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Prevalence of Cognitive Impairment and Risk Factors among Elderly in Rawalpindi, Pakistan: A cross-Sectional study

Hafsah Gul Khattak, Hafsah Arshad, Kinza Anwar, Muhammad Qasim Ali

ABSTRACT:

Objective: The study aimed to find out the prevalence of cognitive impairment and risk factors among elderly.

Study Design and setting: Descriptive cross-sectional study was conducted in elderly population of Rawalpindi.

Methodology: The study was conducted from October 2020 to February 2021. After getting approval from the ethical committee, data was collected using a semi structured questionnaire. The sample of 446 participants, raised through non-probability convenient sampling technique. Participants aged above 60 years, both genders were included however individuals who had severe head injury, depression, severe hearing and visual impairment, delirium and not willing to participate were excluded from study. Informed consent was obtained from all participants. Data was analyzed by using SPSS v24.

Results: The overall mean age of sample was 69±4.6 years. Overall prevalence of cognitive impairment was 35.4 %. Among them 134 (30%) had mild cognitive impairment and 24 (5.4%) had dementia. The prevalence of cognitive impairment increases with age being higher (64.2%) at 70 years and above than at 60-69 years of age. Females 82 (61%) had high prevalence of MCI than males 52 (39%). Age, gender, hypertension, diabetes, and physical activity were significantly associated with cognitive impairment. Data was analyzed using SPSS version 24. Descriptive statistics were applied. Pearson chi square of independence was used to find the association of various factors. The p value less than 0.05 was considered significant.

Conclusion: Cognitive impairment increases with the increasing age and was more prevalent among females. Hypertension, Diabetes, physical activity were modifiable risk factors for cognitive impairment.

Key words: cognition, cognitive decline, dementia, elderly, mild cognitive impairment

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INTRODUCTION:

Aging is associated with decline in whole body functions due to inflammation at cellular level. As the age progresses change in cognitive function of individual are also observed. An increase in the number of older adults is reported worldwide. It is reported that twelve million older adults are living in Pakistan, and this number is expected to rise to eighteen million by 2050. This can exemplify an increase in number of elderly with increase in morbidity and mortality, particular increase in decline of cognitive functions. Decline in cognitive function (aka cognitive impairment) increases risk of dementia and places the elderly having difficulty in learning, memory and performing daily tasks .

Mild cognitive impairment (MCI) was first described by Petersen et al 1997, refers to impairment in cognition above that which is seen with normal age-related cognitive decline, but not sufficient to cause significantly decreased daily life function, considered as transitional stage from normal cognitive function to dementia. Clinically, the term "age-related cognitive decline" is equivalent with changes in memory and cognition that are typically seen with increasing age or "normal aging." The term mild cognitive impairment (MCI) commonly states a decline in the ability to learn new information or recall stored information. MCI is characterized by attention deficit, memory impairment, disorientation, visuospatial disturbances. People with mild cognitive impairment are at higher risk of developing dementia than older adults with healthy cognition. MCI is regarded as a

Hafsah Gul Khattak
Senior Lecturer, Department of Physical Therapy,
Ibadat International University, Islamabad, Pakistan
Email: hafsah.gul@uipt.uol.edu.pk

Hafsah Arshad *(Corresponding author)*
Senior Lecturer, Department of Physical Therapy,
Ibadat International University, Islamabad, Pakistan
Email: hafsah.arshad@uipt.uol.edu.pk

Kinza Anwar
Senior lecturer, Department of Rehabilitation and Allied Health Sciences,
Riphah International University, Islamabad
Email: kinza.anwar@riphah.edu.pk

Muhammad Qasim Ali
Demonstrator
Yusra Institute of Rehabilitation Sciences, Islamabad
Email: qasim111298@gmail.com

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risk factor for developing dementia, previous study indicated that the progression rate of MCI to dementia is approximately 60-100 % over five to ten years.

The worldwide prevalence of MCI was found to be 3% to 42% among individuals of age 60 years and above. Previously published studies conducted in different countries have reported the prevalence of MCI and dementia. A study in United States reported MCI among 22.2% in elder persons of age 71 years and above. The prevalence of MCI in Germany was found to be 3.1%. Population-based studies from India reported 15-33% of estimated prevalence. The difference in prevalence reported in different regions may be due to difference in age of study participants, sample size, tool used for cognitive assessment, difference in inclusion and exclusion criteria, definitions of MCI and dementia. Various risk factors found to be associated with cognitive impairment are advancing age, gender and level of education. Also, low economic status, anxiety, depression, diabetes mellitus and hypertension are some other risk factors reported among older adults with cognitive decline.

Cognitive impairment among older adults decreases the quality of life, independence and increases the burden on society. It also affects daily activities resulting in loss of independence and autonomy. Moreover, such elderly people need a full-time assistance from a caretaker for everyday tasks. There is limited literature on prevalence of cognitive impairment in elderly. Therefore, current study aimed to find out the prevalence and risk factors associated with cognitive impairment among elderly in Rawalpindi, Pakistan.

