

## Assessment Cognitive Functions Among Elderly Patients Attending Out Patient Clinics in Assiut University Hospital

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### Abstract

Cognitive impairment is common among older adults. It doesn't not only threaten their quality of life but also has a negative impact on caregivers, as well as represents challenges in different clinical care settings. **The aim of the study** assess cognitive functions and identify the prevalence of cognitive impairment among elderly patients attending outpatient clinics in Assiut University Hospital. **Material and Methods:** the study included 580 elderly patients recruited from outpatient clinics of Assiut University Hospital, aged 60 years and older, they were selected by none- probability quota sample from the first of July 2012 until the end of June 2013 screened by Mini-Mental State Examination (MMSE) for cognitive functions, they also were assessed for their sociodemographic characteristics, health habits and Activities of Daily Living (ADL). **Results:** The present study shows that 18.8% of elderly patients had cognitive impairment, 57.8 % of elderly with cognitive impairment have no leisure activities, and 7.3% of them were found to be totally dependent in ADL. **Conclusion:** elderly patients at high risk to develop cognitive impairment especially those who are aged  $\geq 65$  years, female, live in rural area, not educated, lives alone and have impairment in ADL. **Recommendations:** screening for cognitive impairments among the elderly is important in early detection for those with cognitive impairments.

**Keywords:** *Elderly, Cognitive Functions & Cognitive Impairment.*

### Introduction

Older people are the fastest growing segment of the population worldwide. Globally, the number of persons aged 60 years and more is expected to almost triple within the next few decades, from 672 million in 2005 to nearly 1.9 billion by the year 2050 (Perel-Levin, 2008).

The cognitive function begins to decline from the age of 50 and accelerates after the age of 65 years. Cognitive impairment is common among elderly and increases with aging. (Angevaren et al., 2008 & Fossati et al., 2011). It does not only threaten the quality of life of older people but also has a negative impact on their caregivers, as well as representing challenges in different clinical care settings (Sweed & Elawam, 2010). Conditions in which cognitive functioning is impaired include dementia, Alzheimer's, delirium, and depression (American Psychiatric Association, 2000).

Cognitive function is also influenced by other conditions like female sex, low education, a clinical history of stroke, tobacco smoking, alcohol consumption, physical inactivity, depression, and

lack of social support (Anstey et al., 2007, Fossati et al., 2011).

Early recognition of cognitive impairment is important for the diagnosis of potentially reversible medical conditions, and initiation of treatment interventions. Patients and caregivers will have time to prepare for lifestyle changes and plan for the future (Miller, 2009, Sweed & Elawam, 2010).

Nurse practitioners who work in a variety of practice settings commonly provide care to the older adults with varying levels of cognitive ability. Although nurses are trained to recognize and provide care to patients with dementia, it is also important to recognize patients who are experiencing mild cognitive impairment (Elliott et al., 2008).

### Significance of the study

Cognitive impairment including dementia is a growing worldwide public health problem, and its prevalence in elderly persons is between 10% and 22% (Etgen et.al., 2010). In Egypt, the prevalence of cognitive impairment was 20.9% among residents of the elderly homes in Cairo (Sweed & Elawam,

2010). The prevalence of dementia was 4.5% in Assiut governorate-Egypt (Farrag et al., 1998), and in Sharkia governorate, was 3.66% (Zaitoun et al., 2008).

### Aim of the study

To assess cognitive functions and identify the prevalence of cognitive impairment among the elderly patients.

### Materials & Method

#### Research design

The cross-sectional descriptive research design was used in this study.

#### Study Setting

This study was conducted at out patient's clinics (i.e. ophthalmology, diabetes, cardiology, internal medicine clinics) in Assiut University Hospital.

Data was collected on average of two days weekly; with an average number of 3-4 elderly interviewed per day during the assessment of their cognitive functions, the approximate time spent on filling the questionnaire sheet was around 30 minutes for filling of the structured interview questionnaire.

#### Study sample

The participants were recruited during the period from the first of July 2012 until the end of June 2013 and their number were 580 elderly patients aged 60 years and above. Non- probability quota sample technique was used in the present study.

#### Inclusion criteria

- Elderly patients aged 60 years and more of both sexes who were attended outpatient clinics (i.e. ophthalmology, diabetes, cardiology, internal medicine clinics) of Assiut University Hospital.
- Able to communicate.
- Accept to participate in the study.

