ASSOCIATED FACTORS WITH DOMAINS OF COMPREHENSIVE GERIATRIC ASSESSMENT AMONG OLDER POST-STROKE PATIENTS

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This is a cross-sectional study conducted on 137 post-stroke patients aged ≥ 60 years old treated at the National Geriatric Hospital to explore some factors related to domains of comprehensive geriatric assessment (CGA). The components of CGA assessed were medical status (nutrition; urinary incontinence, frailty, visual and hearing ability), functional status (Barthel index, instrumental activity daily living, risk of fall) and neuropsychological status (cognition and depression). Patients ≥ 70 years old had a prevalence of malnutrition/ risk of malnutrition, cognitive impairment, urinary incontinence, and frailty syndrome significantly higher than patients under 70 years old (p<0.05). Post-stroke patients with hemiplegia had significantly higher dependency, cognitive impairment, depression, urinary incontinence, frailty syndrome, and hearing loss than patients without hemiplegia (p<0.05). There was no statistically significant difference between gender, stroke classification, post-stroke duration, and the number of strokes and domains of CGA in older post-stroke patients. In summary, this study showed that advanced age and hemiplegia were significantly associated with some CGA domains.

Keywords: Comprehensive Geriatric Assessment, Post-stroke, Older patient, Related factor.

I. INTRODUCTION

Stroke is the most common ailment in the elderly and is defined as the second leading cause of death and the third cause of serious, long-term disability. It is estimated that in 2030, 23 million persons will have a first-ever stroke resulting in 7.8 million deaths.[1] In 2010, the absolute numbers of people with first stroke (16.9 million), stroke survivors (33 million), stroke-related deaths (5.9 million), and DALYs lost (102 million) were high with most of the burden in low-income and middle-income countries.[2] Previous studies have shown that although death in the immediate acute period post-stroke is usually a direct consequence of brain damage, a substantial proportion of morbidity and mortality occurring later on in the ensuing weeks is due to potentially preventable or treatable complications of stroke.[3]

The Comprehensive Geriatric Assessment (CGA) was developed for use in the geriatric population by geriatricians and the wider multidisciplinary team to develop a coordinated and integrated plan for treatment and long-term follow-up. A comprehensive assessment involves looking not only at disease states as a standard medical assessment would do, or at disability, as a standard rehabilitation assessment might do, but at a range of domains. Similar to comprehensive geriatric assessment in elderly patients, comprehensive geriatric in older post-stroke patients also included physical medical conditions, mental health conditions, functioning, social circumstances, and environment.

Previous studies have identified individual problems in post-stroke patients such as

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cognitive decline, functioning, or depression. Not many studies have aggregated problems in the elderly after stroke and analyzed the factors involved. Therefore, we conducted this research to explore some associated factors with domains of comprehensive geriatric assessment in older post-stroke patients.

II. SUBJECTS AND METHODS

1. Study subjects

Older post-stroke patients were treated at the National Geriatric Hospital from February to November 2019 who met the following criteria: (1) patients aged 60 years or older diagnosed with stroke according to clinal symptoms and diagnostic imaging[4]; (2) post-stroke duration was greater than or equal to 2 weeks. Patients were excluded if they (1) were diagnosed with Transient ischemic attack (TIA) or suffered from brain trauma before this time; (2) had a severe condition like respiratory failure, using a ventilator; (3) were unable to communicate; (4) could not complete the cognitive test.

2. Methods

This was a cross-sectional study. A convenience sampling method was used. The number of elderly post-stroke patients in our study was 137. Data were collected by using a unified research record.

Variables:

- General information: age, gender.

- Stroke characteristics: number of strokes (medical records); post-stroke duration (weeks); stroke classification (ischemic or hemorrhage stroke): stroke symptom (hemiplegia).

