Available online at http://www.ijims.com
ISSN: 2348 – 0343

Impact of Cognition on Speech Performance in Elderly Population

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Abstract

India is presently witnessing rapid ageing of its population. This study tried to explore the nature and extent of communication problems associated with memory impairment due to ageing, which will further bring a new sight to Speech Language Pathologist to implicate in assessment and intervention towards ageing associated problems. Aim of the study was to study the cognition in relation to ageing process, to study the communication in relation to ageing process and to study the cognition and communication in relation to gender. Subjects were selected in two groups with age range of 35 – 40 years (15 males 15 females) and 30 subjects with age range of 65 years and above (15 males 15 females). Mini Mental Status Examination , Stroop test, Discourse Ability Profile were administered on each subject. Results showed that adults had consistently higher mean scores than the elderly. So it is concluded that the cognitive declination in old age may be due to reduction in processing capacity, understanding text, paying attention. Gender differences were seen for processing speed i.e. better response in Female in both groups.

Keywords:Cognition,Speech performance, Elderly

Introduction

India, like other developing countries in the world, is presently witnessing rapid ageing of its population. The older generation is caught between the decline in the traditional value on the one hand and the absence of an adequate social security system on the other. This study tried to explore the nature and extent of communication problems associated with memory impairment due to ageing, which will further bring a new sight to Speech Language Pathologist to implicate in assessment and intervention towards ageing associated problems.

Rapidly increasing ageing population on a large demographic base in India has negligible provision for supply of their basic health needs, so ageing is an important demographic issue and need to be taken care of.

We know that with increasing age, human physiology changes. Disease symptoms and signs in the elderly differ from what is seen in the middle aged or the young. The distinction between normal and pathological ageing is often unclear. The elderly also often have cognitive problems leading to therapeutic difficulties. Cognitive problem may be used as a diagnostic indicator.

Keeping in view with the recent articles it is evident that older adults tend to perform more poorly when assessed for item memory and tasks that require attention (Castel & Craik, 2003). Speech-recognition, which requires adequate working memory, tends to be poorer in older adults compared to young adults (Gordon-Salant & Fitzgibbons, 1997; Pichora-Fuller, Schneider, & Daneman, 1995). Working memory declines become apparent during aging (Connor, 2001). Executive function, which impacts attention, working memory, and decision making, slows in older adults (Denberg, Tranel & Bechara, 2005).In general, the middle-aged population is often overlooked and understudied; however, changes in cognition begin much earlier than old age. Considering the

paucity of research in the area of "ageing and communication" in Indian context, this study will help to visualise elderly who will be at risk for communication.

Aim of the study

To study the cognition (processing speed) in relation to ageing process i.e. in adults and elderly population.

To study the communication in relation to ageing process i.e. in adults and elderly population.

To study the cognition and communication in relation to gender with in adults and elderly population.

Methodology

Present study is aimed to investigate whether there is any difference in cognition and communication between the adults and elderly population.

Subjects: The subjects for the study were divided into two groups, with 30 subjects in each group. Purposive sampling method was adapted for the subject selection in this current study.

The two groups were as follows:

Group I: Included 30 subjects with the age range of 35 – 40 years with subgroup of 15 males and females in each.

Group II: Included 30 subjects with the age range of 65 years and above with subgroup of 15 males and females in each.

Selection criteria for subjects

The subject selections for both the groups were done based on the following criteria:

1. Individuals with a minimum qualification of 12th grade and above, 2. Individuals using English language as second language of choice, 3.No history of illness such as diabetic neurologic signs/symptoms (systemic diseases), 4. No history or complaint of hearing problem, 5. No long standing usage of medication, 6. No history of any psychological trauma, 7. Obtaining $\geq$ 23 score on MMSE test.

To meet the above subject selection criteria, an open ended questionnaire was administered to all the volunteering subjects.

Tests used:

Mini Mental Status Examination

Mini Mental Status Examination (MMSE), a neuropsychological test developed by Folstein, et al., (1975), consisting of orientation, attention, recall, repetition, comprehension and reading. (appendix II)

STROOP test

A quick test of processing speed and cognitive function consisting of colour-form, colour-number, colour-letter, colour-animal and colour-object naming test. The number of correct response and time taken were noted for each subject. (appendix III)

Discourse Ability Profile

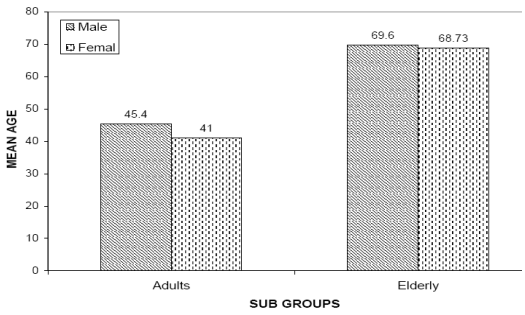
Discourse Ability Profile (DAP), is a sensitive test for assessing communication ability of the individuals. This test constitutes subtests as: Narrative discourse ,Procedural discourse and Spontaneous conversation

Procedure

Before the administration of the test all the subjects were oriented individually about the purpose of the study and procedure. Following the willingness, written consent was sought from all the subjects For the data analysis of processing speed and discourse pattern, the correct responses were marked as "1" and incorrect responses as "0" on score sheet.