#### Exclusion criteria

- Elderly patients which have cognitive disorders.

#### Tools of the study: Three tools were used for data collection

##### 1: Structured interview questionnaire sheet:

A specially designed sheet was used for data collection. It was based on relevant literature in order to assess cognitive function among elderly patients. **It included four parts:**

**Part I:** it included sociodemographic characteristics as age, sex, marital status, education, occupation, residence, social assistance, family size, and family type.

**Part II:** it included questions to assess elder's health habits as nutrition, sleep, smoking, alcohol consumption, exercises, leisure activities and social activities.

**Part V:** assessment of medical history including diabetes mellitus, hypertension, cardiovascular disease, arteriosclerosis or other diseases.

**Part VI:** the presence of family history suggesting cognitive impairment in any family member.

##### 2-The Mini-mental status examination (MMSE)(Folstein et. al., 1975)

The Mini-Mental State Examination (MMSE) is a widely used, well-validated screening tool for evaluation of cognitive impairment. The MMSE was used to assess cognitive function.

Assessment of the cognitive status by using the Arabic version of the Mini-Mental state examination (MMSE). It briefly measures orientation to time and place (score=10), short-term verbal memory (score=3), attention and calculation (score=5), immediate recall (score=3), and language (score=9). The total score of MMSE is 30, a score less than 24/30 indicates cognitive impairment among educated people and less than 22/30 among illiterate subjects.

##### 3- Independence in Activities of Daily Living (ADL) (Katz et. al., 1970):

Index of Independence in Activities of Daily Living (ADL) was used to assess the ability to carry out the basic daily living activities which include; bathing, dressing, toileting, sphincter control, feeding, and transfer. Each criteria is graded according to level of dependence of the elderly patient; either performs independently (score=2), performs with assistance (partial dependent) (score= 1), or unable to perform (dependent) (score= 0). Total score of 0-5 indicates completely dependent, 6-9 partially dependent, and 10-12 independent

##### Pilot study

A pilot study was carried out before starting data collection on (10 elderly patients), who were not included in the study. The aim of the pilot study is to test the clarity and applicability of the tool and to assess the respondent's acceptance and understanding of the questions, and the needed modifications were performed.

##### Ethical considerations

The study was approved by the ethical committee of Faculty of Nursing Assiut University. Oral consent from elderly patients for participation in the study was obtained. Full explanation about the purpose of the study was discussed with the patients before starting data collection. Confidentiality of the information was maintained during the steps of the study. No harm to the participant was expected during all steps of the study. Patient was informed about the result of the test.

##### VI- Statistical analysis

The obtained data were reviewed, prepared for computer entry, coded, analyzed and tabulated.

Descriptive statistics (frequencies, percentage, and mean) were done using computer program SPSS version16. Chi-square test, independent sample t-test,

paired samples t-test, were used for analysis of variance.

## Results

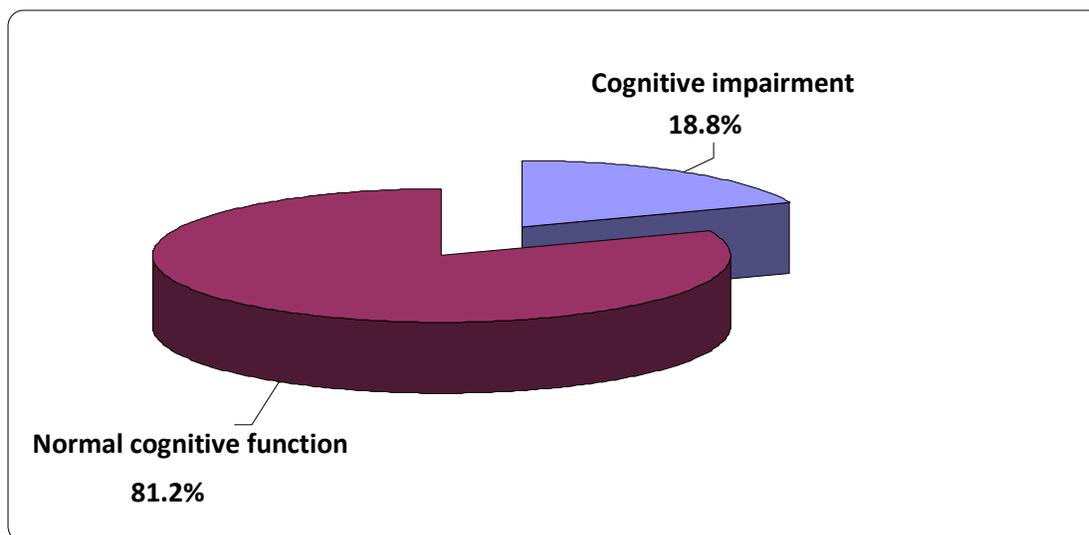
**Table (1): Distribution of the elderly patients regarding their demographic characteristics (n=580).**