- CGA's components:

+ ***Medical assessments***: nutrition status was assessed using the Mini Nutritional Assessment short-form (MNA-SF) with 8-11 points indicating the person is at risk of malnutrition; 0-7 points indicating the person is malnourished.[5] Frailty syndrome was assessed using the Reported Edmonton Frail Scale (REFS).[6] The 3 Incontinence Question (3IQ) was used to determine patients' presence of urinary incontinence. The Snellen chart was used to assess visual acuity and the Whisper voice test is a simple and accurate test for detecting hearing impairment.

+ ***Functional status***: Instrumental Activities of Daily Living scale (IADL) was used to evaluate the functional status of the participants. The maximum of a normal healthy person is 8 points, less than 8 points classifies the person as dependent.[7] The *Barthel Index* for Activities of Daily Living assessed functional independence. The Berg Balance Scale (BBS) is the most commonly used tool for evaluating the balance of older patients.[8] A score of lower than 40 indicates individuals are at moderate to severe risk of falling. A score higher than 40 indicates low fall risk.

+ ***Neuro-Psychological assessments***: Cognitive impairment was assessed by using the Mini-Mental State Examination (MMSE). Evaluation results: MMSE is a 30-point questionnaire with a cut-off point is 24 points: normal cognition (24-30 points); cognitive impairment (£23 points).[9] Geriatric Depression Scale 15 items (GDS-15) was used to assess depression. A total score of 0-5 is considered normal; 6-15 indicates mild to severe depression.[10]

3. Data processing and data analysis

The process of data coding, entry, and analysis was done by using SPSS software (version 22.0). Descriptive statistics were adopted to examine characteristic data: frequency, percentage, and mean. Comparisons between groups were assessed using Chi-square tests for categorical variables. Statistical

significance was accepted with a p-value <0.05.

4. Ethical consideration

The study participants were explained clearly the purpose of the study, and they were willing to participate in the study. Collected data was used for research. The results of the study were proposed for improving the health of the community, not for other purposes.

III. RESULTS

The mean age was 69.7 ± 8.0 (years). Males accounted for 67.2%. The rate of patients having a first stroke was 72.3%. 28.3% of patients had a second or more recurrent stroke. Ischemic stroke accounted for the majority 66.4%. 84.7% of patients had a post-stroke duration was 2-4 weeks.

1. Domains of comprehensive geriatric assessment

Table 1. Domains of CGA among post-stroke patients (n=137)

CGA domain	Frequency (n)	Percentage (%)
IADL impairment	126	92.0
Dependency (Barthel Index)	124	90.5
High risk of fall	114	83.2
Malnutrition or risk of malnutrition	104	75.9
Vision loss	101	73.7
Cognitive impairment	98	71.5
Depression	67	48.9
Urinary incontinence	41	29.9
Frailty syndrome	40	29.2
Hearing loss	29	21.1

Among ten domains of CGA, the prevalence of IADL impairment accounted for the highest value (92%), followed by the prevalence of moderate, severe to total dependency according to the Barthel Index (90.5%). Hearing loss had the lowest percentage (21.1%).

2. Some related factors with components of CGA in older post-stroke patients

Age group, gender

Table 2. Association between age, and gender with CGA domains

CGA domain	Age group		p	Gender		p
	60-69 (n=80)	≥ 70 (n=57)		Male (n=92)	Female (n=45)	
IADL impairment	72 (90.0)	54 (94.7)	>0.05	85 (92.4)	41 (91.1)	>0.05
Dependency	68 (85.0)	56 (98.2)	>0.05	81 (88.0)	43 (95.6)	>0.05

