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# Cognitive Impairment among Urban Elderly of Northern Karnataka and Upper Assam

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## ABSTRACT

*A differential research design to know the effects of age, gender and socio-economic status on cognitive impairment among 240 elderly revealed that female elderly of urban Northern Karnataka were in higher percentages in middle stage of impairment. Age of the elderly was highly and significantly associated with cognitive impairment where in young old (60-74 years) performed better than older elderly (75-110 years) in Northern Karnataka and Upper Assam. Elderly of higher socio-economic status of Upper Assam were significantly better than lower socio-economic status. Mini-Mental State Examination developed by Flostein and Flostein (1975) and Aggarwal et al. (2005) socio-economic status scale were used.*

***Keywords:*** *Cognitive impairment, Age, Gender and Socio-economic status urban elderly.*

## INTRODUCTION

Population ageing is widespread across the world. It is a shift in the distribution of a country's population towards older age. The United Nations has not yet proposed a clear benchmark for determining old age, but as a rule of thumb, people aged 60 or over are considered elderly (Kalaria et al., 2008). Today, old age and gerontology have gained much more attention since the improved health conditions and increased life expectancy in the world have resulted in the boosting of the elderly population.

Advancing age is associated with changes in cognitive ability. Cognitive impairment is a major cause of morbidity and dependency among older adults. WHO (2012) has identified cognitive impairment as a public health priority and has developed the global action plan on the public health response to dementia (2017–2025) to reduce its impact on individuals and communities.

Cognitive impairment is one of the most common health problems for elders. It is estimated that the prevalence of cognitive impairment was higher than 40 percent among elders aged 80 years and over, in Western societies (Yaffe, et al., 2011, & Hebert, 1995).

Cognitive impairment includes mild cognitive impairment and various types of dementia, and is associated with an increasing risk of disability and death (Formiga, et al., 2013). Due to an unprecedented increase in life expectancy, the global prevalence of cognitive impairment is expected to grow exponentially in the coming years. Cognitive impairment not only causes a significant decline in the quality of life for elderly, but also is a substantial economic burden for patients' families and society in general.

With increase in age there is a tendency of decline in some cognitive abilities. Numerous changes occur in the brain structure with age. These include: loss of neurons, reduction in the size of the brain, enlargement of ventricles and accumulation of lipofuscin and plaque, including amyloid. There is also reduced transmission of efficiency, probably due to the smaller number of cells. These structural and functional changes have no real significance since the normal older brain is still quite capable of learning and remembering. Because of the strong influence of biology, heredity and health on cognitive mechanics, their decline with aging is likely. Some researchers have concluded that the decline in cognitive mechanics may begin as soon as early midlife (Li et al., 2004). Cognitive pragmatics are the culture-based "software programs" of the mind. Cognitive pragmatics include reading and writing skills, language comprehension, educational qualification, professional skills and also the type of knowledge about the self and life skills that help us to master or cope with life. Older adults decline in their fluid mechanics, processing speed, working memory capacity and suppressing irrelevant information (inhibition) (Lovden & Lindenberger, 2007). Some, but not all, aspects of memory, decline in older adults (Smith, 2007). The decline occurs primarily in episodic and working memory, not in semantic memory or implicit memory. However, in some individuals, these age-related changes are excessive with significant functional impairment, which is termed as cognitive impairment.

Cognitive impairment is one of the most sensitive symptoms which are likely to reveal changes of the disability of the individual to use essential equipment in everyday activities. Among these activities, changes in one's capability to manage financial affairs and control his/her medication are the first to emerge. Gradually, as the elderly approaches moderate cognitive impairment, disability affects simple everyday activities so much that the individual becomes entirely dependent. As people grow older, their quality of life increasingly becomes dependent on the ability to maintain their autonomy. While life expectancy is an important indicator of population aging, the question of how long people can expect a life without disabilities has remained a special concern for the future elderly community. The increase in age causes physical and cognitive deficits in the elderly and threatens their health. The elderly population will continue to grow at a faster pace and India will encounter an unprecedented geriatric population. So, the study aimed to know the incidence of cognitive impairment and investigate the relationship between age, gender and socio-economic status among elderly residing in Northern Karnataka and Upper Assam.

## MATERIALS AND METHODS

A differential research design was employed to understand the influence of age, gender and socio-economic status on cognitive impairment among 240 elderly residing in urban areas of Dharwad and Gadag taluk of Northern Karnataka and Dibrugarh and Sibsagar taluk of Upper Assam, among young old (60-74 years) and older elderly (75-110 years). From Northern Karnataka and Upper Assam, two districts each were selected. From each selected district two taluks each were randomly selected. From each selected taluk, two localities of the city were selected. From each locality, a sample of 30 elderly was selected through door to door survey. From northern Karnataka, 100 elderly were in Young old category and only 20 were in older category, whereas in upper Assam, 87 were in

Young old category and 33 were older. Elderly who were diseased and bed ridden were excluded from the study. Elderly of older age group were few in number as they were not willing to participate. Face to face interviews were conducted using the questionnaires for only those elderly who happily consented to participate.

