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ORIGINAL ARTICLE

Cognitive Impairment and Associated Factors in Patients Hospitalized in Neurology Services

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Abstract

Background: Cognitive impairments commonly occur due to neurological diseases and elderly. Cognitive impairments in many elderly patients is thought to be related only to neurological disease. However, it is necessary to investigate whether this impairment is due to age. Because cognitive impairment may adversely affect the treatment and care needs of elderly patients; therefore, it is important to assess their cognitive functions.

Methods: This was a descriptive study conducted to identify cognitive impairment and related factors in patients hospitalized in neurology services. The research sample comprised 113 patients who received inpatient treatment at the neurology services of GRU Training and Research Hospital. Research data were collected between 1 October and 31 December, 2015, using the Demographic Information Form and the Standardised Mini-Mental Test. Data were analysed by Mann-Whitney U test, chi-squared test and multiple linear regression analysis.

Results: Standardised Mini-Mental Test scores were ≤ 24 points in 58.4% of patients. Cognitive impairment was determined to be more prevalent in patients aged ≥ 65 years than in those aged < 65 years. Cerebrovascular and cardiac diseases were significantly higher in patients aged ≥ 65 years than in those aged < 65 years. Multiple linear regression analysis found age was the strongest predictor of cognitive impairment (β = 3.67, p = 0.002), followed by educational status (β = 2.94, p = 0.006), and level of care dependency (β = 2.65, p = 0.002).

Conclusions: Patients who are older than 65 years of age, have low level of education and increased level of care dependency can be said to have more cognitive impairments. In accordance with this result, it can be recommended that nurses should evaluate cognitive impairment in patients aged ≥ 65 years to provide appropriate nursing care to these patients and that trainings on this subject should be included in the patient's discharge plan.

Keywords

Inpatient, Elderly patient, Cognitive impairment, Nursing, Chronic disease

Introduction

Worldwide, the population of elderly patients aged ≥ 65 years has been increasing, which has increased the need for more health services for chronic disease and functional losses. The fragile elderly population is a considerable risk group in terms of mortality and hospitalisation [1]. Along with ageing, this group has shown an evident increase in the incidence of some neurological diseases. The most prominent of these diseases are neurodegenerative diseases and stroke, both of which cause the deterioration of cognitive functions in elderly patients. Therefore, the evaluation of cognitive functions is important during the geriatric assessment of elderly patients receiving inpatient treatment [2].

Some risk factors that might be associated with cognitive impairment in elderly patients have been identified. Cognitive impairment has been shown to be higher in elderly patients who are illiterate, are depressed, have more children, are women and whose income is equal to or less than the expenses [3,4]. In a study conducted on patients aged ≥ 60 years, the prevalence of mild cognitive impairment was higher in patients who have no formal education, who have achieved only a primary school educational level, who are lonely and who have low life satisfaction [5]. In a study conducted on 104 patients with type 2

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diabetes, diabetes was determined to be a significant risk factor for cognitive impairment in elderly patients and cognitive impairment was more common in elderly patients with diabetic neuropathy [6].

Cognitive impairment in elderly patients is accompanied by problems such as falling, delirium and severe nutritional disorders [7-9]. Elderly patients with cognitive impairment have been found to be unable to perform activities of daily living, such as bathing and excretion, using the telephone, taking medications and managing money [10,11]. These problems may adversely affect the treatment and care needs of elderly patients; therefore, it is important to assess their cognitive functions.

Neurological diseases, together with old age, cause impairments in the patient's cognitive and body functions at various levels. Several patients return to their homes after medical treatment in hospital and continue to live in their homes with these diseases. When planning a discharge, nurses should not only focus on physical functions. Also, it is important for the nurse to make a planning by taking into account the cognitive impairments of the patient. Nurses should inform families about the possible causes and consequences of cognitive impairments. Because many patients and relatives may experience emotions such as fear and anxiety as cognitive impairment increases. In this process, nurses are responsible for directing and maintaining home care. With a cognitive assessment, nurses can observe the deterioration of patients' cognitive functions early. It is important for the nurses to provide care in the clinic, at home or in the community, to evaluate the patient's cognitive functions and to try to reduce the factors that increase the impairments while planning the care. This study aimed to identify the sociodemographic factors, such as age, sex, marital status, educational status, family structure, residence, employment status, and income status and health-related factors, such as having chronic illness and level of care dependency that may be predictors of cognitive impairment in patients hospitalized in the neurology service.

