

Assessment of Cognitive Impairment and Related Factors Among Elderly People in Jordan

Abstract

Background: With an increase in elderly people, it is essential to address the issue of cognitive impairment and support healthy aging. This study aimed to assess cognitive impairment and factors associated with it among older adults. **Materials and Methods:** A cross-sectional study was carried out in different catchment areas within the Jerash governorate in the north of Jordan. The Elderly Cognitive Assessment Questionnaire (ECAQ) and a household face-to-face interview were used to collect data from 220 older adult participants aged 60 years and more. Descriptive statistics were conducted to describe the study variables. Correlation tests were applied to find associations between them. Logistic regression analysis was applied, with a minimum significance level ($p < 0.05$). **Results:** About 9.10% of the older adults had cognitive impairment. Cognitive impairment was correlated with age, self-perceived health, hypertension, stroke, and mental illness. The primary predictors of cognitive impairment were age [odds ratio (OR) = 1.07 (1.01–1.14), $p = 0.001$] and stroke [OR = 10.92 (1.44–82.85), $p = 0.001$]. **Conclusions:** While many factors were correlated with cognitive impairment, the strongest predictors of cognitive impairment were age and stroke.

Keywords: Aged, cognition disorders, cross-sectional studies

Introduction

In 2019, about 703 million older adults aged 65 and older worldwide.^[1] And, by 2050, the number of older adults will exceed 1.5 billion.^[1] This increase in the number of older adults will be associated with more age-related health problems.^[2,3] Cognitive impairments are one example.^[4] Cognitive impairment is a chronic condition preceding dementia.^[5] In mental impairment, the cognitive deficit is less severe than dementia because independence and regular daily activities are maintained.^[6] Cognitive impairments have negative economic and psychosocial consequences. It increases the use of health care services,^[7,8] costs of health care,^[9] disabilities, and decreases the quality of life.^[10]

The prevalence of cognitive impairment in studies conducted across several countries varies.^[10-15] In Egypt, a cross-sectional study was carried out on a sample of 122 older adults aged 50 years or older. Using the Montreal Cognitive Assessment Test (MoCA), the study found that 73.7% of the participants had mild cognitive

impairment, 9.3% had moderate, and 0.8% had severe.^[10] In India, a recent cross-sectional study used the Minimum Mean Square Error (MMSE) to assess the prevalence of cognitive impairment among 100 randomly selected urban older adults aged 60 years or more. The study reported that most cognitive impairments were 26% among older adults.^[11] Another recent Indian study screened for cognitive impairment among 260 Noncommunicable Disease (NCD) patients attending a rural Primary Health Center (PHC). Using the MMSE, the study found that 10.8% of the elderly with chronic conditions.^[12] In China, in a study including 2626 older adults aged 55 and over with diabetes, they used the MMSE to assess cognitive impairment. The prevalence of cognitive impairment was 9.9%.^[13] Similarly, in Malaysia, a study used the MoCA to assess the prevalence of cognitive impairment among 113 older adults aged 55 years and

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more. The study found that the prevalence of cognitive impairments was 49.90%.^[14] In the United States, data from the National Health Interview Survey (NHIS) regarding 155,682 older adults aged 60 or more showed that the prevalence of cognitive impairment had increased from 5.7% in 1997 to 6.7% in 2015.^[15] Cognitive impairment among older adults is associated with various factors. Age,^[12,16,17] gender,^[16,17] marital status,^[13,16] education level,^[10,12,16,17] living arrangement,^[14] and self-perceived health are examples of these factors.^[16] Many recent studies have found a correlation between chronic illnesses and cognitive impairment among older adults. Hypertension,^[10,13] stroke,^[13] and mental illness are examples of chronic illnesses associated with cognitive impairment.^[11,13,16,17] However, all the previous studies were conducted in developed countries, and none were conducted in Jordan. A middle-income nation like Jordan may not have the same risk factors and chronic illness associations as other parts of the world.

In low- and middle-income nations, the population over 60 is increasing. In 2050, the number of Jordanian older adults is expected to reach 13.8% of the population.^[18] With this anticipated increase in older people, the prevalence of cognitive impairment is expected to grow and will have significant financial, personal, and social influences. So, it is essential to address the issue of cognitive impairment and support healthy aging. However, there is a dearth of studies describing the prevalence of cognitive impairment and associated risk factors in Jordan. For the purpose of creating management strategies, it is essential to understand the prevalence of cognitive impairment and associated factors in Jordan.