Socio demographic characteristics	Total (n= 580)	
	No.	%
<b>Age</b>		
60 < 65 years	404	69.7
≥ 65 years	176	30.3
Mean ± SD	63.00 ± 4.95	
<b>Sex</b>		
Male	186	32.1
Female	394	67.9
<b>Residence</b>		
Urban	104	17.9
Rural	476	82.1
<b>Marital status</b>		
Single	4	0.7
Married	371	64.0
Widow	205	35.3
<b>Education</b>		
Not educated	516	89.0
Educated	64	11.0
<b>Current occupation</b>		
Farmer	126	21.7
Skilled worker	14	2.4
Non-skilled work	19	3.3
Housewife	391	67.4
Retired	30	5.2
<b>Social assistance</b>		
Yes	156	26.9
No	424	73.1
<b>Living condition</b>		
Lives alone	67	11.6
Lives with their family	513	88.4
<b>Family type (no=513)</b>		
Nuclear	99	19.3
Extended	414	80.7
<b>Family history of cognitive impairment</b>		
Yes	44	7.6
No	536	92.4

**Table (2): Distribution of elderly patients according to their total score of different domains of Mini Mental State Examination (MMSE).**

MMSE Domains	Male (n= 186)	Female (n= 394)	Total (n= 580)	P-value
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Orientation (time and place)	8.9 $\pm$ 1.5	7.7 $\pm$ 1.9	8.1 $\pm$ 1.9	0.000*
Registration (short-term verbal memory)	2.9 $\pm$ 0.4	2.9 $\pm$ 0.5	2.9 $\pm$ 0.5	0.576
Attention and calculation	4.8 $\pm$ 0.9	4.7 $\pm$ 1.2	4.7 $\pm$ 1.1	0.179
immediate Recall	2.2 $\pm$ 1.0	2.0 $\pm$ 1.1	2.1 $\pm$ 1.1	0.020*
Language	6.4 $\pm$ 1.0	6.0 $\pm$ 0.7	6.1 $\pm$ 0.8	0.000*
<b>Total score of MMSE</b>	<b>25.3 <math>\pm</math> 3.2</b>	<b>23.3 <math>\pm</math> 3.6</b>	<b>23.9 <math>\pm</math> 3.6</b>	<b>0.000*</b>

(\*)There is a Significant Difference

**Fig. (1): Distribution of elderly patients according to their cognitive functions.****Table (3): Relationship between sociodemographic characteristics of elderly with cognitive impairment and those with normal cognitive functions (n=580).**

Socio-demographic characteristic	Elderly with cognitive impairment (n= 109)		Elderly with normal cognitive functions (n= 471)		X <sup>2</sup>	P-value
	No.	%	No.	%		
<b>Age</b>						
< 65 years (n=404)	69	17.1	335	82.9	2.56	0.109
≥ 65 years (n=176)	40	22.7	136	77.3		
<b>Sex</b>					14.91	<b>0.000*</b>
Male (n=186)	18	9.7	168	90.3		
Female (n=394)	91	23.1	303	76.9		
<b>Residence</b>					3.29	0.070
Urban (n=104)	13	12.5	91	87.5		
Rural (n=476)	96	20.2	380	79.8		
<b>Education</b>					11.57	<b>0.001*</b>
Not educated(n=516)	107	20.7	409	79.3		
Educated (n=64)	2	3.1	62	96.9		