Methods

Design

This study was conducted with the descriptive and cross-sectional design.

Setting and sample

The sample of the study included 113 patients who received inpatient treatment between 1 October and 31 December, 2015, in the neurology service of an education and research hospital located in the north-eastern Black Sea region of Turkey. No sampling method was used, and all patients who met the study criteria between the specified dates were included. The criteria for inclusion were volunteering to participate and not having any auditory or physical impairment that prevents the understanding of what was said and performing what was required.

Ethical considerations

The study was approved by the ethics committee of Giresun Public Hospitals Association. Administrative approval was received from GRU Education and Research Hospital. All of the participants were informed of the purpose and design of the study. Participation in the study was voluntary. The principles of the Declaration of Helsinki were followed at all stages of the study, and verbal and written approvals were obtained from patients.

Instrument

The study's data were collected using the Demographic Information Form and Standardised Mini-Mental Test (SMMT). The Demographic Information Form comprises two parts; the first part includes questions determining the patient's age, sex, marital status, family structure, educational status, working status, residence and income, and the second part includes questions regarding the length of hospitalisation, diagnosis, presence of chronic diseases, level of care dependency, status of psychiatric medication uses, medications used and status of information regarding medicines and from whom the patients received this information.

The SMMT, developed by Folstein, et al. [12], is used for the evaluation of cognitive functions in elderly patients; a Turkish validity and reliability study was conducted by Güngen, et al. [13]. It comprises five main sections, namely orientation, recording memory, attention, calculation recalling and language, and includes eleven items that is evaluated fora total of 30 points. Patients with scores ≤ 24 are considered to have cognitive impairment. In this study, the Cronbach alpha value of SMMT was determined to be 0.79. SMMT was used for patients who had a minimum of 5 years of education; SMMT-E, which is a version for the illiterate, was used for illiterate elderly patients.

Data collection

The data of the study were collected by face to face interview in the patient room by the researchers. Researchers have a PhD degree in psychiatric nursing. The researchers have been trained in the use of scales such as mini mental scales in doctoral education. Data collection from each patient lasted for approximately 20-30 min.

Statistical analysis

The SPSS 16.0 software package was used for data analysis. The Kolmogorov-Smirnov (KS) test revealed that the average SMMT scores of patients did not show a normal distribution ($p < 0.05$). KS-test was used because it is a non-parametric measure that actually tests goodness-of-fit and works well when you are comparing two samples rather than a sample with standard

Table 1: Comparison of descriptive characteristics of patients aged < 65 years and those aged ≥ 65 years.

Descriptive Characteristics	< 65 years (n = 52)	≥ 65 years (n = 61)	test value	p value
	n (%)	n (%)		
Sex				
Female	19 (36.5%)	23 (37.7%)	0.016	0.898
Male	33 (63.5%)	38 (62.3%)		
Family Structure				
Nuclear	42 (80.8%)	42 (68.9%)	2.298	0.317
Extended	10 (19.2%)	19 (31.1%)		
Marital Status				
Married	41 (78.8%)	41 (67.2%)	14.215	0.003
Single/Widowed/Divorced	11 (21.2%)	20 (32.8%)		
Educational Status				
Illiterate	5 (9.6%)	21 (34.4%)	9.755	0.008
Below High School	40 (76.9%)	34 (55.7%)		
High School and Over	7 (13.5%)	6 (9.8%)		
Residence				
Village	17 (32.7%)	33 (54.1%)	5.328	0.070
District	16 (30.8%)	14 (23.0%)		
City	19 (36.5%)	14 (23.0%)		
Employment Status				
Employed	15 (28.8%)	3 (4.9%)	12.001	0.001
Unemployed	37 (71.2%)	58 (95.1%)		
Income Status				
Income Equal to Expenses	35 (67.3%)	44 (72.1%)	0.492	0.782
Income Less Than Expenses	13 (25.0%)	14 (23.0%)		
Income More Than Expenses	4 (7.7%)	3 (4.9%)		

Table 2: Comparison of SMMT scores of patients aged < 65 years and those aged ≥ 65 years.

