

## A STUDY ON AUDITORY COMPREHENSION SKILLS IN NEUROLOGICALLY & COGNITIVELY HEALTHY INDIVIDUALS BY ADMINISTERING AUDITORY COMPREHENSION TEST IN HINDI

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### ABSTRACT

Auditory comprehension is the process, through which spoken language is heard, interpreted and understood. Damage to specific language areas in the brain result in stroke. Auditory comprehension impairment is characterised with semantic and phonological deficits. Various research studies have reported that elderly individuals are at greater risk of developing degeneration than the younger-adult individuals and have to face challenges in the areas such as social roles and activities of daily living.

**Justification:** The burden of communication disorders is cumulative seeing the aging and deleterious advancing risk of dementia globally. Disability comes with aging (Yorkston and Burgeois, 2010).

**Objective:** To investigate auditory comprehension skills in Neurologically & Cognitively Healthy young, middle aged & elderly individuals by administering Auditory Comprehension Test in Hindi.

**Methodology:** Selection of neurologically & cognitively healthy individuals (NACH) The study included 150 NACH Hindi speaking individuals, between the age range 30 to 80 years.

**Result:** Mean age of each of the sub group shows that the participants are uniformly distributed across each of the sub groups. The auditory comprehension skills decline with increasing age among adults.

**Conclusion:** Study concludes decrease in the total scores of auditory comprehension across five age groups from 30 to 80 years. On observation age group 60-70 years scored better than age group 50-60 years. This may be due to stress factor in the 50-60 years of age.

**KEYWORDS:** Interpreted and Understood, Selection of Neurologically & Cognitively Healthy Individuals

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### Article History

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### INTRODUCTION

Auditory comprehension is the process, through which spoken language is heard, interpreted and understood. Damage to specific language areas in the brain result in stroke. Auditory comprehension impairment is characterised with

semantic and phonological deficits. Comprehensions of spoken words are achieved by integrating the auditory information stored as a semantic representation.

Communication process takes various aspects into consideration for effective communication such as physical, cultural, social aspects, cognitive abilities of speaker and listener. Communication standards, gender, literacy, language proficiency & expectations may influence communication skills.

Typical aging affects the communication skills & brings the universal phenomenon called cognitive aging. Cognitive aging causes decline in various cognitive processes pertinent to communicative abilities which have serious implications on quality of life in elderly. A rich literature available on various cognitive, communication disorders focuses on brain behaviour relationship in aging and neurodegenerative diseases.

Cognitive aging affects attention, memory, executive functions, problem solving, reasoning, organizing, planning, and awareness skills. These deficits impact communication by decreasing the efficiency and effectiveness of comprehension & expression of verbal as well as non verbal abilities.

Various research studies have reported that elderly individuals are at greater risk of developing degeneration than the younger-adult individuals and have to face challenges in the areas such as social roles and activities of daily living. Degenerative changes and based on the pathological aging aspects diagnosing the disease is most complicated, due to continuous process of degeneration occurring in aging causing alterations in the structures of brain and normally occurring physiological changes, alterations, white plaque deposition in the brain accompanying the process of aging causes difficulties in auditory and visual acuity leading to communication problem in many older adults. "By definition, aging is a progressive deterioration of physiological function, an intrinsic age-related process of loss of viability and increase in vulnerability" (Hayflick, 1994).

Auditory comprehension deficits are characterized by poor speech recognition, poor repetition of speech, prophecies, phoneme retrieval deficits as well as semantic access. Individuals with aphasia also have difficulty in memory recalling, poor comprehension of pictures. It was also observed individuals with stroke also had difficulty with access to semantics on auditory verbal tasks. Though it is a known fact that a common complaint of forgetfulness in elderly. E.g., misplacing objects/ placing keys in the fridge or at inappropriate places and notable to re-collecting occasionally, difficulty in learning new things and executing the same", difficulty in recollect the names of things, places or relatives, losing the way in new places etc

It is rare that individuals report or approach physician until the symptoms becomes common and irreparable, due to increased social stigma "that what will people think that he/she has become mentally ill" or "people may think as it is a curse" because of which care givers do not seek any medical help.