CGA domain	Age group		p	Gender		p
	60-69 (n=80)	≥ 70 (n=57)		Male (n=92)	Female (n=45)	
High risk of fall	66 (82.5)	48 (84.2)	>0.05	75 (81.5)	39 (86.7)	>0.05
Malnutrition	55 (68.8)	49 (86.0)	**0.02**	69 (75.0)	35 (77.8)	>0.05
Vision loss	55 (68.8)	46 (80.7)	>0.05	67 (72.8)	34 (75.6)	>0.05
Cognitive impairment	52 (65.0)	46 (80.7)	**0.045**	63 (68.5)	35 (77.8)	>0.05
Depression	36 (45.0)	31 (54.4)	>0.05	46 (50.0)	21 (46.7)	>0.05
Urinary incontinence	28 (35.0)	13 (22.8)	**0.037**	29 (31.5)	12 (26,7)	>0.05
Frailty syndrome	15 (18.8)	25 (43.9)	**<0.05**	24 (26.1)	16 (35,6)	>0.05
Hearing loss	21 (26.3)	8 (14.0)	>0.05	16 (17.4)	13 (28.9)	>0.05

Patients aged ≥ 70 years old had the prevalence of malnutrition/risk of malnutrition, cognitive impairment, urinary incontinence, and frailty syndrome significantly higher than those in patients aged under 70 years old (p<0.05). There was no statistically significant difference between gender and domains of CGA (p>0.05).

Table 3. Association between post-stroke duration, and number of strokes with CGA domains

CGA domain	Post-stroke duration		p	Number of strokes		p
	2-4 weeks (n=116)	> 4 weeks (n=21)		1 (n=99)	≥2 (n=38)	
IADL impairment	106 (91.4)	20 (95.2)	>0.05	93 (93.9)	33 (86.8)	>0.05
Dependency	104 (89.7)	18 (85.7)	>0.05	94 (94.9)	30 (78.9)	>0.05
High risk of fall	96 (82.8)	18 (85.7)	>0.05	84 (84.8)	30 (78.9)	>0.05
Malnutrition	86 (74.1)	18 (85.7)	>0.05	75 (75.8)	29 (76.3)	>0.05
Vision loss	87 (75.0)	14 (66.7)	>0.05	71 (71.7)	30 (78.9)	>0.05
Cognitive impairment	84 (72.4)	14 (66.7)	>0.05	72 (72.7)	26 (68.4)	>0.05
Depression	55 (47.4)	12 (57.1)	>0.05	48 (48.5)	19 (50.0)	>0.05
Urinary incontinence	33 (28.4)	8 (38.1)	>0.05	27 (27.3)	14 (36.8)	>0.05
Frailty syndrome	35 (30.2)	5 (23.8)	>0.05	29 (29.3)	11 (28.9)	>0.05
Hearing loss	24 (20.7)	5 (23.8)	>0.05	20 (20.2)	9 (23.7)	>0.05

There was no statistically significant difference between post-stroke duration and the number of strokes and domains of CGA in older post-stroke patients (p>0.05).

Table 4. Association between post-stroke duration, and number of stroke with CGA domains

CGA domain	Stroke classification		p	Hemiplegia		p
	Ischemic (n=91)	Hemorrhage (n=46)		Yes (n=112)	No (n=35)	
IADL impairment	83 (91.2)	43 (93.5)	>0.05	96 (85.7)	30 (85.7)	>0.05
Dependency	81 (89.0)	43 (93.5)	>0.05	101 (90.2)	23 (65.7)	**<0.05**
High risk of fall	72 (79.1)	42 (91.3)	>0.05	87 (77.7)	27 (77.1)	>0.05
Malnutrition	68 (74.7)	36 (78.3)	>0.05	80 (71.4)	24 (68.6)	>0.05
Vision loss	67 (73.6)	34 (73.9)	>0.05	73 (65.2)	28 (80.0)	>0.05
Cognitive impairment	64 (70.3)	34 (73.9)	>0.05	78 (69.6)	20 (57.1)	**0.03**
Depression	46 (50.5)	21 (45.7)	>0.05	61 (54.5)	6 (17.1)	**<0.05**
Urinary incontinence	27 (29.7)	14 (30.4)	>0.05	37 (33.0)	4 (11.4)	**<0.05**
Frailty syndrome	27 (29.7)	13 (28.3)	>0.05	36 (32.1)	4 (11.4)	**<0.05**
Hearing loss	23 (25.3)	6 (13.0)	>0.05	27 (24.1)	2 (5.7)	**<0.05**

Post-stroke patients with hemiplegia had significant higher dependency, cognitive impairment, depression, urinary incontinence, frailty syndrome, and hearing loss patients without hemiplegia (p<0.05). There was no statistically significant difference between stroke classification and domains of CGA in older post-stroke patients (p>0.05).