METHODOLOGY:

The descriptive cross-sectional survey was conducted on community dwelling older adults from October 2020 to February 2021 after getting approval from Institutional Review board & Research ethical committee of university (IRB/EC/00130). The sample size was calculated by using Rao soft, by assuming elderly population 20,000, by considering the confidence level 95% and margin error 5%, the sample size of our study was 377 while total number of participants who participated in the study was 446. Flow of participants in the study was shown in figure 1.

The sample was raised through nonprobability convenient sampling technique. The inclusion criteria were both male and female gender of age sixty years and above. Individuals who had severe head injury, depression, severe hearing and visual impairment, delirium and not willing to participate were excluded from study. Written informed consent was taken from the participants; the researcher explained the purpose and nature of study to the participants.

The questionnaire included socio-demographic questions: age, gender, marital status, level of education, employment status, living status and family history of dementia.

For cognitive assessment MoCA-Urdu version was used, a validated instrument for diagnosis of MCI and dementia. It is comprised of several questions grouped into categories to assess specific cognitive functions: visuospatial/executive function, short term memory/ delayed recall, animal naming, attention, language, abstraction, and orientation. The total score Of MoCA- Urdu version was 30. A score of =26 was considered normal. One point was added if years of education are less than 12 years. Scores below 26 and 17 indicate MCI and dementia, respectively. The MoCA- Urdu version was completed by trained investigator for individual participant.

Data was analyzed by using SPSS version 24. Descriptive statistics were applied. For qualitative variables, frequency and percentages, and for quantitative variables mean and standard deviation were calculated. Pearson chi square of independence was used to find the association of various factors. The p value less than 0.05 was considered significant.

RESULTS:

Out of four hundred and forty-six participants 268 (60.1%) were female and 178 (39.9%) were males. The overall mean age of sample was 69±4.6 years. Most of the study participants 67.1% were in 70 years and above age category. 380 participants were married, and 51 participants were widowed. We found that 138(30.9%) elderly were illiterate, 151 (33.9%) had primary education, 87 (19.5%) had secondary education and 70 (15.7%) were graduate and above. Most of the participants 242 (54.3%) were unemployed, 249 (55.8%) living with spouse. 130 (29.1%) participants had family history of dementia while 316 (70.9%) did not have any family history of dementia. (Table 1)

Overall prevalence of cognitive impairment was 35.4 %. Among them 134 (30%) had mild cognitive impairment and 24 (5.4%) had dementia, using MoCA-Urdu version standard cutoff point less than 26 for MCI and 17 for dementia (figure 2). The prevalence of cognitive impairment increases with age being higher (64.2%) at 70 years and above than at 60-69 years of age. Females 82 (61%) had high prevalence of MCI than males 52 (39%). The prevalence of several risk factors is shown in Table 2. Among them hypertension was 68.8%, diabetes 61.2% and physical activity was 28.5% respectively. Table 3 shows p-value for associated risk factors for cognitive impairment. Most affected sub scores in MCI patients were delayed recall and language as shown in figure 3.

DISCUSSION:

The prevalence of cognitive impairment among older adults in Rawalpindi was 35.4 %. The prevalence of mild cognitive impairment was 30 % and 5.4% was for dementia. It was higher in female gender, participants with hypertension, diabetes, depression, physically inactive and increased with age. This was similar to that of study conducted in Africa, where prevalence of cognitive impairment was 33.3%. Robabeh Soleimani et al conducted a survey on 393 elderly persons of age 60 years and above. The study reported 37%

Table 1: Sociodemographic characteristic of participants (n=446)

Demographics	Categories	Frequency (Percentage)
Age	60-69 years	147 (32.9%)
	70 years and above	299 (67.1)
Gender	Male	178 (39.9%)
	Female	268 (60.1%)
Marital status	Married	380 (85.2%)
	Widowed	51 (11.4%)
	Divorced	15 (3.4%)
Education	Illiterate	138 (30.9%)
	Primary	151 (33.9%)
	Secondary	87 (19.5%)
	Graduate and above	70 (15.7)
Employment status	Employed	68 (15.2%)
	Retired	136 (30.5%)
	Unemployed	242 (54.3%)
Living status	With spouse	249 (55.8%)
	Alone	13 (2.9%)
	Joint family	184 (41.3%)
Family history of dementia	Yes	130 (29.1%)
	No	316 (70.9%)

Table 2: Prevalence of risk factors

Risk factors	Frequency	Percentage
Hypertension		
Yes	307	68.8%
No	139	31.2%
Diabetes		
Yes	273	61.2%
No	173	38.8%
Obesity		
Yes	141	31.6%
No	305	68.4%
Smoking		
Yes	42	9.4%
No	404	90.6%
Physical activity		
Yes	127	28.5%
No	319	71.5%

Table 3: Factors associated with Mild cognitive impairment

Risk factors	X^2	P value
Age	66.285	0.005
Gender	15.451	0.003
Hypertension	7.978	<0.001
Diabetes	2.675	0.004
Obesity	7.958	0.316
Smoking	6.858	0.247
Physical activity	1.052	0.001