**Tools and measures:**

The Mini- Mental State Examination (MMSE) scale developed by Folstein and Flostein (1975) with a set of 30 questions to check cognitive impairment among elderly was used which is a self administered tool. Several mental abilities, such as: Short- and long-term memory, Attention span and Concentration, Language and communication skills, ability to plan and ability to understand instructions were assessed. The test consists of a series of tasks such as: memorizing a short list of objects and then repeating the list back, writing a short sentence that is grammatically correct, such as "The dog sat on the floor", correctly identifying the current day of the week, followed by the date, the month, the season and the year. The maximum score that could be obtained was 30 and categorized as normal with 24-30, mild cognitive impairment/mild Alzheimer's disease with 20-23, middle stage/moderate Alzheimer's disease with 10-19, late stage/severe Alzheimer's disease with less than 9 score. Reliability tested through split half Spearman Brown coefficient was 0.97 which was highly reliable.

The socio-economic status scale of Aggarwal et al. (2005) consists of 22 statements which assess education, occupation, monthly per capita income from all sources, family possessions, Number of children, Number of earning members in family, education of children, domestic servants in home, possession of agricultural land and non-agricultural land along with animals and social status of the family with the scores ranging from ≤46 to 76 and categorized as low with ≤46, medium with 47-61 and high with 62-76. The information was collected through a questionnaire.

## RESULTS AND DISCUSSION

The cognitive impairments of elderly is compared by gender, age and socio-economic status and presented in tables 1a to 3b.

Comparison by Age: The elderly in young old category were in large proportion (100) while older group were only 20. Among older group, 18 were old old and 2 were oldest old, one being 110 years.

Table 1a, shows that among elderly of Northern Karnataka, 63 per cent of young old were in normal range of cognitive abilities while 23 per cent had mild cognitive impairment and 14 per cent were in middle-stage. 55 per cent were in middle-stage while only 25 per cent were with normal cognitive abilities and 20 per cent experienced mild cognitive impairment. Highly significant association was observed, where in as age increased the cognitive decline also increased.

In case of Upper Assam elderly, 94.3 per cent were with normal cognitive abilities, while only 2.3 per cent were with mild and 3.4 per cent with middle stage of cognitive impairment. Among older group similar percentages were noticed in all the three categories of cognitive ability. The association was highly significant.

**Table 1a: Association between age and cognitive impairments in elderly of urban Northern Karnataka (N=240)**

| Region | Age | Cognitive impairment | | | Total | Modified $\chi^2$ |
|---|---|---|---|---|---|---|
| | | Middle-Stage | Mild Cognitive Impairment | Normal | | |
| Northern Karnataka | Young old (60-74) | 14 (14.0) | 23 (23.0) | 63 (63.0) | 100 (100) | 17.76** |
| | Older elderly (≥75) | 11 (55.0) | 4 (20.0) | 5 (25.0) | 20 (100) | |
| Upper Assam | Young old (60-74) | 3 (3.4) | 2 (2.3) | 82 (94.3) | 87 (100) | 54.87** |
| | Older elderly (≥75) | 11 (33.3) | 12 (36.4) | 10 (30.3) | 33 (100) | |

Figures in parentheses indicate percentages, ** Significant at 1 per cent level of probability

**Table 1b: Comparison between age and cognitive impairments in elderly of urban Northern Karnataka (N=240)**

| Region | Age | Mean ± SD | F test |
|---|---|---|---|
| Northern Karnataka | Young old (60-74) | 23.99 ± 4.16 | 20.51** |
| | Older elderly (≥75) | 19.05 ± 5.72 | |
| Upper Assam | Young old (60-74) | 28.70 ± 2.46 | 75.37*** |
| | Older elderly (≥75) | 22.87 ± 4.84 | |

**Significant at 1 per cent level of probability, *** Significant at 0.001 per cent of probability

The comparison of mean scores (Table 1b) showed highly significant difference between young old and older group where in young old scored significantly higher in cognitive abilities in both the regions with a difference of nearly 4-6 scores. This is clear evidence of decline in elderly of age 75 and above. The changes due to difficulties in memory, attention and reasoning may decrease in people over 75 years old. Lipnicki et al. (2013) also reported older age predicted greater declines in attention/processing speed, memory and global cognition as well as the development of mild cognitive impairment or dementia.

Comparison by Gender: It is clear from the table 2a, among male elderly of Northern Karnataka, 69.8 per cent reported normal cognitive abilities, 17 per cent had middle-stage and 13 per cent with mild cognitive impairment, while, female elderly only 46.3 per cent were with normal cognitive abilities and 29.9 per cent were in mild and 23.9 per cent in middle-stage of cognitive impairment. The association was observed to be statistically significant.

Elderly of Upper Assam, 80.7 per cent of male and 73 per cent of female were in normal range, followed by mild cognitive impairment (10-12%) and middle-stage (8-12%). The association between gender and cognitive impairment was non-significant.