IV. DISCUSSION

This cross-sectional study was conducted among 137 older post-stroke patients at National Geriatric Hospital. The finding indicated that advanced age and hemiplegia were significantly associated with some CGA components such as dependency, cognitive impairment, depression, urinary incontinence, frailty syndrome, and hearing loss.

Our results showed that significant difference between nutrition status and age group. The patients equal to or over 70 years old represented more risk of malnutrition and malnourished than patients aged group 60–69 years (86% and 68.8%, respectively). Indeed, malnutrition is usually caused by one or more of the following factors: not eating enough nutrients, food choices lead to dietary deficiencies and diseases that increase nutrient requirements, increase nutrient loss, nutrient malabsorption, or a combination of these factors. The ≥70 years old age group had a higher proportion of cognitively impaired at 80.7% compared to 65% in the 60-69 years old age group,. The difference was significant with a p-value <0.05. Older age is associated with faster cognitive decline post-stroke. In the REGARDS study (Reasons for Geographic and Racial Differences in Stroke), each 1-year increase in baseline age was associated with a 17% higher odds of cognitive impairment per year of follow-up.11 The older the age, the greater the aging process and co-morbidities, and the higher the risk of dementia. Besides that, age was relevant to urinary incontinence in older post-stroke patients. The incidence of urinary incontinence increases with age.

Previous studies showed that up to 53% of stroke survivors report urinary incontinence at four weeks after stroke12 and 44% of stroke survivors are incontinent at three months post-stroke and 38% at one year after stroke.13 Older age is one of the related factors of urinary incontinence. In our study, age was relevant to frailty syndrome. Patients aged ≥ 70 years old had a prevalence of frailty syndrome (43.9%) significantly higher than those in patients aged under 70 years old (18.8%). It is appropriate that together with aging, older people naturally have many health problems such as functional disabilities, depression, cognitive impairment, urinary incontinence, fall, and persistent pain, malnutrition.

The finding showed that hemiplegia was significantly associated with some CGA components such as dependency, cognitive impairment, depression, urinary incontinence, frailty syndrome, and hearing loss. 90.2% of patients with paralysis were significantly more caregiver dependent than patients without sequelae of motor paralysis. Hemiplegia limits movement and reduces daily functional activities as well as the level of physical activity of the patient. This, in turn, increases sluggishness and increases the risk of developing frailty syndrome.[14] In our study, a significant difference was found only in hemiplegia and frailty, the participants with hemiplegia was worse than without hemiplegia (32.1% and 11.4%). In addition, when comparing the cognitive impairment and related factors in older post-stroke patients, we found a significant difference for hemiplegia. Patients with hemiplegia showed greater cognitive impairment when compared with non-hemiplegia. The depression of participants with hemiplegia (54.5%) was higher than the group without hemiplegia (17.1%) and this statistic was significant. Stroke symptoms such as hemiplegia affect the patient's activities and quality of life. In addition, the increased dependence on caregivers can easily lead to mental illnesses such as anxiety and depression.[15] Therefore, medical staff should pay special attention to early rehabilitation and early screening and treatment of depression, cognitive decline, and frailty in patients after stroke in order to increase the effectiveness of treatment and improve the quality of life for older post-stroke patients.

V. CONCLUSION

This study showed that advanced age and hemiplegia were significantly associated with some CGA domains such as dependency, cognitive impairment, depression, urinary incontinence, frailty syndrome, malnutrition, and hearing loss.

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