

## The Inter-Dependence Between Cognitive Impairment And Functional Mobility With Risk Of Fall In Older Individuals.

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### ABSTRACT:

**Background:** Ageing is the natural developmental process where there are deterioration and loss of function over time. This study shows the comparison between cognition impairment and functional mobility with the risk of fall in healthy older individual and results shows that there is a connection between cognitive impairment and increasing age, but it has nothing to do with the risk of fall and cognitive impairment. **Objective:** The study aims to assess the cognitive impairment, functional mobility, and risk of fall in a correlation of cognitive impairment and functional mobility. **Method:** In this study, 50 subjects were selected according to the inclusion criteria at Jalgaon city. The study duration was six months, and it was done based on the Geriatric Depression Scale, Montreal Cognitive Assessment, Peninsula Health and Fall Risk Assessment Tool, Timed Up and Go test. **Result:** According to the study, if the TUG test's time is more than the chances of falls are more. The scoring of MoCA and FRAT are interrelated such as, if the score of MoCA is less than expected, then chances of falls are higher compared to an average score. There is a significant negative correlation of MoCA and FRAT as the p-value is  $p=0.02$ , and positive correlation of FRAT and TUG as the p-value is  $p=0.003$ , which is significant.

**Conclusion:** Study has concluded that, as the age increases, there is an impact on cognitive ability which affects the functional mobility and increases the chances of fall in the elderly.

**Key words:** Ageing, time up and go test, geriatric ,cognitive impairment.

### INTRODUCTION

Ageing is the sequel of changes which take place in every human body as the time progress.<sup>(1)</sup> The series of changes we can see in time being encompasses physiological, psychological, psychosocial changes.<sup>(2)</sup> Ageing occurs according to Biological and Non- Biological theories which affect the optimal brain function and cognitive ability. Cognition is the function of brain related structure the action performed by it is bases on o knowledge and information it get feeded."<sup>(3)</sup> There are the different

theories given by different authors it is divided into Biological and Non Biological theories which affect optimal brain function and cognitive ability.<sup>(4)</sup>

Age stratification:

Young old	65-74
Middle Old	74-84
Old Old	85+

Falls this word is common to here with geriatric people as now and the some person come to clinics with fall related problems. when we see ageing process there can be number of reason for increased number of fall in geriatrics.<sup>5</sup> post retire life for person who work for 9 to 5 regularly suddenly he shift to no job status this transition in work surrounding is difficult for every individual to Handel with their interaction to social world get disturb.<sup>5</sup> Globally India stands second largest country in an account of the population that comprises 17% of the entire world's population, and it has been predicted that the number will soon cross the population of China in 2080.<sup>(6)</sup> At present, the growth rate of healthy elderly is three times higher than the other population groups. Imperious probabilities in increasing share of elderly individuals in India are-

1. Use of contraceptives leads to decreased fertility rates.
2. The age of marriage.
3. Decreased infant mortality rate.
4. Increasing long lives because of advanced medicine, nutrition, sanitation and public health.

The characteristic symptoms of ageing are as follows:

1. Cognitive Decline
2. Demyelination of nerves
3. Degenerative changes in brain
4. Age-related diseases: CVS, RS.
5. Vision and hearing impairment.

Cognition deficit person struggle for judgment and evaluation, reasoning, problem solving decision making, comprehension and performing functional activity.<sup>7</sup> fall cases are common in geriatric population Falls occur due to decreased muscular strength, cerebella atrophy, degenerative changes in the brain, balance impairment, psychoactive drugs, neuromuscular coordination, and flexibility, leading to poor physical performance some other environmental causes are uneven and slippery surfaces, dimmed light during the night. <sup>(8,9)</sup>

### **NEED FOR STUDY**

Falls are the leading cause of both fatal and other injuries for the elderly. The prevalence of fall was 8.6% in 2011, and according to the studies it is expected that the percentage will increase to double in the coming years. Complications of fall are fractures out of which hip and IT fractures are commonly followed by avascular necrosis, head and internal injuries. These all may be attributed to the ageing processes occurring in the human body, which lead to musculoskeletal changes, atrophy of the brain, a decline in cognition, loss of functional activity and loss of productivity. All these are common precipitators for falls in the elderly, and thus interrelation between these aspects has to be studied to plan prevention strategies.<sup>(8,9)</sup>

### **MATERIALS AND METHODOLOGY:**

A co-relational study with a systemic sampling was conducted at various nursing homes of Jalgaon city. Written consent was taken from the 50 subjects who had no musculoskeletal disorder, cardiorespiratory, neurological, acute vestibular disorder, uncontrollable hypertension and diabetes mellitus, and uncontrollable visual/ hearing disorder. Samples were chosen based on age group between 65-85 years & scoring various scales, i.e. GDS <10 and MoCA <26.

