SHORT RESEARCH ARTICLE

A Study on The Assessment of Cognitive Impairment Among Elderly Patients Visiting Rural Health and Training Centre

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ABSTRACT

Background: According to the United Nations, about one in five Indians will be 60 years or older by year 2050. Following this demographic shift, an increase in the proportion of cognitive disorders is expected. This study aims to identify those who have cognitive impairment among the rural elderly and study the factors associated.

Methodology: The cross-sectional study was done on patients attending rural health and training centre of a tertiary care medical college and hospital in Chennai. One hundred seventy-eight participants above 60 years of age were screened with the Mini-Cog™ tool. Those who scored less than 4 on the Mini-Cog scale were referred for cognitive evaluation by a clinical psychologist.

Results: The overall prevalence of individuals positive for cognitive impairment was 41.6%. On bivariate analysis, individuals older than 65 years of age, those who were leading a retired life, not living with spouse, current alcoholics and smokers were associated with impaired cognition. Multivariate logistic regression analysis revealed participants who were retired and not living with spouse were independently associated with cognitive impairment.

Conclusion: A high proportion of participants screened positive for cognitive impairment. Integrating cognitive health with primary care can help in giving attention and support for the ageing population.

Keywords: Elderly, cognition, ageing, dementia

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INTRODUCTION

The United Nations Decade of Healthy Ageing 2021–2030 is a new action plan on ageing and health which currently focuses on older people and emphasizes maximizing people's intrinsic capacity and functional ability while they age.[1] Ageing is an inevitable phenomenon. A renowned sociologist once said that we may not be able to reverse ageing, but we can certainly take steps to safeguard, enhance and prolong it. Ageing of population is associated with a rise in number of individuals stated as 'old', generally at 60 years and above.[2]

World Population Prospects 2019 predicts that by 2050, one in six persons worldwide would be over 65 years, up from one in eleven in 2019.[3] India is also expected to mirror a similar picture. United Nations Population Fund India Ageing Report 2023 predicts that the population above 60 years of age will increase from 10.5% in 2022 to 20.8% by 2050.[4] As the world's population is living longer, it is time that we add life to years rather than years to life.[5]

Demographic transition occurs as a result of increase in life expectancy of people and decrease in fertility levels. This transition is happening at a faster pace in many countries, especially in developing countries like India. It is expected that this shift will lead to a profound increase in the occurrence of cognitive disorders.[6] This could affect the quality of life of elderly, necessitating a response through public health measures to address the challenge.[7]

Cognitive impairment is a stage in-between normal ageing and dementia.[8] Those affected tend to have trouble paying attention, find it harder to solve problems of daily life and have difficulty remembering things. It may range from mild to severe form.[9] In individuals experiencing mild cognitive impairment, there is a noticeable decline in cognitive functions but these individuals can still carry out their daily activities independently. On the other hand, severe cases of cognitive impairment may manifest as an inability to comprehend and difficulties in both verbal communication and written expression. Published research in India indicates prevalence rates falling in the range of 15% to 33%.[10–12] The prevalence of cognitive impairment is high among elderly people living in rural areas compared to elderly people living in urban counterpart[13] ; but studies to back this evidence in the state of Tamil Nadu are scarce.

With this background the present study was conducted with the objective to proactively identify those who are likely to have clinically significant cognitive decline among the rural elderly and study the factors linked to cognitive decline.

METHODOLOGY

This is a cross-sectional study of analytical nature and was conducted over a period of 3 months (September to November) in the year 2022.The study was done on patients at the out-patient department of Rural Health and Training Centre of a tertiary care teaching hospital in Chennai. Individuals who were 60 years and above were selected randomly and those over the age of 60 years with visual, hearing or speech impairment along with illiterates were excluded from the study as clock drawing required a basic level of education.

Sample Size: Based on review of literature, with prevalence of cognitive impairment of 35% from the study done by Rajesh J., Ramasubramanian R., Santhanam R. S[14] at 7% absolute precision, sample size was calculated as follows;

$$Sample\ Size\ (n) = \frac{Z_{(1-\alpha/2)^2} pq}{d^2}$$

Where, $Z_{1-\alpha/2}$= Z-score linked to 95% confidence level; p=Prevalence; q=100-Prevalence; d=Limit of precision

Hence,178 participants above 60 years of age were selected for the study.