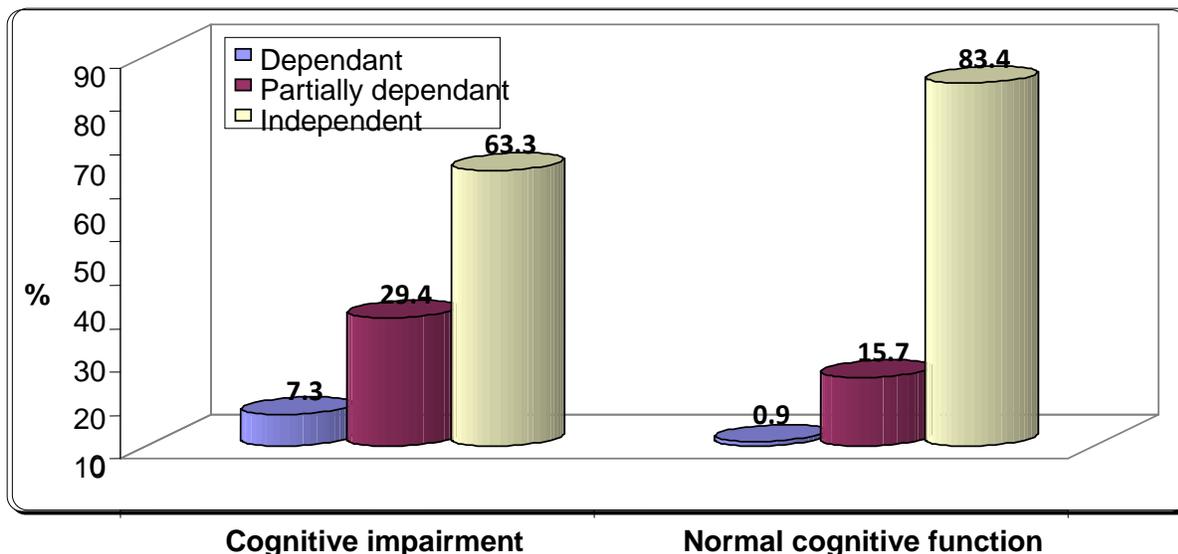
Socio-demographic characteristic	Elderly with cognitive impairment (n= 109)		Elderly with normal cognitive functions (n= 471)		X <sup>2</sup>	P-value	
	No.	%	No.	%			
<b>Living condition</b>						7.82	0.005*
Lives alone(n=67)	21	31.3	46	68.7			
Lives with family (n=513)	88	17.2	425	82.8			

(\*)There is a significant difference

Table (4): Health habits of elderly with cognitive impairment and those with normal cognitive functions (n=580).

Health habits	Elderly with cognitive impairment (n= 109)		Elderly with normal cognitive functions (n= 471)		X <sup>2</sup>	P-value	
	No.	%	No.	%			
<b>Smoking</b>						4.83	0.028*
Smoker (n=53)	4	7.5	49	92.5			
Non-smoker (n=527)	105	19.9	422	80.1			
<b>Drinking coffee/ tea</b>						2.22	0.136
Yes (n=436)	88	20.2	348	79.8			
No (n=144)	21	14.6	123	85.4			
<b>History of sleep disturbance</b>						0.811	0.368
Yes (n=409)	73	17.8	336	82.2			
No (n=171)	36	21.1	135	78.9			
<b>Leisure activities</b>						42.13	0.000*
Yes (n=396)	46	11.6	350	88.4			
No (n=184)	63	34.2	121	65.8			
<b>Sharing in social activities</b>						4.46	0.035*
Yes (n=287)	44	15.3	243	84.7			
No (n=293)	65	22.2	228	77.8			

(\*)There is a significant difference



P= 0.028\*

Figure (2) Relationship between cognitive functions and Activity of Daily Living (ADL) of elderly patients (n=580).

**Table (5): Relationship between cognitive functions of elderly patients and their medical diagnosis in outpatient clinics at Assiut University Hospital (n=580).**

