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# COGNITIVE IMPAIRMENT AND RELATED FACTORS AMONG SAMPLE OF ELDERLY PEOPLE IN BAGHDAD AL-KARKH DURING 2024

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## ABSTRACT

**Background:** With the global rise in the elderly population, addressing cognitive impairment has become crucial due to its impact on memory, learning, concentration, and decision-making, leading to functional disability and increased societal burden. This study aimed to assess the prevalence of cognitive impairment among older adults, identify associated factors, and evaluate the applicability of a simple screening tool for early detection in primary health care centers. **Methodology:** A cross-sectional study was conducted in Baghdad on a convenient sample of 200 elderly individuals (>60 years old) attending four primary health care centers under the Al-Karkh Health Directorate from March 1 to August 31, 2024. Data were collected through direct interviews using the Elderly Cognitive Assessment Questionnaire. Descriptive statistics described study variables, while the Chi-square test assessed associations between categorical variables, considering a p-value of <0.05 statistically significant. **Results:** The study found that 17.5% of participants had cognitive impairment. Significant associations were observed between cognitive impairment and low educational level, lack of work experience, history of hypertension, and smoking ($p < 0.05$). **Conclusion:** Cognitive impairment is increasingly prevalent among older adults in Al-Karkh, Baghdad. Key risk factors include low education, unemployment, smoking, and hypertension. Implementing a simple screening tool, such as the Elderly Cognitive Assessment Questionnaire, in primary health care centers is recommended for early detection and intervention.

**KEYWORDS:** Cognitive impairment, elderly, primary health care, screening tool, risk factors, Baghdad.

## INTRODUCTION

Cognition encompasses a range of mental processes, including perception, attention, memory, learning, reasoning, decision-making, problem-solving, and communication. These processes are fundamental to understanding neuropsychiatric disorders and their symptoms.[1] Cognitive impairment (CI) is a significant health concern, particularly among the elderly, with prevalence rates ranging from 8.4% to 42.7% across different settings.[2-4] It is often associated with reduced quality of life, increased disability, and a higher burden on caregivers.[2,3] As the global population ages, the prevalence of CI is expected to rise, making it a critical public health issue.[5] Cognitive impairment and dementia are distinct yet related conditions. Mild cognitive impairment (MCI) involves objective cognitive decline without significant interference in daily activities, whereas dementia is characterized by substantial functional decline and impairment in multiple cognitive domains.[6,7] Alzheimer's disease (AD), the most common cause of both MCI and dementia, is marked by amyloid-beta plaques and tau protein tangles, with the receptor for advanced glycation end products (RAGE) playing a crucial role in its pathophysiology.[8] Early detection of CI is essential for timely intervention, which can potentially slow or prevent the progression to dementia.[9] The global increase in the elderly population, projected to rise from 11% in 2011 to 22% by 2050, underscores the urgency of addressing CI.[5] This demographic shift is driven by declining birth and mortality rates, coupled with increased life expectancy.[10] In the U.S., approximately two-thirds of individuals experience some level of cognitive impairment, with significant disparities observed among disadvantaged groups.[11] In Iraq, the elderly face additional challenges due to ongoing conflicts and limited access to healthcare services.[12] Screening tools such as the Elderly Cognitive Assessment Questionnaire (ECAQ) and the Montreal Cognitive Assessment (MoCA) are vital for early detection of CI. The ECAQ,

for instance, demonstrates high sensitivity (85.3%) and specificity (91.5%) in screening for CI among elderly populations in developing countries.[13] Early diagnosis facilitates timely interventions, shared decision-making, and better management of co-occurring conditions.[14,15] Understanding the multifaceted risk factors for CI, including sociodemographic variables, chronic health conditions, and lifestyle factors, is crucial for developing effective prevention and treatment strategies.[16,17] Lifestyle modifications, cognitive training, and pharmacological interventions offer promising avenues for managing CI and improving the quality of life for affected individuals.[18,19] As CI continues to pose a significant challenge globally, early detection and comprehensive management strategies are essential to mitigate its impact on aging populations. The aim of study is to evaluate the prevalence of cognitive impairment among a sample of attendees at four primary health care centres (PHCCs) in Baghdad who are at least 60 years old. To determine the factors that may be associated with cognitive impairment. To evaluate the suitability of ECAQ as a screening tool for CI in the geriatric population of Iraq.