Data Collection Method: Data was collected by personal interview of study subjects using a semi-structured questionnaire consisting of two sections. Section A included socio-demographic details like sex, age, marital status, occupation, co-morbidities and personal history of participants. Section B contained questions on cognitive assessment which was done with the validated Mini-Cog™ tool which contains a short memory test with a recall element.[15] The participant would then be subjected to the simple clock drawing test. Following this, the participant was asked to recall the words that were asked to be remembered. One point was given for each word recalled correctly without prompt. Two points for a normal clock and zero point was allotted for a clock drawn abnormally. The psychometric properties of the tool have been studied in an Asian setting and the sensitivity and specificity are 85.71% and 79.41% respectively.[16] As the developer of the screening tool recommended to use a higher cut point in order to achieve a greater sensitivity as supposed to the usual cut point of less than 3 on the scale,[17] those who scored less than the cut-off of 4 on the Mini-Cog™ scale out of a total score of 5 were considered to be impaired cognitively and referred for further evaluation by a clinical psychologist.

Ethical considerations: Study was initiated after the Institutional Ethics Committee of Sri Ramachandra Institute of Higher Education and Research had given approval for our study (Ref: CSP-MED/22/AUG/79/131, Dated:3/9/22). Informed written consent was acquired from the study participants and confidentiality of information collected was ensured.

Statistics: Data entry was done using Microsoft Excel. Basic descriptive statistical analysis was performed with 'Statistical Package for Social Scienc-

es'(SPSS) software v16.0.1. Chi-square test was employed to find the association of cognitive impairment with select variables. Statistical significance was established with p value below 0.05. Multivariate logistic regression analysis was done in order to examine the relationship between independent variables and the outcome variable.

RESULTS

The mean age of study participants screened was 67 years with standard deviation 5.4 years. Median age of participants was 65 years. Basic details of study participants have been presented in Table 1.

Mean score on the Mini-CogTM scale was 3.534, with 95% confidence interval ranging between 3.36 – 3.71. We observed that 41.6% of study participants got a score of less than 4 on the Mini-CogTM scale and hence referred for further cognitive evaluation. On stratified analysis, females older than 65 years of age were positively associated with impaired cognition (OR = 4.819, 95% CI = 1.5-15, p value = 0.005). Table 2 depict the interplay between certain socio-demographic factors with cognitive impairment.

Table 1: Baseline characteristics of participants

Variables	Participant(%)
Age	
>65 years	111(62.35)
<65 years	67(37.65)
Sex	
Male	107(60.11)
Female	71 (39.89)
Employment status	111(62.35)
Retired	67(37.65)
Employed	
Marital status	
Not living with spouse	49(27.52)
Living with spouse	129(72.48)
Personal history	60(33.70)
Alcoholic AND/OR smoker[a]	118(66.29)
Not a known alcoholic AND smoker[b]	
Comorbidities	
Diabetes Mellitus only	53(29.77)
Diabetes Mellitus & Hypertension	42(23.59)
Hypertension only	37(20.78)
Copd/bronchial asthma	3(1.68)
No comorbidities	43(24.15)

Figures in parenthesis denote percentages
[a]Current alcoholic AND/OR Current smoker;
[b]Not a known alcoholic AND not a known smoker

Table 2: Distribution of certain socio- demographic factors associated with cognitive impairment

Variable	Cognition		OR (95%CI)	P value	aOR (95%CI)	P value
	Impaired (%)	Normal (%)				
Age						
>65 years	54(48.6)	57(51.4)	2.22 (1.17-4.2)	**0.014***	0.628 (0.307 - 1.283)	0.202
<65 years	20(29.9)	47(70.1)	Ref			
Sex						
Male	47 (43.9)	60(56.1)	1.27 (0.69-2.3)	0.434	0.489 (0.213 - 1.123)	0.092
Female	27(38)	44(62)	Ref			
Employment status						
Retired	58 (52.3)	53(47.7)	3.4 (1.77-6.84)	**0.001***	3.17 (1.46 - 6.882)	**0.004***
Employed	16 (23.9)	51 (76.1)	Ref			
Marital status						
Not living with spouse	29(59.2)	20(40.8)	2.7 (1.37-5.31)	**0.003***	2.352 (1.051 - 5.267)	**0.038***
Living with spouse	45(34.9)	84(65.1)	Ref			
Personal history						
Alcoholic AND/OR smoker[a]	38(63.3)	22(36.6)	3.9 (2.04-7.57)	**0.001***	1.16 (0.486 - 2.77)	0.738
Not alcoholic AND smoker[b]	36(30.5)	82(69.4)	Ref			
Comorbidities						
DM only	19(35.8)	34(64.2)	0.85 (0.37-1.96)	0.71	0.72 (0.294 - 1.76)	0.471
DM and HTN	19(45.2)	23(54.8)	1.26 (0.53-2.99)	0.59	1.692 (0.648 - 4.416)	0.282
HTN only	19(51.4)	18(48.6)	1.61 (0.66-3.92)	0.28	1.082 (0.414 - 2.824)	0.873
COPD/Bronchial Asthma	0	3(100)	-	0.17	1.065 (0.066 - 17.126)	0.965
No comorbidities	17(39.5)	26(60.5)	Ref			

Figures in parenthesis denote row percentages; DM – Diabetes Mellitus; HTN – Hypertension
OR – Unadjusted Odd's Ratio, aOR – Adjusted Odds Ratio, CI – Confidence Interval
*Statistical significance is established by a p value of less than 0.05
[a]Current alcoholic AND/OR Current smoker; [b]Not a known alcoholic AND not a known smoker

Binary logistic regression of factors associated with cognitive impairment showed that participants who were retired (AOR = 3.170, 95% CI =1.460-6.882, p value = 0.004) and not living with spouse (AOR = 2.352, 95% CI = 1.051-5.267, p value = 0.038) were independently associated with cognitive impairment. This has been illustrated in Table 3.