	X ± SD	z value	p value
Orientation			
< 65 years (n = 52)	8.92 ± 1.25	4.731	p < 0.05
≥ 65 years (n = 61)	6.80 ± 2.67		
Language			
< 65 years (n = 52)	7.96 ± 1.50	43.71	p < 0.05
≥ 65 years (n = 61)	6.39 ± 2.36		
Recording Memory			
< 65 years (n = 52)	2.73 ± 0.59	1.327	p = 0.185
≥ 65 years (n = 61)	2.49 ± 0.51		
Recalling			
< 65 years (n = 52)	2.11 ± 0.98	2.371	p < 0.05
≥ 65 years (n = 61)	1.55 ± 1.23		
Attention			
< 65 years (n = 52)	3.23 ± 1.97	3.036	p < 0.05
≥ 65 years (n = 61)	1.88 ± 2.21		
Total SMMT			
< 65 years (n = 52)	24.96 ± 3.35	4.754	p < 0.05
≥ 65 years (n = 61)	19.13 ± 7.21		

Table 3: Comparison of the diagnosed diseases between patients aged < 65 years and those aged > 65 years of age.

	< 65 years n (%)	≥ 65 years n (%)	X^2	p
Diabetes Mellitus				
Yes	18 (34.6%)	28 (45.9%)	1.481	0.224
No	34 (65.4%)	33 (54.1%)		
Cerebrovascular Disease				
Yes	18 (34.6%)	35 (57.4%)	5.840	0.016
No	34 (65.4%)	26 (42.6%)		
Hypertension				
Yes	23 (44.2%)	35 (57.4%)	1.942	0.163
No	29 (55.8%)	26 (42.6%)		
Chronic Obstructive Pulmonary Disease				
Yes	1 (1.9%)	6 (9.8%)	3.025	0122
No	51 (98.1%)	55 (90.2%)		
Cardiac Disease				
Yes	10 (19.2%)	24 (40.0%)	5.684	0.017
No	42 (80.8%)	36 (60.0%)		

distribution. In the data analysis, descriptive statistics, such as number, percentage, arithmetic average and standard deviation, were used, and the Mann-Whitney U test and the chi-squared test were used to compare the SMMT scores according to the variables. Multiple regression analysis was done to confirm linear relationship between sociodemographic characteristics, such as age, sex, marital status, educational status, family structure, residence, employment status, income status and level of care dependency and total SMMT score and its subscales including orientation, language, recording memory, recolling, and attention scores. For statistical significance, $p < 0.05$ was accepted.

Results

Table 1 shows the comparison of descriptive characteristics of patients aged < 65 years and those aged ≥ 65 years. According to sex, family structure, residence and income status, there was no statistically significant difference between patients aged < 65 years and those aged ≥ 65 years ($p > 0.05$). But, there was a statistically significant difference between patients aged < 65 years and those aged ≥ 65 years according to marital status, educational status and employment status ($p < 0.05$).

The average hospitalisation period of patients was 6.25 ± 6.40 days. When the level of care dependency of patients was assessed, 19.5% were severe and 47.8% were moderate and 67.3% lived with their spouses and 16.8% lived with their children. When the clinical diagnosis of patients was examined, it was determined that 46.9% had cerebrovascular disease, 40.7% had diabetes mellitus, 51.3% had hypertension and 30.4% had cardiac disease. Among the patients, 8.0% stated they used antipsychotic drugs and 16.8% stated that they used antidepressant drugs. Further, 56.6% stated that they had information about the medications that they used; of these patients, 52.3% stated that they had received this information from their doctors and 41.5% stated that they had received it from their nurses, and 82.8% stated that they were satisfied with the information that they had received.

The SMMT score was ≤ 24 in 58.4% of patients. Table 2 shows a statistically significant difference between the average SMMT scores of patients aged < 65 years (X = 24.96 ± 3.35) and those aged ≥ 65 years (X = 19.13 ± 7.21) (z = 4.754, p < 0.05). There was also a statistically significant difference (p < 0.05) in the orientation, language, recall and attention subscales of SMMT depending on age but not in the recording memory subscale (p > 0.05).

As shown in Table 3, when the diseases were compared between patients aged < 65 and ≥ 65 years, cerebrovascular and cardiac diseases were found to be significantly higher in patients aged ≥ 65 years than in those aged < 65 years (x^2 = 5.84, p = 0.016; x^2 = 5.68, p = 0.017, respectively).