Medical Diagnosis	Cognitive impairment (n= 109)		Normal cognitive functions (n= 471)		X <sup>2</sup>	P-value
	No.	%	No.	%		
<b>Internal medicine Clinic: (n= 214)</b>	37	17.3	177	82.7		
Liver cirrhosis (n=53)	10	18.9	43	81.1	0.12	0.726
Colitis (n=31)	7	22.6	24	77.4	0.71	0.400
Hepatitis (n=29)	2	6.9	27	93.1	2.53	0.111
Peptic ulcer (n=26)	3	11.5	23	88.5	0.69	0.582
Renal failure (n=23)	5	21.7	18	78.3	0.36	0.760
Anemia (n=18)	2	11.1	16	88.9	0.16	0.690
<sup>∞</sup> Other (n=34)	8	23.5	26	76.5	1.10	0.294
<b>Ophthalmology Clinic:(n= 171)</b>	43	25.1	128	74.9		
Cataract (n=119)	30	25.2	89	74.8	0.01	0.977
Glaucoma (n=26)	7	26.9	19	73.1	0.05	0.821
Retinal detachment(n=10)	2	20.0	8	80.0	0.00	0.991
Eye inflammation(n= 16)	4	25.0	12	75.0	0.00	0.989
<b>Cardiology Clinic: (n= 117)</b>	16	13.7	101	86.3		
Hypertension (n=39)	7	17.9	32	82.1	0.91	0.341
Angina (n=26)	5	19.2	21	80.8	0.37	0.541
Myocardial infraction(n=16)	0	0.0	16	100.0	1.75	0.186
Atherosclerosis(n=28 )	1	3.6	27	96.4	2.16	0.142
Rheumatic heart disease(n=4 )	1	25.0	3	75.0	0.00	0.449
Hypotension (n= 4)	2	50.0	2	50.0	1.99	0.158
<b>Diabetes Clinic: (n= 78)</b>						
Diabetes mellitus	13	16.7	65	83.3		--

<sup>∞</sup> Other Diseases: Renal Stones, Cholitisystis, Splenomegaly, Osephygel Varese, & Prostatic Enlargement.

**Table (1):** Distribution of the elderly patients regarding to their demographic characteristics, it was observed that the mean age of the studied sample was  $63.0 \pm 4.95$  years, 67.9 % of them were females, 82.1% of them live in the rural area, 64.0 % of them were married, 89.0 % of them were not educated, 21.7 % of them were farmer, 73.1% of them don't receive social assistance, 88.4 % of them were living with their family and 71.9% of them were living in extended family. Only 7.6% of the total sample had a family history of cognitive impairment.

**Table (2):** Distribution of elderly patients according to their total score of different domains of Mini-Mental State Examination (MMSE), it showed that the mean total score of (MMSE) of the whole sample were  $23.9 \pm 3.6$ , and female have significantly lower mean of total score ( $23.3 \pm 3.6$ ) than male ( $25.3 \pm 3.2$ ).

**Figure (1):** Distribution of elderly patients according to their cognitive functions, it was observed that as regards cognitive functions, 81.2% of the studied sample had normal cognitive functions. While 18.8% of them had cognitive impairment.

**Table (3):** Relationship between sociodemographic characteristics of elderly with cognitive impairment and those with normal cognitive functions, it showed that significant higher percentage of cognitive impaired elderly patients was female (23.1%), not educated (20.7 %), and lives alone (31.3 %).

**Table (4):** Health habits of elderly with cognitive impairment and those with normal cognitive functions, it was observed that significant higher percentage of cognitive impaired elderly patients was not smoker (19.9%), have no leisure activities (34.2%) and not sharing in social activities (22.2%).

**Figure (2):** Relationship between cognitive functions and Activity of Daily Living (ADL) of elderly patients, it was observed that 7.3% of the cognitively impaired were found to be totally dependent in activities of daily living (ADL) compared to 0.9 % of those with normal cognitive functions.

**Table (5):** Relationship between cognitive functions of elderly patients and their medical diagnosis, it was observed that 17.3% of elderly patients who attended Internal medicine clinic have cognitive impairment (18.9 % of them have liver cirrhoses, 22.6 % have

colitis and 21.7 % have renal failure), and 25.1% of elderly patients who attended Ophthalmology clinic have cognitive impairment (25.2 % of them have cataract patients and 26.9 % have glaucoma).

## Discussion

Cognitive impairment is common among older adults. In the present study, the researcher assesses cognitive functions and determine the prevalence of cognitive impairment among elderly people. Regarding sociodemographic characteristics of the studied population, it was found that their mean age was  $63.00 \pm 4.95$  years, 67.9% was females, 82.1% were living in the rural areas, 64.0 % of them were married, 89.0% were not educated, 64.0 % were a housewife, and 11.6% lived alone.

These results are similar to that reported by the study conducted by **Shehatah et al., (2009)** who studied the prevalence of depression and association of cognitive impairment in elderly in suburban community in Egypt and reported that the mean age of participants was  $66.16 \pm 5.62$  years, 52.3% were females and 47.7% were males, 67.4% were married, 89.5% were not educated, and 16.3% lived alone.

