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Disability assessment due to stroke

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ABSTRACT

Objectives: The main purpose of the study is to determine the frequency of stroke in patients who applied to the disability board. The secondary aim of the study is to determine the factors affecting disability rates in patients who applied to the disability board due to stroke.

Methods: Patients over the age of 18 who applied to the physical nedicine and rehabilitation outpatient clinic for disability assessment were included in the study. Disability board files of all patients were scanned retrospectively and the information obtained was recorded.

Results: It was found that 9.1% of patients who were evaluated for disability and were found to have any level of disability experienced disability due to stroke. A statistically significant relationship was found between stroke-related disability score and advanced age, female gender, and the presence of aphasia and dementia in the patients ($p < 0.05$). However, no statistically significant relationship was found between the type of stroke, the affected side and the stroke-related disability scores ($p > 0.05$).

Conclusions: Stroke patients constitute a remarkable part of disability assessment. When evaluating stroke patients in terms of their disability, comorbid diseases and demographic characteristics of the patients should also be taken into consideration.

Keywords: Stroke, disability, community health

Disabled individual; it refers to the individual who is affected by the attitudes and environmental conditions that restrict his full and effective participation in society on equal terms with other individuals due to the loss of his physical, mental, spiritual and sensory abilities at various levels. If the disability is; these are the ratings and classifications that determine the disability of the individual due to tissue, organ and/or function and psychiatry diagnosis and related loss of reasoning ability, based on international methods. Disability status assessment; it covers the evaluation of disease severity, organ or function loss with the aim of determining disability [1]. It is important that disability is evaluated in a standard way according to these ratings, so that disabled people can benefit from the rights provided by social support systems.

Stroke is defined as the sudden loss of brain functions as a result of cessation of blood flow to the brain [2]. Stroke is one of the most common causes of death worldwide and a leading cause of permanent and acquired disability in adults [3]. Every year, 15 million people worldwide have a stroke, resulting in 5 million deaths and permanent disability in 5 million [4]. A review noted that stroke, listed as the most common cause of disability, ranks second after arthritis and back pain in its impact on functional limitations [5]. In another study, stroke was associated with the highest disability-adjusted life expectancy loss of all dis-

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eases in China, with more than 2 million new cases per year [6]. Studies on stroke-related disability rates and associated risk factors in our country are limited. The rate of severe disability was found to be 57% in stroke patients who applied to the health board for disability assessment, and severe disability was associated with right-sided involvement, advanced age, dementia, and aphasia [7]. In another study, disability was found in 145 (4.2%) people out of 3443 selected by stratified sampling method in Kayseri province, and disability was found to be more common especially in women [8].

The main purpose of the study is to determine the frequency of stroke in patients who applied to the disability board. The secondary aim of the study is to determine the factors affecting disability rates in patients who applied to the disability board due to stroke.

METHODS

The study was carried out retrospectively and cross-sectionally in the physical medicine and rehabilitation outpatient clinic of Bursa Uludağ University. In this context, the medical records of 620 patients who applied to the outpatient clinic for disability status evaluation between November 15, 2019 and November 15, 2020 were retrospectively reviewed. Patients younger than 18 years of age were not included in the study because they did not comply with the regulations on disability assessment for adults. Apart from this, patients who applied for disability assessment but were not found to be disabled and patients whose disability board files could not be accessed were excluded from the study. When the patients were classified, those who had a stroke due to causes other than vascular stroke were considered to be admitted due to non-stroke causes. Among the disabled patients, the proportion of patients who applied to us for disability assessment due to stroke was determined. In addition, patients who applied for stroke were grouped separately and the factors affecting the disability rates of these patients were tried to be determined. The study was conducted in accordance with the principles of the