## METHOD

A cross-sectional study with an analytical component was conducted in Baghdad from March 1 to August 31, 2024, with data collection occurring approximately 2-3 days per week. A convenient sample was obtained from four Primary Health Care Centers (PHCCs) within the Baghdad Al-Karkh Health Directorate. Three health districts were selected using a convenience sampling method, followed by the selection of four PHCCs: Al-Wafaa PHCC in Al-Kadhimiya, Bilat Al-Shuhadaa PHCC in Al-Dora, Al-Jihad PHCC, and Al-Salam PHCC in Al-Amil. All individuals aged 60 years and older attending these PHCCs during the data collection period were eligible to participate, with numbers varying across centers based on participant availability. A total of 200 participants were recruited using a convenience sampling method. The inclusion criteria consisted of individuals aged 60 years and older who attended PHCCs, regardless of their health status.[20] The exclusion criterion was a prior diagnosis of mental illness or cognitive impairment. Cognitive impairment was assessed using the Elderly Cognitive Assessment Questionnaire (ECAQ), a validated screening tool designed for elderly individuals in developing countries. The ECAQ comprises 10 items across three categories: memory (three items), orientation (six items), and memory recall (one item), with a total score ranging from 0 to 10. A score of ≤5 indicated cognitive impairment. The tool demonstrates high sensitivity (85.3%) and specificity (91.5%), with a positive predictive value of 82.8%.[13] Data on socio-demographic characteristics were collected through direct interviews. Variables included age, gender, education level, occupation, smoking status, alcohol use, and chronic illnesses such as hypertension, diabetes, stroke, osteoarthritis, asthma, autoimmune diseases, and liver disease. Marital status and family size were categorized into three living conditions: living with a partner, living with others, and living with both. Data were analyzed using Microsoft Family 365 and the Statistical Package for Social Sciences (SPSS) version 29. Continuous variables were presented as means and standard deviations, while categorical variables were expressed as frequencies and percentages. Associations between categorical variables were examined using the chi-square test, with a p-value of <0.05 considered statistically significant. Ethical approval was obtained from the Ethical Scientific Committee of the Department of Family and Community Medicine, College of Medicine, University of Baghdad, and the Scientific Council of Family and Community Medicine, Iraqi Board for Medical Specialization. Permission was granted by the Baghdad Karkh Health Directorate. Verbal informed consent was obtained from all participants after explaining the study's purpose and ensuring confidentiality.

## RESULTS

This study involved 200 individuals, with a mean age of 66.09 ± 5.487 years, of which 51% were male. The majority were married, comprising 73.5%, Their educational levels were as follows: illiterate 22.5%, able to read and write 16%, and primary school education 20%. Over fifty per cent were unemployed or not part of the workforce, precisely 52.5%. The study revealed that 165 individuals (83%) demonstrated no cognitive impairment, having scored above five on the Elderly Cognitive Assessment Questionnaire (ECAQ). The average score of the ECAQ was 7.56 ± 2.17. as in table 1.

**Table 1: Demographic Data Summary.**

| Category | Subcategory | Number | Percentage (%) |
|---|---|---|---|
| Sex | Male | 101 | 51.0 |
| | Female | 99 | 49.0 |
| Age | 60-64 | 101 | 50.5 |
| | 65-69 | 42 | 21.0 |
| | 70-74 | 39 | 19.5 |
| | 75-79 | 13 | 6.5 |
| | 80-84 | 5 | 2.5 |
| Marital Status | Married | 147 | 73.5 |
| | Widow/Widower | 49 | 24.5 |
| | Single | 4 | 2.0 |

| | | | |
|---|---|---|---|
| Living Condition | With others without partner | 53 | 26.5 |
| | With partner and others | 143 | 71.5 |
| | With partner only | 4 | 2.0 |
| Education | Illiterate | 45 | 22.5 |
| | Write and read | 32 | 16.0 |
| | Primary school | 41 | 20.5 |
| | Intermediate school | 32 | 16.0 |
| | Secondary school | 19 | 9.5 |
| | College | 26 | 13.0 |
| | More | 5 | 2.5 |
| Work Experience | Unemployed/non-worker | 105 | 52.5 |
| | Retired and doesn't work | 51 | 25.5 |
| | Retired but working | 8 | 4.0 |
| | Worker | 29 | 14.5 |
| | Employee | 7 | 3.5 |
| Cognitive Impairment | No risk of CI | 165 | 83.0 |
| | Risk of CI | 35 | 17.0 |

Among participants 65% of individuals were non-smokers, 97% of them did not consume alcohol, 52% had HTN, 38.5% had DM, and 8.5% had a previous history of stroke **(Table 2)**.