Also, the study illustrated that the mean score of MMSE of the participants was  $23.93 \pm 3.58$ , which is still within normal range of MMSE score. However it tends to be at the lower limit of normal range which is expected in relation to the educational level of participants as 89.0% of them were not educated. This score was reported by **Sweed & Elawam (2010)** who found that the mean MMSE score was  $24.14 \pm 4.48$  in their studied population in an elderly home in Cairo.

It was shown from the present study that the prevalence of cognitive impairment was 18.8% (MMSE score less than 23). This was in agreement with **Sweed & Elawam (2010)** who found the slightly higher prevalence of cognitive impairment (20.9%). Also, the present study agreed with **Wu et al., (2011)** who studied socio-demographic and health-related factors associated with cognitive impairment in the elderly in Taiwan and found that the prevalence of cognitive impairment was 22.2%.

The higher prevalence rates of cognitive impairment which found in present study and the other studies may be explained by; first, the prevalence of cognitive impairment increases with aging, and our sample in this study was elderly patients whose age 60 years and older, and second due to increasing the impairment in ADL of the elderly patients, and increase prevalence of chronic illness among elderly patients as, hypertension, diabetes mellitus, and sensory impairment (visual and hearing impairment) that might affect cognitive functions.

Cognitive impairment is usually common among older adults. Cognitive function is influenced by other factors like female sex, low education, a clinical history of stroke, tobacco smoking, physical inactivity, and lack of social support (**Fossati et al., 2011**).

It was shown from the present study that increased age, being female, living in rural area, not educated, being single, lived alone, have a history of sleep disturbance, have no leisure activities, and no sharing in social activities were associated with lower MMSE scores (cognitive impairment).

This agreed with **Wu et al., (2011)** who found that low level of education, being single, low social support, physical inactivity, non-coffee drinking and poor physical function were associated with a higher risk of cognitive impairment. Also, it was agreed with **Zhuang et al., (2012)** who found that associated factors to lower MMSE scores: low education, old age, marital status, and limited physical. Also, it was agreed with **Sweed & Elawam (2010)** who reported that increasing age, being female, and being illiterates were associated with lower MMSE score.

The present study agreed with **Verghese et al., (2003)** who studied leisure activities and the risk of dementia in the elderly, and found that participation in leisure activities is associated with a reduced risk of dementia. Also was agreed with **Krueger et al., (2009)** who studied social engagement and cognitive function in old age, and found that higher level of social engagement in old age is associated with the better cognitive function.

The relation between cognitive impairment and aging can be interpreted by that, with aging the age-related changes of the brain lead to a decrease of cognitive functions and lowering the MMSE score. Cognitive impairment was higher among females than males in the present study could be explained by that 67.9% of studied sample were female, and all of the elderly females didn't have any work.

The relation between the low level of education and risk of cognitive impairment can be explained as; a higher brain reserve capacity of educated persons could postpone the onset of cognitive impairment. The educated elderly may get more brain stimulation. Factors related to education such as lifestyle, occupational exposure, morbidity, and health care might play a role. Persons with higher educational levels are more resistant to the effects of dementia as a result of having a greater cognitive reserve and increased the complexity of neuronal synapses.

The relation between living in rural area and risk of cognitive impairment can be explained as; in a rural community, there is lacking or inadequate in health care and mental health resources, lacking in social facilities and increase the rate of illiteracy.

The relation between leisure activities and risk of cognitive impairment can be explained as leisure activities affect MMSE score as leisure activities like cognitive activities (e.g. reading, playing board games, and playing musical instruments) were associated with a lower risk of cognitive impairment. Participation in leisure activities may increase cognitive reserve, delaying and slowing the pathological processes of disease (cognitive impairment). Leisure activities and exercises have beneficial effects on the brain by promoting plasticity, increasing the levels of neurotrophic factors in the brain, and enhancing resistance to insults.

The present study illustrates that as regarding to the relation between cognitive functions state of elderly patients and their Activity of Daily Living (ADL), the current study found 7.3% of the cognitively impaired were found to be totally dependent in activities of daily living (ADL) compared to 0.9% of those with normal cognitive functions. It was reported by many authors that cognitive impairment has a significant effect on ADL, either those who live in the nursing home (Ang et al., 2006, Sweed & Elawam, 2010) or those who live in their home (Mehta et al., 2002).

Cognitive impairment can be demonstrated by performance decline in activities of daily living (ADL) and it is closely correlated with mental status scores. The increasing prevalence of chronic illness among elderly patients can affect on their ADL.

