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Multimorbidity, Polypharmacy and Cognitive Assessment Among a Sample of Elderly People in Erbil

Didan Jassim Muhamed* Ali Shakir Dauod Rachel Elaine Dunham*****

Abstract

Background and objectives: As life expectancy increases and the world's population ages, multimorbidity is becoming more widespread globally, the study aims to evaluate the degree of cognitive impairment and the frequency of polypharmacy and multi-morbidity in elderly patients, as well as the association of cognitive impairment with sociodemographic background, adverse drug reactions, with multimorbidity and polypharmacy.

Methods: A cross-sectional study was conducted with 165 elderly patients (who visited Rizgari Teaching Hospital and Brayati Family Primary Health Center in Erbil City, from the first of February 2023 till end of September 2023) were enrolled in this study. The questionnaire included basic demographics, medical, and medication history, and a cognitive assessment. The latter was done using the Mini-Mental State Examination.

Results: The results demonstrated that with increasing age, cognitive impairment became more severe (p-value = 0.005). There was more severe cognitive impairment among females (20.2%) compared with males (3.7%). (p-value <0.001). The severity of cognitive impairment was improved among those with higher levels of education. Of those with low socioeconomic status, 35% had severe cognitive impairment in comparison to those with medium socioeconomic status which was 4.8% (p-value <0.001). Of the participants, 92.7% had multimorbidity with no significant association with cognitive impairment (P-value = 0.625). Around one-quarter (24.8%) of participants took 5 or more medications. Some commonly observed adverse drug reactions were observed like: constipation, falling, delirium, difficulty sleeping, urine retention, and vertigo with significant association with cognitive impairment (p-value = 0.021).

Conclusion: In this study, it was found that severe cognitive impairment increases with age among the elderly in Erbil, with females and illiterate individuals more affected.

Keywords: Cognitive impairments, Multimorbidity, Mini-mental status examination, Polypharmacy

*MBChB, KHCMS, Department of Family Medicine, Kurdistan Higher Council of Medical Specialties, Erbil, Iraq. Email: didanjassim92@gmail.com Corresponding author.
**MPH, JBFM, PhD, Assistant Professor of Family Medicine, Department of Community Medicine, Hawler Medical University. College of Medicine Erbil, Iraq. Email: alidauod@hotmail.com.
*** DABFM, MD, Consultant in Family Medicine, Department of Family Medicine, Kurdistan Higher Council of Medical Specialties, Duhok, Iraq. Email: rdunham7@gmail.com

Introduction

The prevalence of multimorbidity is rising globally as the world's population ages and life expectancy increases.[1] The occurrence of two or more chronic illnesses in a given patient is known as multimorbidity, affecting 81.5% of those over the age of 85. The number of medications taken rises with multimorbidity.[1] Taking five or more different types of medication each day is the criterion for polypharmacy that is most frequently employed in medical research. [2] Polypharmacy is especially concerning for elderly individuals for several reasons. Multimorbidity is more common in the elderly. Due to age-related pharmacodynamic changes, elderly people are more vulnerable to Adverse drug reactions.[3] Because polypharmacy has been tied to an increase in Adverse drug reactions, as well as an increase in morbidity and mortality in this population, it is a serious public health concern for older adults.[4] A connection between polypharmacy and impaired cognitive performance has been found in certain research. Some studies have looked at how polypharmacy affects older adults living in communities as their cognitive abilities deteriorate.[3] Mild cognitive impairment (MCI) is a deterioration in cognitive function that substantially interferes with day-to-day activities and is greater than expected for a person's age and educational level. Dementia, on the other hand, affects daily functioning in a more profound and widespread way.[5] Most cases of MCI will proceed to dementia or Alzheimer's dementia, according to numerous long-term follow-up studies. Individuals with MCI have a three to four times increased risk of dementia than people with normal cognitive function.[5,6] The combination of physical frailty and cognitive impairment is termed mental frailty, which is connected to a higher risk of mortality. Frailty and cognitive decline are also linked to an increased likelihood of falls and subsequent physical injuries.[5] Few studies have examined the relationships between multimorbidity, polypharmacy, and CI in older persons.[2,5] Recognizing the interrelationship of these factors is essential to developing effective strategies to improve the quality of life and health outcomes for the elderly. The aim of this study was to assess the prevalence and severity of CI as well as the prevalence of multimorbidity and polypharmacy among geriatric patients, and also. The relationship between cognitive impairment and factors such as sociodemographic background and adverse drug reactions.