**Table 2: Habits and chronic disease distribution.**

| | | N | % |
|---|---|---|---|
| **Smoking** | **Ex-smoker** | 38 | 19.0% |
| | No | 130 | 65.0% |
| | Yes | 32 | 16.0% |
| **Alcohol** | No | 194 | 97.0% |
| | Sober | 6 | 3.0% |
| **Hypertension** | No | 96 | 48.0% |
| | Yes | 104 | 52.0% |
| **Diabetes mellitus** | No | 123 | 61.5% |
| | Yes | 77 | 38.5% |
| **Stroke** | No | 183 | 91.5% |
| | Yes | 17 | 8.5% |
| **Other** | No | 169 | 84.5% |
| | Yes | 31 | 15.5% |

The study showed the highest percentage of persons with C.I in those who are aging 75Y-79y, female, living with others without partner, illiterate, unemployed non worker, Ex-Smoker, nonalcoholic, also those with history of H.T, D.M, and stroke. **Table (3).**

**Table 3: Cognitive impairment distribution among sociodemographic characteristics, habits and chronic diseases, which show the percentage of persons with C.I among subgroups of each variable.**

| | | N. of CI | C.I% |
|---|---|---|---|
| **Age** | 60 – 64 | 17 | 16.8 |
| | 65 – 69 | 10 | 23 |
| | 70 – 74 | 4 | 10.3 |
| | 75 – 79 | 3 | 23.1 |
| | 80 – 84 | 1 | 20 |
| **Sex** | Male | 16 | 15.8 |
| | Female | 19 | 19.2 |
| **Living condition** | With partner | 0 | 0 |
| | With others | 13 | 24.5 |
| | With partner and others | 22 | 15.4 |
| **Education** | Illitrate | 25 | 55.6 |
| | Write and read | 7 | 21.9 |
| | Primary school | 3 | 7.3 |
| | Intermediate school | 0 | 0 |

| | | | |
|---|---|---|---|
| | Secondary school | 0 | 0 |
| | College | 0 | 0 |
| | Higher education | 0 | 0 |
| **occupation** | Worker | 6 | 20.7 |
| | Unemployed / non-worker | 29 | 27.6 |
| | Retired and work | 0 | 0 |
| | Retired and doesn't work | o | 0 |
| | Employed | 0 | 0 |
| **Smoking** | Yes | 3 | 9.4 |
| | No | 19 | 14.6 |
| | Ex-smoker | 13 | 34.2 |
| **Alcohol consumption** | Yes | 0 | 0 |
| | No | 35 | 18 |
| **Hypertension** | Yes | 27 | 26 |
| | No | 8 | 8.3 |
| **Diabetes mellitus** | Yes | 17 | 22.1 |
| | No | 18 | 14.6 |
| **Stroke** | Yes | 5 | 29.4 |
| | No | 30 | 16.4 |
| **Others** | Yes | 8 | 25.8 |
| | No | 27 | 15.9 |

There was no statistically significant association between CI and age groups, sex and living conditions, with a p-value of 0.573, 0,53, and 0.212, respectively. However, a significant difference was found in different education and occupation groups with a p-value < 0.001. There was a significant association in CI between the history of smoking, with a p-value of 0.008, but not with alcohol consumption, with a p-value < 0.05. There was a significant association in CI between those with a history of HTN, with a p-value of 0.001, but not with a history of DM, and stroke with a p-value < 0.05. There was no significant association in CI between the history of having other diseases which include (liver diseases, autoimmune diseases, osteoarthritis, and asthma) with a P-value of 0.186. As shown in **Table (4).**

**Table 4: Association of CI with sociodemographic characteristics, habits and chronic diseases.**

| | | **With cognitive impairment score<5** | **Without cognitive impairment score >5** | **total** | **Pearson Chi-Square p-value** |
|---|---|---|---|---|---|
| age | 60y-64y | 17 | 84 | 101 | 0.573 |
| | 65y-69y | 10 | 32 | 42 | |
| | 70y-74y | 4 | 35 | 39 | |
| | 75y-80y | 3 | 10 | 13 | |
| | >80y | 1 | 4 | 5 | |
| Sex | Female | 19 | 80 | 99 | 0.53 |
| | Male | 16 | 85 | 101 | |
| Living condition | With partner | 0 | 4 | 4 | 0.212 |
| | With others | 13 | 40 | 53 | |
| | With partner and others | 22 | 121 | 143 | |
| Education | Illiterate | 25 | 20 | 45 | **< 0.001** |
| | Read and write | 7 | 25 | 32 | |
| | Primary school | 3 | 38 | 41 | |
| | Intermediate school | 0 | 32 | 32 | |
| | Secondary school | 0 | 19 | 19 | |
| | collage | 0 | 26 | 26 | |
| | Higher education | 0 | 5 | 5 | |
| occupation | Un employer/non worker | 29 | 76 | 105 | **< 0.001** |
| | worker | 6 | 23 | 29 | |
| | Retired and does not work | 0 | 51 | 51 | |
| | Retired and work | 0 | 8 | 8 | |
| | employer | 0 | 7 | 7 | |
| **Habits** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Smoking | Ex-smoker | 13 | 25 | 38 | **0.008** |
| | No | 19 | 111 | 130 | |
| | Yes | 3 | 29 | 32 | |
| Alcohol | No | 35 | 159 | 194 | 0.252 |
| | yes | 0 | 6 | 6 | |
| **Chronic diseases** | | | | | |
| Hypertension | No | 8 | 88 | 96 | **0.001** |
| | Yes | 27 | 77 | 104 | |
| Diabetes mellitus | No | 18 | 105 | 123 | 0.178 |
| | Yes | 17 | 60 | 77 | |
| Stroke | No | 30 | 153 | 183 | 0.177 |
| | Yes | 5 | 12 | 17 | |
| Others | No | 23 | 146 | 169 | 0.186 |
| | Yes | 8 | 23 | 31 | |