Major risk factors e.g. hypertension and diabetes mellitus, known to be associated frequently with different cerebrovascular diseases that might also have a contribution in degenerative forms of cognitive impairment (Ciconetti et al., 2004).

Regarding medical diseases of an elderly patient with cognitive function, the present study shows that 17.9% of them have hypertension, 16.7% have diabetes mellitus, 25.2 % of having cataract patients and 26.9 % have glaucoma.

This result is similar to that reported by the study conducted by Umegaki et al., (2012) who studied risk factors associated with cognitive decline in the elderly with type 2 diabetes, and found that diabetes mellitus and hypertension were significantly associated with cognitive declines. Also, Maggi et al., (2009) studied diabetes as a risk factor for cognitive decline in older patients and found that diabetes consider as a risk factor for cognitive decline in older patients, as the metabolic and cardiovascular abnormalities associated with diabetes might be responsible for the cognitive decline, at different rates and ages, in men and women.

The relationship between cognitive impairment and hypertension is explained as chronic hypertension

leads to the breakdown of cerebral capillaries, which lead to cognitive impairment.

The relationship between cognitive impairment and diabetes mellitus is explained as diabetes (hyperglycemia) was considered associated risk factor for cognitive impairment and related to the high metabolic demand for energy in the brain, and even small disturbance in glucose metabolism can affect cognitive performance and can lead to cognitive impairment.

In agreement with Gussekloo et al., (2005) who studied the sensory impairment and cognitive functioning in oldest-old subjects, and found visual impairment were associated with lower scores on the MMSE. Also agrees with Ong et al., (2012) who study visual impairment, age-related eye diseases, and cognitive function, and found that older persons with visual impairment, particularly those due to cataract, were more likely to have cognitive dysfunction.

The relationship between cognitive impairment and visual impairment is based on the influence of visual impairment on the level and quality of interactive experiences of older adults, thus reducing their capacity to develop and maintain relationships and to participate in activities that may improve their physical, mental and psychosocial well-being. Vision impairment affects cognitive performance by reducing the level of participation in these types of stimulating activities and thus leads to a decrease in brain reserve. The lack of activity may exacerbate cognitive impairment indirectly if it predisposes a person to depression and social isolation.

## Conclusion

Elderly patients at high risk to develop cognitive impairment especially those who are aged  $\geq 65$  years, female, live in rural area, not educated, lives alone and have impairment in ADL.

## Recommendations

screening for cognitive impairments among the elderly is very important in early detection for those with cognitive impairments. Increasing elderly awareness about the importance of regular examinations to detect early medical disorders that may negatively affect cognitive functions.

## References

1. American Psychiatric Association (APA), (2000): Diagnostic and statistical manual of mental disorders, 4<sup>th</sup> ed., Washington
2. Ang Y., Au S., Yap L., & Ee C., (2006): Functional decline of the elderly in a nursing home. Singapore Med J. 47(3):219-224.