Findings in Table 4 suggested that three independent variables significantly predicted total SMMT, with all variables explained 40.70% of its variance. Age was the strongest predictor of cognitive impairment (β = 3.67, p = 0.002), followed by educational status (β = 2.94, p = 0.006), and level of care dependency (β = 2.65, p = 0.002). Educational status was a predictor of language (p < 0.05) and attention subscales (p < 0.01). Age was a predictor of orientation (p < 0.05) and language subsclaes (p < 0.01). Level of care dependency was a predictor of orientation (p < 0.01), language (p < 0.05) and attention (p < 0.05).

Discussion

Among the patients who participated in this study, 58.4% had mild cognitive impairment. In a study conducted on 144 patients aged ≥ 65 years, severe cognitive impairment was found in 6.9% and moderate cognitive impairment in 25.7% [14]. Another study that assessed cognitive profiles in inpatients aged ≥ 50 years revealed that 53.7% of patients had mild cognitive impairment [14]. Another study conducted on inpatients aged ≥ 65 years reported that 33.3% of patients had cognitive and functional impairment, which may be associated with dementia [3]. In another study

Table 4: Predictors of cognitive impairment according to multiple linear regression analysis.

Predictor variables	Orientation[a]		Language[b]		Recording memory[c]		Recolling[d]		Attention[e]		Total SMMT[f]	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Age	-1.09 (0.43)	0.013	-1.14 (0.41)	0.007	-0.10 (0.17)	0.543	-0.49 (0.25)	0.053	-0.72 (0.42)	0.094	-3.67 (1.16)	0.002
Sex	0.44 (0.43)	0.307	-0.09 (0.41)	0.820	-0.01 (0.17)	0.947	-0.13 (0.25)	0.606	0.59 (0.42)	0.165	0.81 (1.16)	0.485
Marital status	-0.19 (0.23)	0.391	0.16 (0.22)	0.463	-0.17 (0.09)	0.069	0.01 (0.13)	0.960	0.41 (0.22)	0.070	0.24 (0.62)	0.694
Educational status	0.68 (0.39)	0.082	0.92 (0.37)	0.017	0.20 (0.15)	0.187	-0.04 (0.22)	0.838	1.28 (0.38)	0.001	2.94 (1.05)	0.006
Family structure	-0.14 (0.39)	0.712	0.66 (0.38)	0.082	0.20 (0.15)	0.197	0.06 (0.23)	0.767	-0.80 (0.38)	0.041	0.07 (1.06)	0.942
Residence	-0.13 (0.24)	0.583	-0.42 (0.23)	0.080	-0.15 (0.10)	0.138	-0.25 (0.14)	0.080	-0.09 (0.24)	0.704	-1.06 (0.66)	0.113
Employment status	-0.70 (0.53)	0.190	-0.31 (0.51)	0.540	0.01 (0.21)	0.939	-0.30 (0.31)	0.333	0.22 (0.52)	0.668	-1.06 (1.43)	0.460
Income status	0.02 (0.32)	0.936	0.07 (0.31)	0.810	-0.03 (0.13)	0.810	-0.05 (0.19)	0.795	-0.20 (0.32)	0.523	-0.07 (0.89)	0.934
Level of care dependency	1.03 (0.31)	0.001	0.67 (0.29)	0.026	0.17 (0.12)	0.156	0.18 (0.18)	0.323	0.62 (0.30)	0.044	2.65 (0.83)	0.002

[a]R^2 = 0.388, adjusted R^2 = 0.335; [b]R^2 = 0.319, adjusted R^2 = 0.252; [c]R^2 = 0.134, adjusted R^2 = 0.058; [d]R^2 = 0.111, adjusted R^2 = 0.033; [e]R^2 = 0.322, adjusted R^2 = 0.255; [f]R^2 = 0.407, adjusted R^2 = 0.349.

conducted on elderly patients living in nursing homes, 50.6% of patients had mild cognitive impairment and 13.3% had moderate cognitive impairment [15]. The rate of cognitive impairment in this study was higher than those reported in previous studies, which may be due to neurological diseases of patients who participated in this study. One of the important findings accompanying neurological diseases in the literature is deterioration in the cognitive abilities [16].