## DISCUSSION

Cognitive impairment (CI) is a growing global health concern, with variations in prevalence and associated risk factors across different studies. The current study found a CI prevalence of 17% using the Elderly Cognitive Assessment Questionnaire (ECAQ), with significant associations observed for smoking (p=0.008), hypertension (p=0.001), educational level, and occupation (p<0.001). Unlike other studies, age and gender did not show a significant correlation with CI. A study in Mosul by Harith Kh. Muzammil Al-Qazaz et al.[21] using the Saint Louis University Mental Status (SLUMS) tool found a higher CI prevalence (43%), with significant associations with educational level, occupation, and income. The discrepancy may be due to differences in cognitive assessment tools and sample populations. Similarly, a study in Sulaimani by Zana Faris Muhammed et al.[22] using the Mini-Mental State Examination (MMSE) reported a higher CI prevalence (31.25%) and associations with advanced age, female gender, low socioeconomic status, and sensory impairments. The current study's lower CI prevalence may be due to differences in assessment methods and socio-demographic variables examined. In a case series study at Al-Yarmouk Teaching Hospital, 27% of stroke patients were found to have CI using MMSE.[23] In contrast, the current study did not find a significant association between CI and stroke, likely due to differences in study design and sample selection. The hospital-based study focused on stroke patients, while the current study included all elderly PHCC attendees regardless of health status. Comparing findings with Alkhawaldeh et al. in Jordan[24], where CI prevalence was 9.1%, both studies found hypertension to be a significant risk factor. However, Alkhawaldeh's study identified age and stroke as predictors of CI, while the current study did not find significant associations with these variables. Differences in sample characteristics and methodological approaches likely explain these variations. A study in Spain by Millán-Calenti et al.[25] reported CI prevalence ranging from 22.2% to 35.2%, with higher rates in women and a strong negative correlation between age and MMSE scores. In contrast, the current study did not find significant associations with age or gender. Millán-Calenti's study also identified associations with heart failure, anemia, and stroke, whereas the current study found significant links only with hypertension and smoking. The differences may stem from variations in assessment tools and population characteristics. Holz et al. in Brazil[26] reported a CI prevalence of 34% using MMSE and found associations with older age, female gender, lower education, and depression. While both studies linked CI with lower education, the current study found no significant associations with age or gender but identified hypertension and smoking as significant factors. Differences in sample demographics, socioeconomic context, and cognitive assessment tools likely contributed to these variations. Finally, comparing the study with Feng Qin et al. in China[27], where CI prevalence varied regionally from 16.53% to 29.94%, the current study's prevalence (17%) aligns more closely with lower estimates. Feng Qin's study found significant associations with marital status, living conditions, and geographic factors, whereas the current study did not. Differences in cultural, geographical, and healthcare contexts, as well as variations in assessment tools, likely account for these disparities. Overall, differences in CI prevalence and risk factors across studies highlight the influence of assessment tools, study populations, and contextual factors. The findings reinforce the importance of hypertension and smoking as modifiable risk factors for CI and emphasize the need for targeted interventions to improve cognitive health among older adults.

## CONCLUSION

The study revealed that 17% of the elderly individuals exhibited cognitive impairment, with smoking, hypertension, work experience, and education level being identified as influential factors. In contrast to certain reports from other countries, age, sex, and living status did not emerge as essential correlates of a significant association. In contrast to the other tools, which are time-consuming, not as user-friendly, and not specifically designed for the elderly, the ECAQ is user-friendly and specific to the elderly. It is intended for the diagnosis of cognitive impairment in all age groups.

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