Materials and methods

A cross-sectional study was carried out between February 1, 2023, and September 30, 2023, including a sample of 165 older patients. Participants were selected from those 65 years of age or older who came to the outpatient clinics at Brayati Family Medicine Health Center and Rizgari Teaching Hospital in Erbil, Iraq. Each participant was interviewed for about thirty minutes to complete a questionnaire. Multimorbidity refers to the co-occurrence of two or more chronic conditions at the same time.[1] Polypharmacy is defined as the regular use of 5 or more medications at the same time.[2] The questionnaire included participants' age, gender, place of residence, marital status, level of education, socioeconomic status. [7] (which was divided into low and medium), ownership of a home and a car (if applicable), income, and occupation. Also, use of tobacco products, alcohol, current medications, and a list of his or her chronic diseases. Participants were questioned about the prescriptions they took, and the information was verified by looking at the actual medications that were brought into the office. Patients' relatives were interviewed to verify the sociodemographic data. In addition to demographic information

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and medical history, a cognitive assessment was completed with the Mini-Mental State Examination (MMSE). The MMSE was completed including assessing orientation to time (5 points), orientation to place (5 points), registration (3 points), attention and calculation (5 points), recollection (3 points), and language (9 points) and the total was (30 scores). Each participant's score was recorded. To determine level CI a cut-off of 23 points or less was utilized. [1] Mild CI was between (18-23), and severe CI was between (0-17). Data management and statistical analysis. all data were managed using the Statistical Package for Social Sciences (SPSS) version 26 and presented as frequencies, proportion, and mean ± Sd. Data were analyzed using Chi-square tests with a statistical significance level of ≤ 0.05. Ethical consent was obtained from each patient and the study was approved by the ethics research committee of Kurdistan Higher Council for Medical Specialties to document number (56) dated (14/2/2023).

Results

A total of 165 participants took part in the study. 43.6% of elderly were between ages (65-69) years and Elderly patients aged 70-75 years were 46.7% of the group, and (99.7%) were aged more than 75 years. More than half (50.9%) of cases were females. 32.1% of them were illiterate, and 28.5% of the study population were able to read and write. 3.6% of cases had an intermediate level of education. More than three-quarters (75.8%) of participants reported medium Socioeconomic status and 24.2% of cases reported low socioeconomic status. No participants fit the criteria for high socioeconomic status, Table (1). Table (2) shows that 29.1% of cases were diagnosed with MCI followed by 12.1% who had severe CI. More than half (52.1%) had 3-6 diseases, and 40.6% of cases were diagnosed with 2 diseases. which equals to a total of 92.7% of the patients having multimorbidity. More than half (61.2%) of the participants were taking 1-4 medications, and 24.8% of them had polypharmacy.

Table (1): Sociodemographic data of the participants

Variables	Categories	Frequency	%
Age group	65- 69 years	72	43.6
	70 - 75 years	77	46.7
	More than 75 years	16	9.7
Sex	Male	81	49.1
	Female	84	50.9
Educational level	Illiterate	53	32.1
	Read and write	47	28.5
	Intermediate	6	3.6
	Secondary	26	15.8
	College and above	33	20
Socioeconomic status	Low	40	24.2
	Medium	125	75.8
Chronic disease	Hypertension	100	60.6
	Osteoarthritis	79	47.9
	Arthritis (besides osteoarthritis)	75	45.5
	Heart disease	73	44.2
	Diabetes Mellitus	50	30.3
	Osteoporosis	30	18.2
	Sleep disturbance	15	9.1
	Cerebrovascular accident	8	4.8
	Depression	6	3.6
Total		165	100 %

*Each patient may have more than one disease, so the total is more than 100% (the requested data are presented in the next Table)

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Table (2): Cognition based on MMSE, Prevalence of multi-morbidity, and polypharmacy among patients.