**Table 2a: Association between gender and cognitive impairment in elderly of urban Northern Karnataka (N=240)**

| Region | Gender | Cognitive impairment | | | Total | Modified $\chi^2$ |
|---|---|---|---|---|---|---|
| | | Middle-stage | Mild Cognitive Impairment | Normal | | |
| Northern Karnataka | Male | 9 (17.0) | 7 (13.2) | 37 (69.8) | 53 (100) | 7.21* |
| | Female | 16 (23.9) | 20 (29.9) | 31 (46.3) | 67 (100) | |
| Upper Assam | Male | 5 (8.8) | 6 (10.5) | 46 (80.7) | 57 (100) | 1.13[NS] |
| | Female | 9 (14.3) | 8 (12.7) | 46 (73.0) | 63 (100) | |

Figures in parentheses indicate percentages, NS=Non-significant, *Significant at 5 per cent level of probability

The differences between the gender were very less with 1 or 2 scores where in female elderly had lesser scores which was similar in both the regions (Table 2b). The findings are in line with Carayanni et al. (2012) who observed that women had more cognitive disability than men. They reported that unfavorable economic situations and being childless were associated with prevalence of cognitive disability among women only. However, Scott and Collins (2010) revealed that men with emotional disorders experienced disproportionately greater role, social and cognitive disability than women with these disorders.

   

**Table 2b: Comparison between gender and cognitive impairments in elderly of urban Northern Karnataka**

**(N=240)**

| Region | Gender | Mean ± SD | F test |
|---|---|---|---|
| Northern Karnataka | Male | 24.06 ± 5.39 | 3.32[NS] |
| | Female | 22.46 ± 4.18 | |
| Upper Assam | Male | 27.61 ± 3.96 | 1.65[NS] |
| | Female | 26.63 ± 4.34 | |

NS=Non-significant

**Comparison by Socio-Economic Status:** From both the regions, elderly's education status ranged between professional qualification to primary school where in 37.92 percent were graduated and above , while 56.25 percent were less than graduation ranging from secondary schooling to primary school and only five percent were illiterate. Only four elderly of Northern Karnataka were from low socio-economic status, the rest belonged to middle and high socio- economic status.

A higher per cent (55.6%) of elderly from middle socio-economic status were in normal cognitive abilities and almost equal distribution in mild and middle-stage cognitive impairment. In high socio-economic status, still higher (60.4%) were in normal cognitive abilities and rest was in equal proportion in mild (20.8%) and middle-stage (18.9%) of cognitive impairment. Among the four who were from low socio-economic status two of them had mild and one each had middle-stage and normal cognitive abilities. However, the association between socio-economic status and cognitive impairments was non-significant.

**Table 3a: Association between socio-economic status and cognitive impairments of urban Northern Karnataka elderly**

**(N=240)**

| Region | SES | Cognitive impairments | | | Total | $\chi^2$ |
|---|---|---|---|---|---|---|
| | | Middle-Stage | Mild Cognitive Impairment | Normal | | |
| Northern Karnataka | Middle SES | 14 (22.2) | 14 (22.2) | 35 (55.6) | 63 (100) | 2.46[NS] |
| | High SES | 10 (18.9) | 11 (20.8) | 32 (60.4) | 53 (100) | |
| Upper Assam | Middle SES | 6 (11.5) | 1 (1.9) | 45 (86.5) | 52 (100) | 8.63* |
| | High SES | 8 (11.8) | 13 (19.1) | 47 (69.1) | 68 (100) | |

Figures in parentheses indicate percentages, NS=Non-significant, *Significant at 5 per cent level of probability

Elderly of Upper Assam from middle socio-economic status had normal cognitive abilities (86.5%) and very few were in middle and mild stage of cognitive impairment. Higher percentage (69.1%) of elderly with high socio-economic status had normal cognitive abilities, while 19.1 per cent were in mild and 11.8 per cent had middle stage cognitive impairment. The association between cognitive impairment and socio-economic status was statistically significant.

However, the difference between socio-economic status and cognitive impairments among elderly of both the regions was not significant (Table 3b). The findings are in line with Honjo et al. (2006) who explained that higher income and higher educational attainment was statistically

significantly correlated with cognitive abilities among older adults. Kong et al. (2019) also found that SES showed a positive effect on cognitive abilities for both male and female elderly people, and a slightly stronger effect was found among the male elderly.

**Table 3b: Comparison between socio-economic status and cognitive impairments in elderly of urban Northern Karnataka**

**(N=240)**

| Region | SES | Mean ± SD | t-test |
|---|---|---|---|
| **Northern Karnataka** | Middle SES | 22.88 ± 4.93 | 0.54[NS] |
| | High SES | 23.53 ± 4.67 | |
| **Upper Assam** | Middle SES | 27.71 ± 3.97 | 1.97[NS] |
| | High SES | 26.63 ± 4.30 | |

NS=Non-significant

## CONCLUSION

Cognitive impairment seems to appear among older adults (75 years and above) and among those with low socio-economic status. Female elderly are in significantly higher percentages in mild impairment than male elderly. The findings of this study have implications for societies that are aging. When planning geriatric health care for elderly, priority must be given to older adults (75 years and above), female elderly and illiterate elderly, as they are more vulnerable to impaired cognitive function. Establishing an early diagnosis for cognitive impairment enables elderly and their family members to provide care in an appropriate way.

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