This study aimed to assess cognitive impairment and factors associated with cognitive impairment among older adults living in the Jerash governorate region of north Jordan.

Materials and Methods

A cross-sectional design was used to identify factors associated with and predictive cognitive impairment among the older adult^[19]; and was carried out between September and November 2021.

The study was carried out in different catchment areas within the Jerash governorate north of Jordan. Jerash is located 40 km north of Amman (the capital city).^[20] According to the population estimates, the Jerash governorate has approximately 1,088,100 people, constituting 17.8%.^[20]

A catchment area is a geographical area served by a government institute or particular health facility.^[21] The present study was done in the catchment areas linked to three PHCs. These areas are rural and situated in different locations of the Jerash governorate. They were chosen randomly to ensure that the study sample was representative of the Jerash governorate.

The sample size was calculated using the RaoSoft sample size calculator. Based on a margin of error of 5%, a confidence level of 95%, a population size of 500, a response distribution of 50%, the estimated measurement, the appropriate sample size was 218. A sample of 220 older adults, participated in the present study. The inclusion criteria are: (a) agreeing to take a 15-min interview and (b) being aged 60 years and over. The exclusion criterion is incapable of responding to questions because of diseases. The target population comprised all older adults whom the PHCs served in the Jerash governorate in the current study. The accessible population comprised all older adults who lived within the catchment areas of three PHCs in the Jerash governorate.

It is hard to offer recommendations in binary logistic regression to have sufficient statistical power.^[22] A minimum N has been recommended to be no less than ten times K , where K is the predictors' number in the model.^[23] Still, a larger N may be required to obtain sufficient statistical power.^[22] A sample size of less than 100 must be avoided, and 500 observations must be suitable for nearly all situations.^[24] In the current study, the number of predictors was 15. Subsequently, with the criteria recognized by Peduzzi *et al.*,^[23] the minimum sample size required in the present study was 150 participants.

A multi-stage sampling design was done: (1) choosing three PHCs within the Jerash governorate. These centers were chosen randomly, (2) selecting the households from the areas within the range of the three PHC's services. They were nominated using a convenience sampling technique, and (3) in the chosen spots, the investigator presented himself to the home and asked if all members of the family, 50 years of age or more, would agree to participate in the study and be interviewed.

Cognitive impairment was assessed using the Elderly Cognitive Assessment Questionnaire (ECAQ).^[25] The ECAQ is an applied instrument to determine the cognitive impairment of older individuals living in developing countries.^[25] It is a 10-item cognitive test, which is categorized into three categories: memory (three items), orientation (six items), and memory recall (one item). Every item has a value of 1 for every correct response, and the highest score is 10 points. Participants who had total scores of 5 or less were recognized as having a cognitive impairment.^[25] This 10-item questionnaire demonstrates a sensitivity of 85.30%, a specificity of 91.50%, and a positive predictive value of 82.80%.^[25]

Demographic variables were identified by using the questionnaire/self-report from respondents. They were age (years), gender (male or female), marital status (married, unmarried), education level (no education, primary education, and secondary and higher education), employment status (unemployed, employed), smoking status (smoker or nonsmoker), monthly income, self-perceived health (poor health, good health), chronic illness (yes or no), type of

chronic illness (heart diseases (yes, no)), hypertension (yes, no), diabetes mellitus (yes, no), stroke (yes, no), mental illness (yes, no), and bronchial asthma (yes, no).

Descriptive statistics were conducted to describe the study variables. Correlation tests were applied according to the level of measurement of variables to find associations between them. Logistic regression analysis was applied using SPSS software version 17, with a minimum significance level ($p < 0.05$).

Ethical considerations

Permission to carry out the study was obtained from the university's Ethical Committee (NO. 5/2/7/48). An agreement to use the ECQA was obtained. Informed verbal consent was obtained from the participants. In addition, the anonymity and confidentiality of the participant's data were protected.

Results

The participants' mean age was 64.70(9.96). About 57.30% were males, the remaining 42.70% were female, and the majority of participants were married (88.60%). More than one-third of participants (36.80%) had no education, 42.70% had a primary school education, and 20.50% had a secondary or higher level of education. The majority were unemployed and nonsmokers, with the mean income for each participant equaling 232.36 Jordanian Dinars monthly. Most of the participants perceived their health as good. About 71.40% of participants had a chronic illness. The most commonly cited chronic conditions were heart diseases, hypertension, diabetes mellitus, stroke, mental illness, and bronchial asthma [Table 1].