### **Justification**

The burden of communication disorders is cumulative seeing the aging and deleterious advancing risk of dementia globally. Disability comes with aging (Yorkston and Burgeois, 2010). Hence, the current study will be of relevance in view of studying auditory comprehension abilities of elderly individuals and individuals with high risk of neurological degenerative disease. It will be of help to address issues related communication changing and advancing Dementia. Auditory comprehension plays a major role in the process of verbal communication. It is an important cognitive aspect of the auditory perceptual skills. There are very few studies carried out to explore auditory comprehension deficits in clinical population with neurological degenerative disease.

## OBJECTIVE

To investigate auditory comprehension skills in Neurologically & Cognitively Healthy young, middle aged & elderly individuals by administering Auditory Comprehension Test in Hindi.

## METHODOLOGY

### Selection of Neurologically & Cognitively Healthy Individuals (NACH)

The study included 150 NACH Hindi speaking individuals, between the age range 30 to 80 years. The participants are assigned into five age groups, each group comprises of 30 participants (15 males + 15 females). Hindi Mental State Examination was administered to neurologically & cognitively healthy individuals to confirm the adequate cognitive function. Neurologically and cognitively healthy individuals were divided into groups based on the scores of Hindi Mental State Examination.

**Table 1: Shows Numbers of Neurologically and Cognitively Healthy Participants in Each Age Group**

| Group Numbers | Age Group   | Male | Female | Total |
|---------------|-------------|------|--------|-------|
| Group I       | 30–40 years | 15   | 15     | 30    |
| Group II      | 40–50 years | 15   | 15     | 30    |
| Group III     | 50–60 years | 15   | 15     | 30    |
| Group IV      | 60–70 years | 15   | 15     | 30    |
| Group V       | 70–80 years | 15   | 15     | 30    |

Prior to the test, consent was taken from each individual/family members; detailed case history including demographic data was taken for each individual. Any medical history, if present, was included in the case history for neurologically and cognitively healthy individuals.

## RESULTS AND DISCUSSIONS

The present study was aimed to adapt Marathi auditory comprehension test (MAC) into an auditory comprehension test in Hindi Language for individual's with neurological degenerative disorders (NDD). A total of 100 sentences consisting of simple to complex commands was presented. The test consists of syntactic sentence structures in increasing complexity with various types of sentence patterns i.e. plurals, conjunctions, adverbial clauses of manner and time, postpositional clauses, negative phrases, anaphora, two stage and three stage commands.

The test was administered to 150 neurologically & cognitively healthy individuals (NACH) in the age range 30-80 years and to the group of 23 individuals with NDD. Details of NACH are mentioned below in table 2.

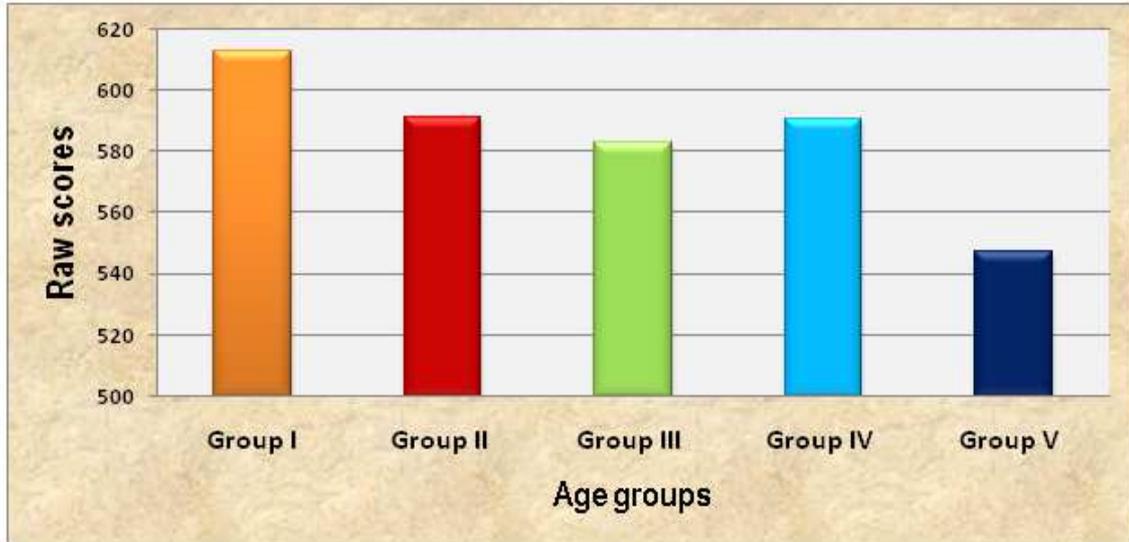
**Table 2: Mean Age Across Age Groups of Neurologically and Cognitively Healthy Individuals**