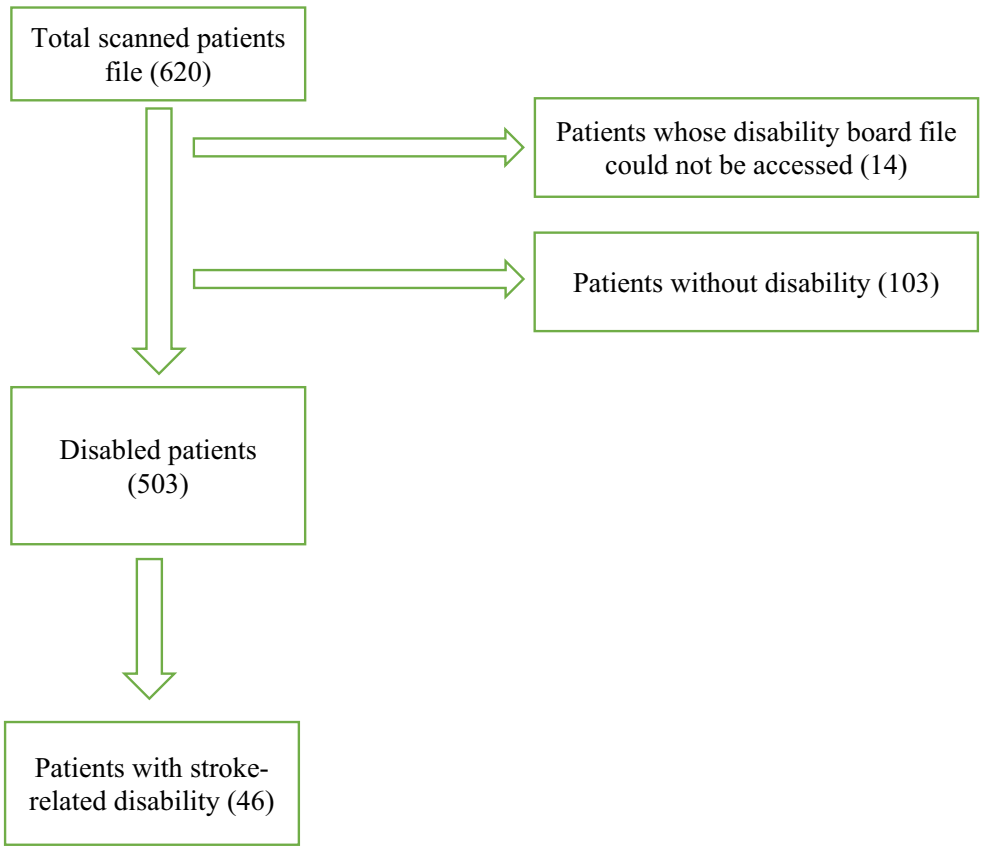

Fig. 1. Study flow chart.

declaration of Helsinki, with the approval of Bursa Uludağ University School of Medicine Clinical Research Ethics Committee (decision no: 2020-21/13, date: 25/11/2020).

Statistical Analysis

Analysis of the study was performed using SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) statistical analysis program. Conformity of continuous variables to normal distribution was examined with the Shapiro Wilk test, and the Mann Whitney U test was used for comparisons between groups according to the test result. In addition, Spearman correlation analysis was performed to evaluate the relationship between numerical data. Descriptive statistics are given as unit number (n), percentage (%) and median (minimum-maximum). Statistical significance was taken as 0.05 in the analysis.

RESULTS

Medical records of 620 patients over the age of 18 who applied to the disability board and were evaluated in the outpatient clinic were reviewed retrospectively. 503 of these patients were included in the study. The patients who were not included in the study were excluded because the disability board files could not be reached in the system or the disability was not detected. Stroke-related disability was detected in 46 patients. The flow chart of the study is given in Fig. 1. The status of stroke patients among the disabled patients is given in Table 1. A strong positive correlation was found between stroke-related disability score and age ($p < 0.001$, r = 0.676) (Table 2). In addition, a statistically significant relationship was found between stroke-related disability score and female gender, dementia and aphasia coexistence ($p < 0.05$) (Table 3).

Table 1. General distribution of patients with disability

	n	%
Stroke-related disability	46	**9.1**
Disability due to non-stroke causes	457	90.9

However, there was no statistically significant relationship between stroke-related disability score and the affected side and type of stroke ($p > 0.05$) (Table 3).

DISCUSSION

Stroke is one of the leading causes of disability associated with a neurological disease. Yang *et al*. [9] found the long-term disability rate after stroke to be 45%. Bensenor *et al*. [10] found the prevalence of post-stroke disability to be 29.5% in men and 21.5% in women. In the study of Teh *et al*. [11], it was determined that the dependence of elderly individuals who had a stroke in Singapore to another individual increased due to stroke. Another study, it was found that the Rankin Disability scores of 67.6% of stroke patients were negatively affected [12]. In general, we can say that stroke causes significant disability. We did not look at the prevalence of stroke-related disability in our study. We aimed to review the status of patients with stroke-related disability among other disabling musculoskeletal diseases. 9.1% of the patients included in the study were experiencing disability due to stroke. This situation showed a considerable rate among the disability status applications.

In the study of Türkel *et al*. [13], at the end of the 6-month follow-up of stroke patients under 65 years of age, a significant functional improvement was observed in most of the patients. We know that functional

Table 2. Disability rates and age

		Stroke-related disability scores	
		Correlation coefficient (r)	*p* value
Age			
Median	64.5	0,676	**< 0.001**
Min/Max	21.0-87.0		

Data are expressed as median (minimum-maximum).