DISCUSSION

In our study, we enrolled 178 elderly participants to identify those who are at risk of clinically significant cognitive impairment. Our study revealed that 41.6% of the participants were likely to be cognitive impaired using the tool. The result can be compared to reported prevalence of cognitive impairment of

about 35.06% in a population-based study done by Rajesh J., Ramasubramanian R., Santhanam R. S.[14] in an urban field practice area of a medical college in Chennai as opposed to our study which was done in a rural setting. This could be due to factors such as poverty, lower levels of education, limited opportunities for social interaction in rural communities.

In our study, 43.9% of males and 38% of females scored less than the cut off, but we could not any find statistical significance between them. In contrast, a study done by Ren et al[18] showed that women were significantly associated with increased chances of being impaired cognitively when compared to men.

Being engaged in some kind of work has a big impact on how our brains can stay sharp. For those dealing with chronic illnesses or health issues that force them to reduce or stop working, not being engaged in work can affect their thinking abilities. Based on our study findings on regression analysis, we found that that those participants who were not engaged in formal work and were retired had 3.17 times the odds of developing cognitive impairment when compared to those who were employed (95% CI= 1.460-6.882, p value= 0.004).

The study conducted by Ren et al[18] study revealed that people who led a solitary life were significantly associated with increased risk of cognitive impairment, compared to those who have family support. A study led by Liu H[19] indicated that being divorced or losing a spouse at an older age could increase the chances of experiencing memory and thinking difficulties, leading to cognitive impairment in both men and women. Similarly in our study we observed that among 27.52% of the total participants were leading a solitary life without spouse and their association with impaired cognition showed statistically significance (OR=2.70, 95% CI=1.37-5.31, p value =0.003,).

Previous studies suggested that habits like smoking and alcohol use were linked to memory and thinking issues. Our study found that being an alcoholic and smoker was associated with presence of cognitive impairment (p value = 0.001) but the same showed no association with cognitive impairment on controlling the confounders.

Xue et al[20] found that having diabetes increased the chances of having problems with memory and thinking. People with diabetes were almost twice as likely to go from having mild memory issues to developing more serious problems like dementia. Ebady SA, Arami MA, Shafigh MH [21] also noticed that being diabetic was linked to a higher chance of having trouble with thinking, especially if the diabetes had been around for a long time and was not well controlled. Our study could not find an association between Diabetes Mellitus and cognitive impairment probably due to a small sample size.

The influence of education on cognitive health in later-life cannot be understated. Our study had excluded illiterates as the impact of education in the assessment of cognition through tools like clock drawing, is a topic of debate and there is difference of opinion among researchers regarding this.[22]

Multiple factors found to be associated with cognitive impairment. Although some of the factors such as age are non-modifiable and may not have much practical significance, the knowledge of such factors which frequently occur together with impaired cognition would be helpful in planning interventions such as cognitive stimulation, cognitive training and cognitive rehabilitation for at-risk individuals along with behavioural change communication for modifiable risk factors. Interventions cannot change non-modifiable risk factors; however, they are relevant in effectiveness of interventions because they can modify their effect. The attitudes of healthcare providers towards non-modifiable risk factors may change over time as they encounter new evidence, especially considering the increasing elderly population.

Limitations

The prevalence of cognitive impairment through our study has been obtained from a basic screening tool for use in primary care settings. A definitive diagnosis of cognitive impairment requires further evaluation. Our primary objective was to estimate the prevalence of cognitive impairment, hence only a handful of factors which could be possibly associated with cognitive impairment were chosen as a secondary objective. Also, sample size of our study was small. These could be few limitations of the study. Efforts should be made at primary level to enhance awareness about cognitive issues, its consequences and preventive measures.

Conclusion

The prevalence of cognitive impairment in our study was 41.6%. As we had found that living alone was associated with cognitive impairment, it is essential to assess the need for social care and support to senior citizens as they are mostly left in the lurch beyond a certain age such as being confined to old age homes. Family members and caregivers need to constantly engage with older people by promoting communication and stimulate their thinking to keep their autonomy and independence intact.

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