| Groups (In Years)  | Group I<br>>30- >40 |       | Group II<br>>40- >50 |       | Group III<br>>50- >60 |       | Group IV<br>>60- >70 |       | Group V<br>>70- >80 |       |
|--------------------|---------------------|-------|----------------------|-------|-----------------------|-------|----------------------|-------|---------------------|-------|
|                    | M                   | F     | M                    | F     | M                     | F     | M                    | F     | M                   | F     |
| Gender :           |                     |       |                      |       |                       |       |                      |       |                     |       |
| No of Participants | 15                  | 15    | 15                   | 15    | 15                    | 15    | 15                   | 15    | 15                  | 15    |
| Mean age           | 33.93               | 33.67 | 43.80                | 44.13 | 55.21                 | 55.33 | 65.27                | 64.40 | 74.47               | 74.73 |
|                    | 33.80;              |       | 43.97                |       | 55.30                 |       | 64.33                |       | 74.10 years         |       |

From table 2 the Mean age of each subgroup of NACH is 33.80; 43.97; 55.30; 64.33 and 74.10 years. Mean age of each of the sub group shows that the participants are uniformly distributed across each of the sub groups, thereby minimizing the variations within each of the group.

**Performance of Neurologically and Cognitively Healthy Individuals**

Descriptive statistics for NACH individuals across the age groups on ACT-H is presented below in figure 4.1. The total score of ACT-H test is 695. Performance of both males and females across the age groups is analyzed.



**Figure 1: Descriptive Statistics for NACH Individuals across the Age Groups on ACT-H**

There is a decrease in the total scores of auditory comprehension from group I to group V. On observation group IV (60–70 years) scored better than group III (50-60years). Mean scores of group I is 612.73 (*SD* = 37.55) group II is 591.33 (*SD* = 59.02), group III 582.8 (*SD* = 57.69), group IV is 590.56 (*SD* = 54.07) and group V is 547.43(*SD* = 70.86). This shows that the auditory comprehension skills decline with increasing age among adults. Various studies using Token Test and Auditory Comprehension tests confirmed the effect of age-related decline. **Obler, Fein, Nicholas and Albert (1991)** conducted a study on healthy individuals in the age range 30–79 years by administering comprehension task consisting of six syntactic structures. Findings showed age-related decline in comprehension suggesting subtle breakdown in syntactic processing, which can be a cause of language-specific impairment.

**Albert and Bear (1974)** in their study showed differences in scores of comprehension between younger group and older group, due to reduced temporal retaining of auditory stimuli for longer duration of time in comparison with younger individuals.

**Schaie and Willis (2002)** observed changes in language and communication from 18 to 65 years. More obvious decline was reported for the healthy elderly individuals of 65 years and above in language skills including auditory acuity, discrimination and Considering large difference in the scores of ACT-H across the age groups, test of normality was carried out.

**Table 3**

| Shapiro-Wilk's |           |    |      |
|----------------|-----------|----|------|
| Age Groups     | Statistic | Df | Sig  |
| Group I        | .960      | 30 | .313 |
| Group II       | .923      | 30 | .032 |
| Group III      | .927      | 30 | .040 |
| Group IV       | .865      | 30 | .001 |
| Group V        | .962      | 30 | .356 |

Table 3: shows statistically significant value at the level  $p < 0.05$ , which explains that randomly selected population are homogeneously distributed for age groups II, III, IV, whereas group I and V seem to be non-homogenous.

## **CONCLUSIONS**

There was no significant difference observed in the scores of auditory comprehension of neurologically and cognitively healthy individuals across genders on adapted Auditory Comprehension Test in Hindi. Auditory comprehension skills decline with increasing age among adults. There is a decrease in the total scores of auditory comprehension from age group 30 to 80 years. On observation age group 60-70 years scored better than age group 50-60 years. This may be due to pressure of work load in the 50 -60 years of age.

## **RECOMMENDATIONS**

This is an important area to assess and address the increased incidence of neurological & cognitive morbidity in aging population causing decline in comprehension abilities, which is less investigated in multilingual hub like India with large aging population

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