Table 3. Disability rates and related factors

		Patients evaluated for stroke-related disability	Stroke-related disability scores	*p* value
Sex				
	Women	14 (30.4%)	86.0 (58.0-96.0)	**0.047**
	Men	32 (69.6%)	70.0 (20.0-98.0)	
Aphasia				
	Yes	19 (41.3%)	92.0 (28.0-98.0)	**< 0.001**
	No	27 (58.7%)	68.0 (20.0-92.0)	
Dementia				
	Yes	10 (21.7%)	92.0 (70.0-98.0)	**< 0.001**
	No	36 (78.3%)	73.0 (20.0-92.0)	
Stroke type				
	Hemorrhagic	12 (26.1%)	63.0 (20.0-92.0)	0.056
	Ischemic	34 (73.9%)	82.5 (20.0-98.0)	
Affected side				
	Right	23 (52.3%)	84.0 (20.0-98.0)	0.094
	Left	21 (47.7%)	67.0 (20.0-98.0)	

Data are expressed as n (%) and median (minimum-maximum).

recovery is more common especially in the early stages after stroke. From this point of view, the evaluation period of the patients will affect the level of disability. In our study, we did not evaluate stroke patients in terms of disability in the acute phase, where the condition of the patients can change rapidly and we cannot make a clear decision in terms of disability. The disability status assessment of the patients we evaluated was made at least 3 months after the event date.

In the study of Martin *et al*. [14], female gender was associated with increased disability in atrial fibrillation-related stroke. Kes *et al*. [15] found that advanced age and female gender were associated with increased disability at discharge in stroke patients. Because stroke pathology varies depending on sex [16], disability may vary after stroke. In our study, stroke-related disability scores were found to be statistically significantly higher in female patients than in male patients ($p < 0.05$). Since the patients we included in the study were selected only among the patients who applied to the disability board, they could not fully reflect the stroke patients in the community. Therefore, we cannot make a definitive judgment between sex and stroke-related disability.

In the study of Oyewole *et al*. [17], post-stroke disability status increased with advanced age. Lee *et al*. [18] found that recurrent stroke was associated with advanced age. Based on this, it was concluded that recurrent stroke is associated with increased disability in individuals, and disability due to stroke increases with advanced age [18]. Farzadfard *et al*. [19] found in their study that advanced age was associated with increased disability. In our study, stroke-related disability scores increased significantly with increasing age ($p < 0.001$). In the correlation analysis, a strong positive correlation was found between age and disability scores ($r = 0.676$). In this respect, we can say that our results are compatible with the literature.

In one study, no significant difference was found between the affected extremity in stroke and the quality of life of patients [20]. Oyewole *et al*. [17] found that right dominant extremity involvement was associated with worse disability status. In our study, although the disability scores were higher in the right-sided affected patients, no statistically significant relationship was found between the affected side and disability scores ($p > 0.05$). In fact, this situation is contradictory considering that the dominant extremity

is the right side in most of the population. Normally, patients affected by the dominant side are expected to score higher in the upper extremity according to disability legislation. Since the upper and lower extremity disability scores of most of the patients we evaluated were not written separately, whether the side involved between the upper extremities was effective or not could not be compared. Therefore, we cannot reach a clear conclusion on this issue.

In one study, the presence of aphasia was associated with poor functional outcomes in stroke patients [21]. Flowers *et al*. [22] found that patients with aphasia 28 days after stroke had more disability. In another study, it was stated that the coexistence of stroke and dementia was associated with an increase in disability status [23]. In our study, we thought that disability in stroke patients may be related to comorbidities. Of the stroke patients included in our study, 41.3% had aphasia and 21.7% had dementia. Stroke-related disability scores of patients with both aphasia and dementia were found to be statistically significantly higher ($p < 0.001$).

Rehabilitation is widely used to reduce disability and improve functional status in stroke patients [24]. In a systematic review, it was concluded that home-based rehabilitation program is effective in reducing disability in stroke and other diseases that cause physical disability [25]. In our retrospective analysis, we could not determine whether most of the patients received rehabilitation in the disability status reports. Therefore, we cannot comment on the relationship between disability and rehabilitation.

In a study, 56% of patients with ischemic stroke and 49% of patients with hemorrhagic stroke were found to be severely disabled at discharge [26]. In another study, patients with hemorrhagic stroke were found to have lower quality of life and mobility scale scores than patients with ischemic stroke [27]. Another study found a strong association between hemorrhagic stroke and worse lower extremity function [28]. In general, ischemic stroke is more common, but hemorrhagic stroke is thought to be responsible for more deaths and disability-adjusted life-year losses [29]. In our study, it was concluded that the type of stroke did not have a statistically significant relationship with the disability scores of the patients ($p > 0.05$). The reason why our study differs from the literature may be due to the fact that the patients who applied to the disability board did not show all stroke patients in the community homogeneously.