Results

Purposive sample selection method was used for subject selection. The volunteering subjects with proficient English language usage at work place were taken for the study. On Descriptive statistics Means and standard deviations were obtained for correct test scores across participant groups. Overall: Adults generally had consistently higher mean scores than did the elderly. The working memory scores obtained on MMSE by all the subjects were computed for comparing working memory for both the group.



Graph 1: Represents the mean age of subgroups of adults and elderly subjects

Table 1: Test of significance of working memory scores on MMSE for adults and elderly population

MMSE Scores	t – value	df	sig (2 tailed)
Adults	3.087	30	.004
Elderly	2.440	30	.021
Group	3.110	60	.003

ANOVAS (Adults v/s elderly) showed Adults had statistically significant higher scores than the other two age groups on subtest of STROOP Processing speed time , F (2, 40) = 7.42, p< .05. Adults also had statistically significant higher scores than elderly on the following trials.

STROOP correct response: subtests, F (2, 40) = 6.25, p< .05; Trial V, F (2, 40) = 3.20, p< .05; and Trial I-IV, Total F (2, 40) = 178.85, p< .05.

Adults performed significantly better than elderly in the DAP Domains of narration, F (2, 40) = 6. 77, p<.01; procedural, F (2, 40) = 6.61, p<.01; and conversation, F (2, 40) = 3.87, p<.04.

Table 2: Significant difference in communication efficacy on Discourse Ability Profile Score test

Subtests of DAP	t value	df	Significance (2 tailed)
Narrative Discourse Scores	- 12.170	48.685	.000
Procedural Discourse Scores	12.729	60	.000
Conversational Discourse	- 4.875	60	.000
Non Linguistic Scores	- 16.940	31.000	.000
Coherence Scores	- 6.991	60	.000

There emerged significant differences with the entire discourse task in both the groups, except in paralinguistic skills. Results showed no significant differences in terms of stress, intonation and rate due to aging. However studies showed, elderly has increased word length with increased response time (source: Huntley: Communication in Later Life, ed. 2002). On the task of narrative discourse, there is a significant difference between the group with t = 12.170 at df = 48.685. On the task of procedural discourse, the significance with t = -

12.729 at df = 62, and on the conversational discourse the significant difference is with t = -4.875 at 31.00 df. All the discourse patterns are tested at the significant level of 0.05.

Discussion

Overall, all age groups performed well on the cognitive tests. As recommended by Marc Agronin (2004), the maximum scores obtainable on MMSE is 30 and scores less than 23 indicate cognitive impairment in the subjects. Although the score of 23-27 indicates borderline impairment, subjects were selected for the study and were administered DAP to study their language ability.Performance on STROOP tasks for elderly may be a result of slower processing speeds for features of visual memory, such as location. Attention and visuo-spatial tasks resulted in lower scores for elderly. It is possible that the combination of attention measured by visual tasks lowered the participant's mean scores. Delayed response on STROOP differences were expected, but did not occur significantly between genders possibly due to shorter time delays in this study than other studies with longer delays. The DAP domain showed a significant difference between both adults and elderly suggesting executive function delay.The researcher also found during the study that, the elderly as compared to their adult group: 1. Spoke more, with giving more information, 2. The content of the narrative tasks were reduced, 3. Elderly spoke in a 'story telling' form, 4. Produced more words in the discourse but loosing the theme., 5. Possessive to talk their personal problems / thought, 6. Incomplete senses with break downs in content form, 7. Used fillers as 'that, this, you know, like' in discourse pattern.

Conclusion

From the above result and discussion it can be concluded that, there is difference between the groups i.e. adults and elderly, and the performance scores of working memory and communication deteriorate due to normal ageing. Thus indicating slight deterioration in performance of communication in elderly which may be due to the interference in working memory. Although some components of language declin all due to cognition, some do not change due to ageing. Gender differences were seen for working memory but not for communication in ageing.However with advanced age, it appears that most convenient process of decline is cognition. Also generalized decline in associative abilities and a specific difficulties found with word order information is evident due to ageing. It Is been concluded that the cognitive declination in old age may be primarily due to the reduction in processing capacity, understanding text, paying attention. Gender differences were seen for processing speed i.e. better response in Female in both groups, but not for communication in ageing.This study has an important implication to view communication impairment in elderly. This may guide Speech and Language Pathologist to differentiate between pathological and non-pathological ageing. As there is an increased demand for the professionals in geriatric management, this will aid to better understanding of communication impairment in elderly.

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