Variables	Categories	Frequency	%
Mini-Mental State Examination	No CI	97	58.8
	Mild CI	48	29.1
	Severe CI	20	12.1
Multimorbidity	None	12	7.3
	2 diseases	67	40.6
	3-6 diseases	86	52.1
Polypharmacy	None	23	13.9
	1-4 medications	101	61.2
	≥ 5 medications	41	24.8
Total		165	100%

There was a significant statistical relationship between age groups and the MMSE ($p = 0.005$), Figure (1). Table (3), with the level of CI increasing as age increases. Of the participants between the ages of 65 and 69, the majority (61.1%) had no CI. while more than one-third (37.5%) of the severe cognitive cases were over 75 years of age. A statistically significant correlation was also observed between the gender and the MMSE results. 3.7% of males and 20.2% of females, respectively, exhibited severe CI. A statistically significant correlation was observed between the MMSE and SES. Severe CI was seen in 35% of low SES individuals compared to only 4.8% of those with medium SES. A statistically significant inverse relationship between CI and educational level was also observed. The severity of CI decreased with increasing education levels. More than one-third (37.7 %) of Those who were illiterate had severe CI while no one with any greater level of education—read and write, intermediate, secondary, college, and above developed severe CI.

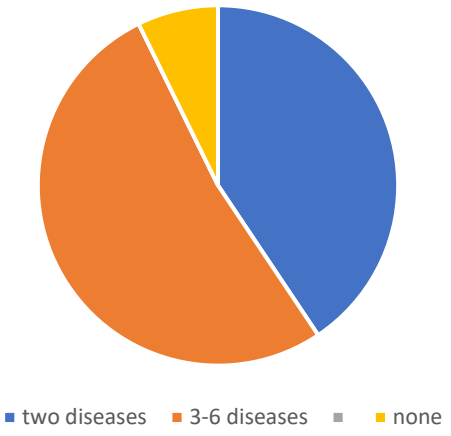

Figure (1): Distribution of the participants according to the Multimorbidity.

Table (3): Association between MMSE and sociodemographic background.

Variable	Categories	Mini-mental state examination			p-value
		No cognitive impairment	Mild cognitive impairment	Severe cognitive impairment	
Age	65 - 69 years	44 (61.1%)	22 (30.6%)	6 (8.3%)	0.005
	70 - 75 years	43 (55.8%)	26 (33.8%)	8 (10.4%)	
	>75 years	10 (62.5%)	0 (0%)/	6 (37.5%)	
Sex	Male	59 (72.8%)	19 (23.5%)	3 (3.7%)	<0.001
	Female	38 (45.2%)	29 (34.5%)	17 (20.2%)	
SES	Low	5 (12.5%)	21 (52.5%)	14 (35%)	<0.001
	Medium	92 (73.6%)	27 (21.6%)	6 (4.8%)	
Educational level	Illiterate	6 (11.3%)	27 (50.9%)	20 (37.7)	<0.001
	Read and write	26 (55.3%)	21 (44.7%)	0 (0%)	
	Intermediate	6 (100%)	0 (0%)	0 (0%)	
	Secondary	26 (100%)	0 (0%)	0 (0%)	
	College and above	33 (100%)	0 (0%)	0 (0%)	
Total		97 (58.8%)	48 (29.1%)	20 (12.1%)	

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Outcomes of Table (4) reveal there was a significant statistical association between CI and ADRs. A chi-square test was done and the p-value was 0.021. In contrast, no significant association was observed between CI and both polypharmacy and multimorbidity, p-values were more than 0.05.

Table (4): Association between Cognitive impairment and adverse drug reactions polypharmacy, and multimorbidity.

Variable	Categories	Mini mental status examination			p-value
		No CI	Mild CI	Severe CI	
ADRS	None	29 (76.3%)	4 (10.5%)	5 (13.2%)	0.021
	Constipation	4 (40%)	6 (60%)	0 (0%)	
	Delirium	1 (100%)	0 (0%)	0 (0%)	
	Dry mouth	3 (37.5%)	5 (62.5%)	0 (0%)	
	History of fall	7 (46.7%)	8 (53.3%)	0 (0%)	
	Memory problems	6 (75%)	2 (25%)	0 (0%)	
	Sleep difficulty	1 (100%)	0 (0%)	0 (0%)	
	Urinary retention	2 (100%)	0 (0%)	0 (0%)	
	Vertigo	2 (100%)	0 (0%)	0 (0%)	
	More than one	42 (52.5%)	23 (28.7%)	15(18.8%)	
Polypharmacy	None	12 (52.2%)	9 (39.1%)	2 (8.7%)	0.614
	1-4 medications	62 (61.4%)	25 (24.8%)	14 (13.9%)	
	≥ 5 medications	23 (56.1%)	14 (34.1%)	4 (9.8%)	
Multimorbidity	None	7 (58.3%)	5 (41.7%)	0 (0%)	0.625
	2 diseases	42 (62.7%)	17 (25.4%)	8 (11.9%)	
	3-6 diseases	48 (55.8%)	26 (30.2%)	12 (14%)	
Total		97 (58.8%)	48 (29.1%)	20 (12.1%)	