Figure 1: Flow chart for study participants in the study

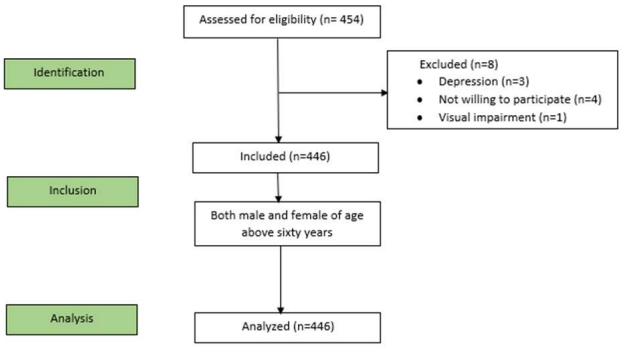


Figure 2: Spectrum of cognitive pattern among study participants (n=446)

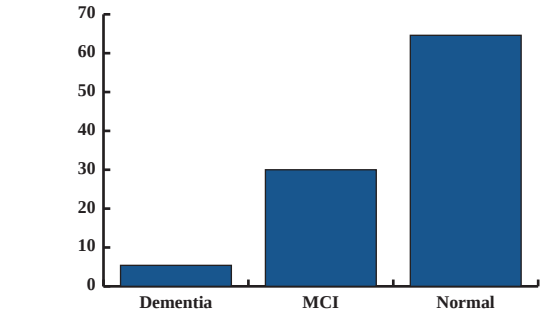
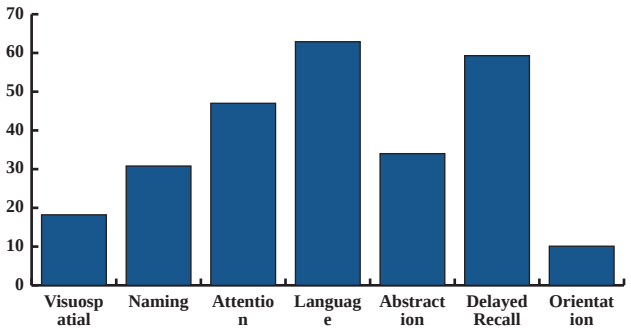


Figure 3: Percentage of MCI patients in various sub scores of MoCA



prevalence of MCI. Moreover, it was observed that females with low education level and participants over 70 years had more cognitive impairment .

Our study results were consistent with a previous study conducted in China, where reported prevalence of cognitive impairment was 30%. They also found that females living alone and belonging to low economic status had increased risk for cognitive impairment. Artero et al conducted a prospective community-based survey in older adults of age 65 years and above. They confirmed that increasing age was the most significant risk factor in the progression from MCI to dementia. Jia et al. in their study observed the prevalence of MCI to be 20.8% and also found that aging was important risk factor for vascular dementia Chinese elderly population.

The present study indicated that physical inactivity was a significant risk factor for mild cognitive impairment among elderly. A previous study conducted in 2017 by Tan et al. found that age related decrease in brain volume and cerebral structures were related to levels of physical activity. They also suggested that this decrease in brain volumes could be prevented by involving elderly in physical activities. The current study has shown that hypertension increases the risk for cognitive problems. Various studies have demonstrated that hypertension is highly associated with the development of ischemic lesions in white matter of brain which results in impaired cognitive function. McDonald et al conducted a five year follow up study in 353 community-dwelling older adults of age 65 years and above. The study concluded that blood pressure variability was significantly associated with impaired cognitive function in older people. Insa Feinkohl et al in their study reported the prevalence of cognitive impairment to be 29.0% in older persons. They also found that cognitive impairment was associated with obesity, hypertension and diabetes, which supports our study results. Qingtao Hou et al in their work reported that abdominal obesity is linked with an increased risk of cognitive impairment in elderly unrelated of conventional sociodemographic, lifestyle, and health-related comorbid factors. current study also revealed that diabetes was also a risk factor that can cause mild cognitive impairment. In another work done by et al concluded that type 2 diabetes myelitis was considered be a risk factor which can progress for MCI into AD. In a work done by et al found that patients with Diabetes at initial develop at severe stages of MCI are more probable to progress towards dementia. They also recommended that patients should be frequently assessed for their cognitive status.

This study may have several limitations. First, this was a cross-sectional study. Due to study design correlations and causal relationships cannot be established. Secondly, the study was conducted only in one setting and so the results of the study were not generalized. Third, in the current study subtypes of mild cognitive impairment were not assessed. Fourth, due to lack of resource neuroimaging studies were not carried out.

CONCLUSION:

The current study found prevalence of cognitive impairment to be 35.4% among elderly. Cognitive impairment increases with the increasing age and was more prevalent among females. Hypertension, Diabetes, physical activity was modifiable risk factors for cognitive impairment. Early detection of modifiable risk factors may help health professionals to slow the progression of cognitive impairment to dementia.

Authors Contributions:
Hafsah Gul Khattak: Designed and Concept, Data collection, Manuscript writing
Hafsah Arshad: Designed and Concept, Statistical Analysis, Interpretation
Kinza Anwar: Literature search, Critical review of Manuscript
Qasim Ali: Data collection, Manuscript writing

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