### **PROCEDURE:**

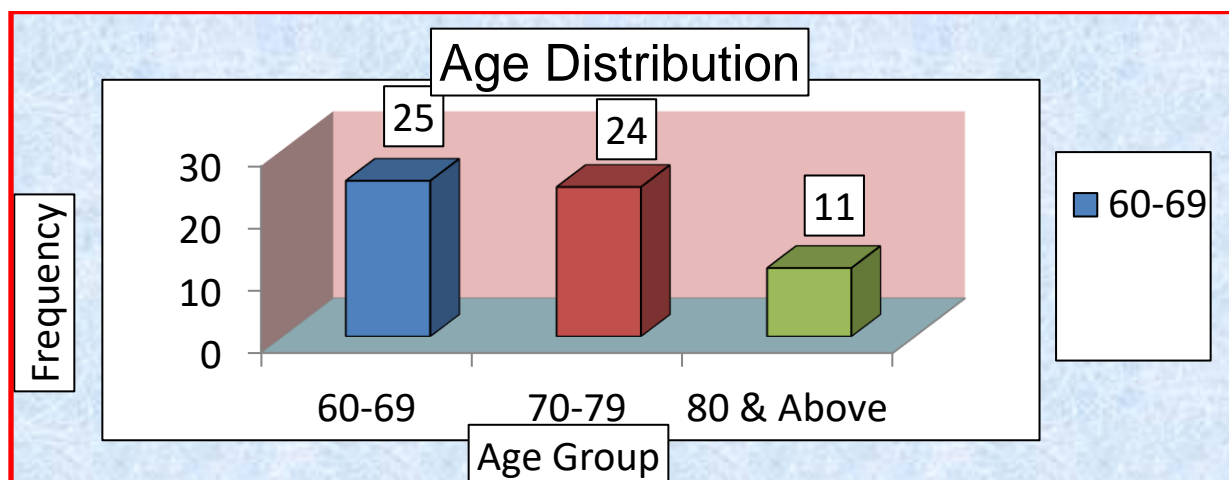
Permission was taken from the ethical committee. All the procedure was explained to the subjects likewise, firstly they were asked about their age (60 to 85), their education whether they can read and write or not and any disorders they are suffering from according to inclusion criteria. The inclusion criteria were a population of having age between 60 to 85 years old. GDS score should be less than nine, MoCA score should be less than twenty-six. They were given GDS to fill; it is a 30-item questionnaire to write the verbal answer with yes or no. The answers were cross-checked. The negative answers were given one score, and it was calculated then. The cut-off of GDS is normal 0 to 9, mild depressive 10 to 18, and severe depressive >19. After fulfilment of GDS criteria, they were given MoCA, it includes visuospatial/executive, naming, memory, attention, language, abstraction, delayed recall, orientation. If the subject is scoring below twenty-six, the subject does not have any impairment. FRAT is included in the outcome measures to assess the risk of fall, the subjects were asked about the history of fall in previous twelve months, any medication they are taking, any psychological problems they are suffering, cognitive status the scoring were done and found out the risk such as low risk: 5 to 11, medium risk: 12 to 15, high risk: 16 to 20. TUG test was performed to check the functional mobility of the subjects.<sup>(9,17)</sup> They were seated on a chair, and marking of three-meter was made that could be visible, and subjects were given orders as to get up from a chair, have to walk three meters and go back to the starting position during this procedure time was measured by the therapist from starting to end.<sup>(10)</sup> A normal elderly individual can walk three-meter in nine seconds, and very old or frail elderly can take time one min to two min or more. According to age classification, normal values of the subjects aged from 60 to 69 is 8.1 sec, 70 to 79 is 9.2 sec, 80 & above is 11.3 sec. The total population was 98 sample size and calculated using the formula: with a confidence level of 97%. The source was OpenEpi, Version 3, Open source calculator-SS propor. Statistical analysis was done, and results were found out.