Based on the ECAQ, 9.10% of the participants showed cognitive impairment. Increasing age, self-rated perceived health, and having hypertension, stroke, or mental illness were significantly associated with cognitive impairment ($r = 0.25$, $p = 0.01$). These factors, especially cognitive impairment, were entered into the logistic regression analyses. However, gender, marital status, education level, employment status, smoking, family monthly income, and having heart disease, diabetes, or bronchial asthma were not significantly associated with cognitive impairment ($p > 0.05$) and consequently were excluded from the logistic regression analyses. On the other hand, the average income of the participants suggests that they are in a low-income group. This may show that they might be a socially deprived group with limited access to resources.

The factors significantly associated with cognitive impairment among the older adults in the logistic regression analysis were age (OR 1.07, 95% CI 1.01–1.14) and stroke (OR 10.92, 95% CI 1.44 – 82.85) [Table 2].

Discussion

The current study indicated that the prevalence of cognitive

Table 1: Descriptive statistics (n=220)

Variables	n (%)	Mean (SD)
Age (years)		64.77 (10.02)
Gender:		
Male	126 (57.30)	
Female	94 (42.70)	
Marital status:		
Married	195 (88.60)	
Unmarried	25 (11.40)	
Education level:		
No education	81 (36.80)	
Primary education	94 (42.70)	
Secondary and higher education	45 (20.50)	
Employment status:		
Employed	52 (23.60)	
Unemployed	168 (76.40)	
Smoking status:		
Smoker	68 (30.90)	
Nonsmoker	152 (69.10)	
Monthly income (in JD)*		232.36 (102.47)
Self-perceived health:		
Poor health	58 (26.40)	
Good health	162 (73.60)	
Chronic illnesses:		
Yes	157 (71.40)	
No	63 (28.60)	
Heart diseases		
Yes	39 (17.70)	
No	181 (82.30)	
Hypertension		
Yes	98 (44.50)	
No	122 (55.50)	
Diabetes mellitus		
Yes	83 (37.70)	
No	137 (62.30)	
Stroke		
Yes	5 (2.30)	
No	215 (97.70)	
Mental illness		
Yes	5 (2.30)	
No	215 (97.70)	
Bronchial asthma		
Yes	10 (4.50)	
No	210 (95.50)	
Cognitive impairment		
Yes	20 (9.10)	
No	200 (90.90)	

*JD: Jordanian Dinar

impairment is 9.1% among the elderly Jordanian population. A recent survey conducted among the Chinese elderly with diabetes found a similar majority^[13] and less than 6.70% among Americans aged 60 years and older.^[15] At the same time, a study conducted among the elderly in South India found a higher prevalence (26.06%).^[11] Also, a survey conducted

Table 2: Logistic regression analysis of predictors of cognitive impairment among old adult

Predictors	B	S.E.**	Wald	p	Exp (B)	95% CI*	
						Lower	Upper
Age	0.076	0.031	6.171	0.013	1.079	1.016	1.145
Self-perceived health	-0.857	0.553	2.407	0.121	0.424	0.144	1.253
Hypertension	0.545	0.562	0.942	0.332	1.725	0.574	5.187
Stroke	2.391	1.034	5.348	0.021	10.92	1.440	82.858
Mental illness	0.823	1.135	525	0.469	2.277	0.246	21.060

*Confidence interval (CI)=95%. **S.E.=Standard error

in Egypt found a much higher prevalence of cognitive impairment among older adults (32%).^[10] This dissimilarity among studies could be a function of the self-reported nature of some studies, the differences in study populations, the setting where studies were conducted, and the differences in tools used to assess cognitive impairment. Therefore, there is a need for a national and international effort to design a multi-center study considering all the factors.

In the present study, the results indicated that the prevalence of cognitive impairment increased with aging. Correspondingly, studies have shown that increasing age is associated with cognitive impairment.^[12,16,17]

The present study found a relationship between self-perceived health and cognitive impairment among older adults regarding the self-perceived health variable. This result was consistent with Indian studies.^[16] However, it was inconsistent with a Brazilian study, which found no association between cognitive impairment and self-perceived health.^[26] In previous studies, self-perceived health was examined as a significant predictor of cognitive impairment.^[27]

The present study indicated that hypertension was associated with cognitive impairment among older adults, similar to other study findings.^[13] On the other hand, the association between hypertension and cognitive impairment is still unproven.^[28] Future studies may advance our understanding of the direction and amount of the interaction between hypertension and cognitive impairment and the impact of hypertension treatment on the decline of cognitive impairment.