In other studies, conducted in Turkey using SMMT to determine mild cognitive impairment, rates in elderly patients ranged from 17.1% to 44.4% [4,17,18]. Mild cognitive impairment is a clinical condition between normal ageing and dementia [19]. It also describes the characteristics of patients in the prodromal phase of Alzheimer-type dementia [20]. Thus, the SMMT can be used as a pre-assessment tool. In another study, as a result of extensive assessment, 30 of 57 patients who were diagnosed with cognitive impairment using SMMT were later diagnosed with cognitive dysfunction according to the DSM-IV diagnostic criteria [15]. Similarly, cognitive impairment was found in 146 of 742 patients aged ≥ 65 years, and 81 of 146 patients were diagnosed with dementia according to the DSM-IV diagnostic criteria [21].

According to another finding in this study, cognitive impairment scores for patients aged ≥ 65 years did not significantly differ from those for patients aged < 65 years; the average SMMT score of patients aged > 65 years was 19.13 ± 7.21. In one study, the SMMT score of elderly patients aged ≥ 65 years was 21.4 ± 5.6 [10]. In a study conducted on patients aged ≥ 60 years, the average SMMT score was 22.05 ± 7.46 [18]. According to another study, the SMMT score was 27.34 ± 0.92 for patients aged 65-74 years, whereas it was 25.65 ± 1.20 for those aged 75-88 [22]. Compared with other studies, cognitive impairment scores were lower in this study, reflecting higher cognitive impairment in patients aged ≥ 65 years; this could be related to the fact that these patients had a chronic illness, such as cerebrovascular or cardiac disease, that negatively affected the functioning of the brain.

Another important finding in the study was that cerebrovascular and cardiac diseases are significantly more in patients aged ≥ 65 years than in those aged < 65 years. Some studies have shown that cognitive impairment is present in patients who have had strokes [23,24]. Studies conducted on patients who have had a stroke have revealed atrial fibrillation to be a risk factor for dementia after stroke [24,25]. Likewise, studies that investigated the relationship between heart failure and dementia have shown that atrial fibrillation is an important risk factor [26,27]. Both diseases reduce cerebral perfusion and severely impair the patient's cognitive functions in the presence of atrial fibrillation.

Several studies have reported diabetes to be a risk factor for dementia [6,26,28]; however, no significant difference was found between the average SMMT scores of patients with and without diabetes in this study. According to some studies, insulin use, insulin resistance and diabetic neuropathy are important risk factors for dementia [6,28,29]. Therefore, when assessing cognitive functions in patients with diabetes, determining the risk factors is important to maintain cognitive functions at a healthy level so as to take precautions early.

In the present study, we found that having a low level of education, increasing age, and having severe level of care dependency of patients were significantly associated with the SMMT scores of patients. These findings were consistent with the studies in Brazil, Malaysia, China and Poland in which the cognitive impairment was increased with older age and low level of education [5,30-32]. According to Millan-Calenti, et al. [11], cognitive impairment can be a predictor for functional dependency on activities of daily living. In another study, it was found that cognitive performance was the only predictive variable of functional incapacity for the activities of daily living [33].

Conclusions

Cognitive impairment was found in 58.4% of patients and was more common in patients aged ≥ 65 years than in those aged < 65 years. These cognitive impairments were observed in orientation, language, recalling and attention. The sample of this study consisted of patients hospitalized in the neurology service. Only 46.9% of patients had a neurological problem including cerebrovascular disease, 53.1% of them had no a neurological problem. But they had diseases, such as diabetes mellitus, hypertension and cardiac disease affecting the neurological system, disrupting or slowing the blood circulation in the brain. In the present study, another important finding was also that cerebrovascular and cardiac diseases are two important risk factors affecting cognitive impairment in patients aged ≥ 65 years. In line with these results, we recommend that nurses should assess cognitive impairment in inpatients aged ≥ 65 years, hospitalised in neurology service, and/or had a chronic disease so as to provide appropriate care to these patients and that patients' discharge plan should include training on this issue.

Limitations

Some limitations of our study were that it was a cross-sectional study; no detailed scales were used to evaluate cognitive functions, except SMMT and only in patients who were treated in neurology clinics were included and, therefore, our results are only generalisable to this group.

Conflict of Interest

The authors report no conflicts of interest.

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