**RESULT:**

**Table No. 1**

Sr. No	Variable	Groups	Frequency	Percentage
1	Age	60-69	25	41.67
		70-79	24	40.00
		80 & Above	11	18.33

Table no. 1 and Graph no. 1 shows the frequency of older individual according to age stratification.



**Graph No.1**

**Graph No. 2**

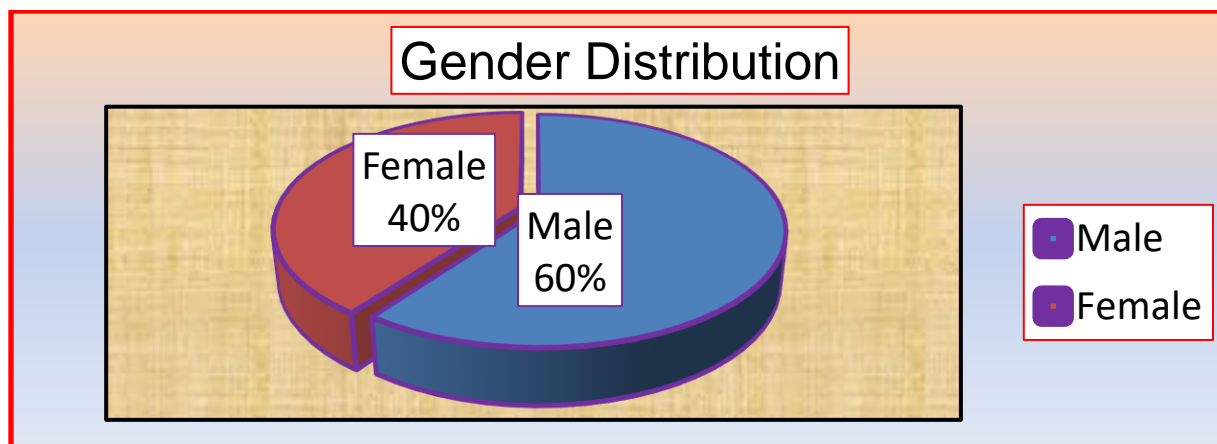


Table no. 2 and pie diagram shows the frequency of older individual according to gender classification. Out of 60 subjects, 36 were males, and 24 were females.

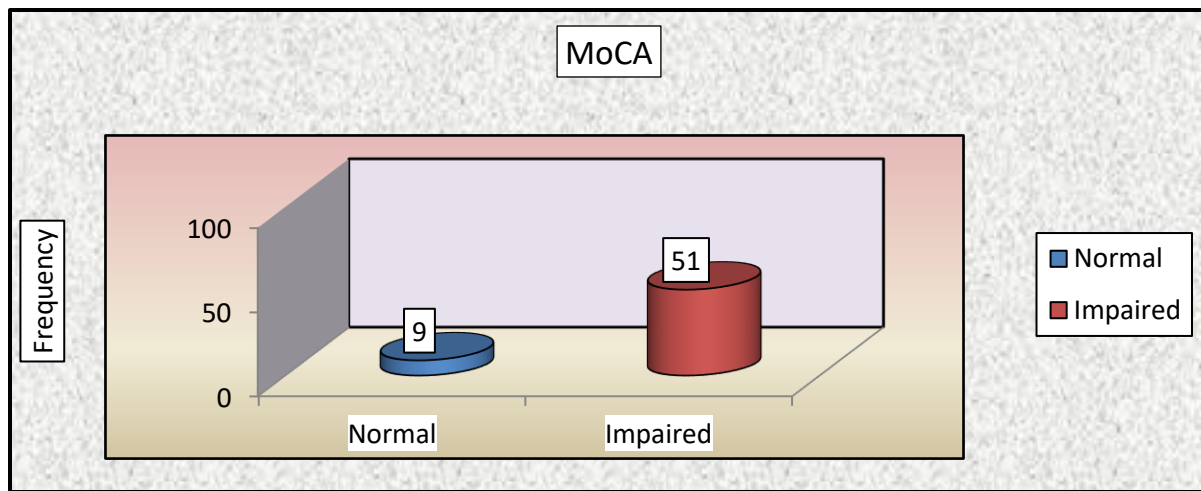
**Table No. 3**

Sr. No.	Variable	Groups	Score	Frequency	Percentage
3	MoCA	Normal	$\geq 26$	9	15.00
		Impaired	$< 26$	51	85.00