The current study found that stroke was significantly associated with cognitive impairment among older adults. This is comparable to findings from a survey of 2626 aging in China.^[13] Whereas, in India, a cross-sectional study found that stroke was not associated with cognitive impairment among 100 older adults.^[16] On the other hand, the wide confidence interval around our finding that there was an association between stroke and cognitive impairment pointed to the fact that we are less assured. Therefore, data needs to be gathered in future studies to increase our confidence and have more data about the influence.

Regarding mental illness, this study reported a significant association between cognitive impairment among older adults and mental illness. Similar findings were found in a recent survey conducted in China^[13] and India.^[11,16] Across

the globe, studies have shown that risk factors for cognitive impairment include anxiety and depression.^[29] Therefore, to improve the detection of cognitive impairment, it is essential to evaluate cognitive status among older adults once a new mental illness is diagnosed.^[30]

Age and stroke were the strongest predictors of cognitive impairment among older adults in the present study. The current study found that cognitive impairment increased with age. Similar to a cross-sectional study conducted in Malaysia^[14] and India,^[16] in this study, logistic regression showed that an old adult with a stroke was 10 times more likely to have cognitive impairment than those who did not have a stroke. The current study results were consistent with a Chinese study.^[28]

The current study has some limitations. A cross-sectional study limits our ability to examine detailed causal inferences; further longitudinal studies are needed. The results cannot be generalized to all Jordanian old age as the participants were selected from the north of Jordan only. The ECAQ is a screening instrument only. Also, the cognitive impairment was measured with a single tool. In addition, participants of this study were community-dwelling older adults (50–92 years) with a pretty low frequency of cognitive impairment (about 9.10%) who had evidence of cognitive impairment based on ECAQ.^[25] The strengths of the present study were that all significant risk factors were addressed in this study, the cognitive impairment was assessed among different chronic illnesses, and the use of a valid instrument.

Conclusion

Compared with some other countries, the percentage of older adults who had cognitive impairment in this study was lower. The current study identified several factors that were associated with cognitive impairment. However, the predictors of cognitive impairment were age and stroke. Therefore, it is essential to encourage older adult patients with chronic illnesses about the importance of lifestyle modifications (such as engaging in physical activity, avoiding smoking, and use of alcohol), which may help to improve their illness condition and cognitive functions. The study findings add to the senior nursing body of knowledge regarding the health status of older adults, which will help develop an effective nursing program that promotes the health of older adults. Moreover,

such findings will help create a comprehensive healthcare program in PHCs that allows care providers to screen and refer to cognitive impairment cases.

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Conflict of interest

Nothing to declare.