Discussion

The growing elderly population, increased life expectancy, and lack of data in clinical trials have amplified the need for geriatric research.[6] Approximately 962 million people globally were 60 years of age or older in 2017. By 2030 and 2100, it is estimated that this population will have increased to 1.4 billion, and 3.1 billion, respectively.[8] It is thought that the development of CI in the elderly could be slowed down if underlying conditions are recognized and addressed earlier.[7] In this study, 12.1% (20 participants) had severe CI. Comparatively, a study done by Al-Nuaimi stated that severe CI was reported in 4.3% of their participants.[9] This study showed some differences from the results in Baghdad and more studied are needed to determine whether those are significant or not. This could be explained by differences in the literacy rates. 32.1% of participants in this study were illiterate versus 17.6% in the study by Al-Nuaimi. Several studies have found similar results to ours demonstrating worse CI among elderly women, this could be explained by education level among women as well as longer life expectancy among them. [6,9] This study found elderly individuals without CI experienced ADRS like delirium, sleep difficulties, urinary retention, and vertigo, whereas these adverse effects were not observed in any of the cases with severe or mild CI may be due to fewer patients in the MCI and severe CI groups than in the group without CI. Also, patients with CI do not remember all of their

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ADRs as well as those without CI. In contrast to another study that demonstrated an inverse relationship between the severity of CI and the reported prevalence of ADRs.[10] The study represents a statistically significant association ($p = 0.021$) between adverse drug reactions (ADRS) and cognitive impairment (CI) levels, classified using the Mini Mental Status Examination (MMSE) into no CI, mild CI, and severe CI. Notably, constipation and dry mouth are linked with higher proportions of mild CI and no cases of severe CI, suggesting they may serve as early indicators of cognitive decline. A history of falls shows a significant proportion of mild CI, indicating a potential connection between physical and cognitive health. Moreover, symptoms such as delirium, sleep difficulty, urinary retention, and vertigo are observed only in individuals with no CI, albeit with small sample sizes. The presence of multiple ADRS correlates with an increased likelihood of both mild and severe CI, underscoring the compounded risk of cognitive impairment. These findings highlight the importance of early detection and comprehensive management of ADRS in clinical practice to potentially mitigate the progression of cognitive decline. This study revealed that 24.8% of participants had polypharmacy (≥ 5 medications). Similarly, a study conducted by Redha et al, also found a high prevalence of polypharmacy among their participants.[11] Even though the vast majority of patients had multiple illnesses, there was no statistically significant correlation between CI and medical disorders. However, many studies indicated that several conditions, including hypertension, arthritis, heart disease, sleep difficulties, diabetes , stroke , and hyperlipidemia, were substantially linked to a higher risk of CI.[12,13] Overall, all studies observed a heightened risk of cognitive decline or decreasing test scores as the accumulation of chronic diseases increased.[14] Comparing our findings with those of other studies, it appears that multimorbidity itself does not appear to be significant factor alone rather, the presence of particular illnesses may represent a higher risk factor for the progression of CI. This study is limited in both the number of participants and the numerous possible confounding factors. Furthermore, it was difficult to obtain precise information from severe CI individuals, particularly when ADRS was involved. Therefore, recall bias is a concern, especially in a study assessing CI, since it could lead to deceptive reporting.

Conclusion

Our findings indicate that the senior population in Erbil has an increased prevalence of severe CI. Adverse drug reactions were common in the majority of cases, regardless of whether a person had severe or no CI, and female gender and those with illiteracy exhibited more severe CI. To validate the presence and prevalence of CI, more research is needed to minimize unnecessary polypharmacy and develop supportive cognitive evaluation techniques for older adults.

Conflict of interest

No conflict of interest

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