Graph No. 3

Table no. 3 and Graph no. 3 shows the number of an elderly individual having cognition normal and impaired according to Montreal Cognitive Impairment Assessment tool scoring. Out of 60 subjects, 51 were having impaired cognition, and nine were with normal cognition.

Table No. 4



Correlations:

Correlation		MoCA	FRAT	TUG
MoCA	r	1.00	-0.29	0.03
	p		0.02*	0.78
FRAT	r	-0.29	1.00	0.38

	<b>p</b>	<b>0.02*</b>		<b>0.003*</b>
<b>TUG</b>	<b>r</b>	<b>0.03</b>	<b>0.38</b>	<b>1.00</b>
	<b>p</b>	<b>0.78</b>	<b>0.003*</b>	
<b>* Correlation significant at 5% level</b>				

This table shows the strong correlation between MoCA, FRAT, and TUG. There is a negative relationship between MoCA and FRAT & a positive relationship between TUG and FRAT.

**DISCUSSION:**

Present study was carried out to know the correlation between cognitive impairment, functional mobility, and fall risk in an elderly individual. An elderly individual has a substantial risk to face fall complication. Over the lifespan, neurons are replaced at a declining rate, which may decline the brain's average weight with ageing. Another age-associated cognitive decline is due to widespread damage to myelin sheaths of cortical neurons.<sup>(8,9)</sup> Executive functions consist of those capacities that enable a person to engage successfully in independent, purposive, self-serving behavior. Programming of functional activities accomplished by different body capacities that help the individual approach to involve in purposive self caring successful independent target oriented activity.<sup>(10)</sup> Performing a task with perfection need good attention ability to select and attend a to specific stimulus while simultaneously suppressing extraneous stimuli. Attention deficit result from lesion in prefrontal cortex and reticular formation. The brain of human is having n number of function in which memory is interesting to study amount, Memory is the ability to store experiences and perceptions for later recall. both memory system short and long term memory can be get affected Short term if there is lesions of the limbic system, limbic association cortex (orbit frontal areas, or temporal lobes), with lesions of the hippocampus of the limbic system. Attention is the ability to select and attend to a specific stimulus while simultaneously suppressing extraneous stimuli. Altered attention results from lesions in the prefrontal cortex and reticular formation.<sup>(11)</sup> The risk of geriatric population is increased due to age related changes in central nervous system i.e local and distal grey matter volume reduction and that consideration of these structural measures aids the interpretation of MRI results. There are the studies which was found the association between cognition and functional activity where cognition function associated with subsequent decline with physical activity .physical activity limitation have impact on conditioning of body and other system of body like depression and psychological function of structure.<sup>(12)</sup> Contributing factor to decreased strength includes a loss of alpha motor neurons (decreased number of functional motor units), atrophy of fast-twitch fibers (most notable type II b), reduced number and diameter of muscle fibers, diminished oxidative capacity of exercising muscle and a

subsequent reduction in ability to produce torque cognition is type of higher mental function it is under control of cerebel cortex which regulates complex activities of daily living such as calculation decision making complex task.<sup>(13)</sup>

### CONCLUSION:

According to the study, it has been concluded that as the age increases, there is an impact on cognitive ability which affects the functional mobility and increases the chances of fall in an elderly individual as this study shows, the positive correlation of cognitive impairment and risk of fall. On this basis, we can form a prevention strategies for an elderly individual. Early intervention for fall prevention should be taken into consideration to improve the quality of individual geriatric in population.

Limitation of the study was small sample size and communication problems.

### ABBREVIATIONS:

GDS (Geriatric Depression Scale)

MoCA (Montreal Cognitive Assessment)

FRAT (Fall Risk Assessment Tool)

TUG (Timed Up and Go test)

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