತದೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ

4) ನಿಮಗೆ ಸಂಭಾಷಣೆಯನ್ನು ಆರಿಸುವುದಕ್ಕೆ ಕಷ್ಟವೆಂದು ನಿಮ್ಮ ಬದುಕು ಅವರೇ ನಿರ್ಧಾರಕ್ಕೆ ಬರುತ್ತಾರೆಯೇ?

- (ಅ) ಯಾವಾಗಲೂ
- (ಆ) ಯಾವಾಗಲಾದರೊಮ್ಮೆ
- (ಇ) ಯಾವಾಗಲೂ ಇಲ್ಲ