3. **Angevaren M., Aufdemkampe G., Verhaar H., Aleman A., & Vanhees L., (2008):** Physical activity and enhanced fitness to improve cognitive function in older people without known cognitive impairment. *Cochrane Database Syst. Rev.* 3, CD005381.
4. **Anstey K., Von-Sanden C., Salim A., & O’Kearney R., (2007):** Smoking as a risk factor for dementia and cognitive decline: a meta-analysis of prospective studies. *Am. J. Epidemiol.* 166, Pp. 367–378.
5. **Cicconetti P., Riolo N., Priami C., Tafaro L., and Ettore E., (2004):** Risk factors for cognitive impairment, *Recenti Prog Med.* Nov;95(11):535-45.
6. **Elliott A., Horgas A., & Marsiske M., (2008):** Nurses’ Role In Identifying Mild Cognitive Impairment In Older Adults, *Geriatr Nurs.*; 29(1): Pp. 38–47.
7. **Etgen T., Sander D., Huntgeburth U., Poppert H., Förstl H., and Bickel H., (2010):** Physical Activity and Incident Cognitive Impairment in Elderly Persons, *Arch Intern Med.*, 170(2): Pp. 186-193.
8. **Farrag A., Farwiz H., Khedr E., & Mahfouz R., (1998):** Prevalence of Alzheimer’s disease and other dementing disorders: in Assiut-Upper Egypt Study. *Dement and Geriatr Cogn Disord.*; 9: Pp 322-8.
9. **Folstein M., Folstein S., & McHugh P., (1975):** Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. *J Psychiat Res* 12: Pp. 189-198.
10. **Fossati C., De Benedetto G., Leboffe C., Marigliano B., Mancinella M., Ettore E., and Marigliano V., (2011):** A self-administered questionnaire to screen the risk of dementia: A pilot study and the results of a comparison with the mini-mental state examination (MMSE), *Archives of Gerontology and Geriatrics*, 1-5.
11. **Gussekloo J., de Craen A., Oduber C., van Boxtel M., & Westendorp R., (2005):** Sensory impairment and cognitive functioning in oldest-old subjects: the Leiden 85+ Study. *Am J Geriatr Psychiatry.*; 13(9): Pp. 781-6.
12. **Katz S., Downs T., Cash H., & Grotz R., (1970):** Progress in development of the index of ADL. *Gerontologist*; 10(1): Pp. 20-30.
13. **Krueger K., Wilson R., Kamenetsky J., Barnes L., Bienias J., & Bennett D., (2009):** Social Engagement And Cognitive Function In Old Age, *Exp Aging Res.*; 35(1): Pp. 45–60.
14. **Maggi S., Limongi F., Noale M., Romanato G., Tonin P., Rozzini R., Scafato E., & Crepaldi G., (2009):** Diabetes as a risk factor for cognitive decline in older patients. *Dement Geriatr Cogn Disord.*;27(1): Pp. 24-33.
15. **Mehta K., Yaffe K., & Covinsky K., (2002):** Cognitive Impairment, Depressive Symptoms, and Functional Decline in Older People, *J Am Geriatr Soc.*;50(6): Pp. 1045-50.
16. **Miller C., (2009):** Nursing for Wellness in Older Adult, 5th edition, Chapter 11, p.p. 192, 196, chapter 14, Pp. 273-280
17. **Ong S., Cheung C., Li X., Lamoureux E., Ikram M., Ding J., Cheng C., Haaland B., Saw S., Venketasubramanian N., Chen C., & Wong T., (2012):** Visual impairment, age-related eye diseases, and cognitive function: the Singapore Malay Eye study. *Arch Ophthalmol.*; 130(7): Pp. 895-900.
18. **Perel-Levin S., (2008):** Discussing Screening for Elder Abuse at Primary Health Care level, *Who, Aging And Life Course.*
19. **Shehatah A., El-Okda E., & Rabie M., (2009):** Prevalence of Depression and Association of Cognitive Impairment in Elderly in Suburban Community in Egypt *Current Psychiatry*; Vol. 16 No.2: Pp. 192-199).
20. **Sweed H., & Elawam A., (2010):** Cognitive Impairment among Residents of Elderly Homes In Cairo, Egypt, *Middle East Journal OF Psychiatry And Alzheimers*, Volume 1, Issue 1.
21. **Umegaki H., Imuro S., Shinozaki T., Araki A., Sakurai T., Iijima K., Ohashi Y., & Ito H., (2012):** Risk factors associated with cognitive decline in the elderly with type 2 diabetes: baseline data analysis of the Japanese Elderly Diabetes Intervention Trial. *Geriatr Gerontol Int.*; 12 Suppl 1: Pp. 103-9.
22. **Verghese J., Lipton R., Katz M., Hall C., Derby C., Kuslansky G., Ambrose A., Sliwinski M., & Buschke H., (2003):** Leisure Activities and the Risk of Dementia in the Elderly, *N Engl J Med*; Pp. 348:2508-2516.
23. **Wu M., Lan T., Chen C., Chiu H., & Lan T., (2011):** Socio-demographic and health-related factors associated with cognitive impairment in the elderly in Taiwan *BMC Public Health*, 11:22
24. **Zaitoun A., Sarhan A., Selim A., & Mousa G., (2008):** Epidemiological Study of Dementia after Retirement, *Egypt J. Neurol. Psychiat. Neurosurg.*, 45(1): Pp. 65-74.
25. **Zhuang J., Wang G., Cheng Q., Wang L., Fang R., Liu L., Xiong R., Zhang Y., Gui Y., Kang W., Tang H., & Chen S., (2012):** Cognitive impairment and the associated risk factors among the elderly in the Shanghai urban area: a pilot study from China, *Translational Neurodegeneration*, 1:22