References

- United Nations, Department of Economic and Social Affairs, Population Division (2020). World Population Ageing 2019 (ST/ESA/SER.A/444).
- Chang AY, Skirbekk VF, Tyrovolas S, Kassebaum NJ, Dieleman JL. Measuring population ageing: An analysis of the global burden of disease study 2017. *Lancet Public Health* 2019;4:e159-67.
- Jakovljevic M. Population ageing alongside health care spending growth. *Serbian Archives of Medicine* 2017;145:113.
- Ebrahimi H, Hosseinzadeh M, Seifi Saray R, Wilson M, Namdar Areshtanab H. Ability of older adults to recognize cognitive changes and its relationship with mental health: A cross-sectional study. *BMC Geriatr* 2022;22:402.
- Rasmussen J, Langerman H. Alzheimer's disease—why we need early diagnosis. *Degener Neurol Neuromuscu Dis* 2019;9:123-30.
- Dhakal A, Bobrin BD. *Cognitive Deficits*. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023.
- LaMantia MA, Stump TE, Messina FC, Miller DK, Callahan CM. Emergency department use among older adults with dementia. *Alzheimer Dis Assoc Disord* 2016;30:35–40.
- St-Hilaire A, Hudon C, Preville M, Potvin O. Utilization of healthcare services among elderly with cognitive impairment no dementia and influence of depression and anxiety: A longitudinal study. *Aging Ment Health* 2017;21:810–22.
- Hoffman GJ, Maust DT, Harris M, Ha J, Davis MA. Medicare spending associated with a dementia diagnosis among older adults. *J Am Geriatr Soc* 2022;70:2592-601.
- AbouGabal M. *Assessing the Correlation between the Socioeconomic Level and Cognitive Function Among Older PhD Thesis*. The American University in Cairo (Egypt). 2023.
- Mohan D, Iype T, Varghese S, Usha A, Mohan M. A cross-sectional study to assess prevalence and factors associated with mild cognitive impairment among older adults in an urban area of Kerala, South India. *BMJ Open* 2019;9:e025473.
- Krishnamoorthy Y, Sarveswaran G, Sakthivel M, Rehman T, Majella M, Kumar S. Screening for mild cognitive impairment among noncommunicable disease patients attending a rural primary health center in Puducherry, South India. *J Nat Sci Biol Med* 2019;10:77.
- Xiu S, Liao Q, Sun L, Chan P. Risk factors for cognitive impairment in older people with diabetes: A community-based study. *Ther Adv Endocrinol Metab* 2019;10:2042018819836640.
- Suain Bon R, Ariaratnam S, Mat Saher Z, Mohamad M, Lee FS. Cognitive impairment and its associated risk factors in the elderly with type 2 diabetes mellitus. *Front Psychiatry* 2021;12:669725.
- Luo H, Yu G, Wu B. Self-reported cognitive impairment across racial/ethnic groups in the United States, National Health Interview Survey, 1997-2015. *Prev Chronic Dis* 2018;15:E06.
- Konda PR, Sharma PK, Gandhi AR, Ganguly E. Correlates of cognitive impairment among Indian urban elders. *J Gerontol Geriatr Res* 2018;7:489.
- Giri M, Chen T, Yu W, Lü Y. Prevalence and correlates of cognitive impairment and depression among elderly people in the world's fastest growing city, Chongqing, People's Republic of China. *Clin Interv Aging* 2016;11:1091-8.
- United Nations. *World Population Prospects: 2008 Revision*. Author.
- Spector PE. Do not cross me: Optimizing the use of cross-sectional designs. *J Busi Psychol* 2019;34:125-37.
- Jordan Ministry of Health Jerash Health Directorate. *PHC Services and Population of Alweya in Jerash*. Jerash (Health Directorate of Jerash): Ministry of Health: Jordan; 2020.
- Webster's New World College Dictionary. *Catchment's Area Definition*. Wiley Publishing, Inc.: Cleveland, Ohio; 2010.
- Warner R. *Applied Statistics II: Multivariable and Multivariate Techniques*. Sage Publications University of New Hampshire, USA; 2020.
- Peduzzi P, Concato J, Kemper E, Holford TR, Feinstein AR. A simulation of the number of events per variable in logistic regression analysis. *J Clin Epidemiol* 1995;99:1373-9.
- Frees EW, Derrig RA, Meyers G, editors. *Predictive Modeling Applications in Actuarial Science*. Vol 1. Cambridge University Press New York, USA; 2014.
- Kua EH, Ko SM. A questionnaire to screen for cognitive impairment among elderly people in developing countries. *Acta Psychiatr Scand* 1992;85:119-22.
- Almeida MLD, Dalpubel D, Ribeiro EB, Oliveira ESD, Ansai JH, Vale FAC. Subjective cognitive impairment, cognitive disorders and self-perceived health: The importance of the informant. *Dement Neuropsychol* 2019;13:335-42.
- Luszcz MA, Anstey KJ, Ghisletta P. Subjective beliefs, memory and functional health: Change and associations over 12 years in the Australian longitudinal study of ageing. *Gerontology* 2015;61:241-50.
- Wang Y, Song M, Yu L, Wang L, An C, Xun S, et al. Mild cognitive impairment: Vascular risk factors in community elderly in four cities of Hebei Province, China. *PLoS One* 2015;10:e0124566.
- Sutin AR, Stephan Y, Terracciano A. Psychological distress, self-beliefs, and risk of cognitive impairment and dementia. *J Alzheimers Dis* 2018;65:1041-50.
- Lavigne KM, Sauvé G, Raucher-Chéné D, Guimond S, Lecomte T, Bowie CR, et al. Remote cognitive assessment in severe mental illness: A scoping review. *Schizophrenia* 2022;8:14.