Limitations

There have been some limitations in our study. First of all, the study was a retrospective study. In addition, since the patients we evaluated were selected only from among the patients who applied to the disability board of our hospital, we do not reflect all the stroke patients in the society homogeneously, and therefore we cannot form a general judgment. Finally, the evaluation of the patients only in terms of the pathology constituting the disability rate prevented us from looking at the event from a broad perspective.

CONCLUSION

In conclusion, stroke patients constitute a significant portion of disability status assessment. When evaluating stroke patients in terms of disability, comorbidities and demographic characteristics of patients should also be taken into account.

Authors' Contribution

Study Conception: UE; Study Design: UE; Supervision: UE; Funding: UE; Materials: UE; Data Collection and/or Processing: UE; Statistical Analysis and/or Data Interpretation: UE; Literature Review: UE; Manuscript Preparation: UE and Critical Review: UE.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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REFERENCES

1. Erişkinler için engellilik değerlendirmesi hakkında yönetmelik. Tanımlar Madde 4. Resmi Gazete Tarihi: 20.09.2019 Sayısı: 30692. https://www.resmigazete.gov.tr.
2. Hakbilir O, Çete Y, Göksu E, Akyol C, Kılıçaslan İ. [Characteristics of patients who present to the emergency department with sroke and the impact of delayed presentation on therapeutic management strategies]. Turk J Emerg Med 2006;6:132-8. [Ar-

ticle in Turkish]
3. Sarikaya H, Ferro J, Arnold M. Stroke prevention-medical and lifestyle measures. Eur Neurol 2015;73:150-7.
4. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, et al. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics-2017 update: a report from the American Heart Association. Circulation 2017;135:e146-603.
5. Ma VY, Chan L, Carruthers KJ. Incidence, prevalence, costs, and impact on disability of common conditions requiring rehabilitation in the United States: stroke, spinal cord injury, traumatic brain injury, multiple sclerosis, osteoarthritis, rheumatoid arthritis, limb loss, and back pain. Arch Phys Med Rehabil 2014;95:986-95.
6. Wu S, Wu B, Liu M, Chen Z, Wang W, Anderson CS, et al. Stroke in China: advances and challenges in epidemiology, prevention, and management. Lancet Neurol 2019;18:394 405.
7. Yetişgin A, Hartavi A, Kocatürk M, Tutoğlu A, Boyacı A. Risk factors affecting disability rates in patients with stroke. J Phys Med Rehabil Sci 2017;20:118-25.
8. Naçar M, Çetinkaya F, Baykan Z. [Prevalence of impairments, disabilities, handicaps: study from Kayseri Province]. TAF Prev Med Bull 2012;11:71-80. [Article in Turkish]
9. Yang Y, Shi YZ, Zhang N, Wang S, Ungvari GS, Ng CH, et al. The disability rate of 5-year post-stroke and its correlation factors: a national survey in China. PLoS One 2016;11:e0165341.
10. Bensenor IM, Goulart AC, Szwarcwald CL, Vieira MLFP, Malta DC, Lotufo PA. Prevalence of stroke and associated disability in Brazil: National Health Survey-2013. Arq Neuropsiquiatr 2015;73:746-50.
11. Teh WL, Abdin E, Vaingankar JA, Seow E, Sagayadevan V, Shafie S, et al. Prevalence of stroke, risk factors, disability and care needs in older adults in Singapore: results from the WiSE study. BMJ Open 2018;8:e020285.
12. Beare R, Chen J, Phan TG, VISTA-Acute Collaboration. Googling stroke ASPECTS to determine disability: exploratory analysis from VISTA-Acute Collaboration. PLoS One 2015;10:e0125687.
13. Türkel Y, Güngör L, Onar MK. [The predictors of mortality, recurrence and functional recovery in ischemic cerebrovascular disease]. Turk Norol Derg 2010;16:177-86. [Article in Turkish]
14. Martin RC, Burgin WS, Schabath MB, Kirby B, Chae SH, Fradley MG, et al. Gender-specific differences for risk of disability and death in atrial fibrillation-related stroke. Am J Cardiol 2017;119:256-61.
15. Kes VB, Jurašić MJ, Zavoreo I, Lisak M, Jelec V, Matovina LZ. Age and gender dıfferences ın acute stroke hospıtal patıents. Acta Clin Croat 2016;55:69-78.
16. Gibson CL, Attwood L. The impact of gender on stroke pathology and treatment. Neurosci Biobehav Rev 2016;67:119-24.
17. Oyewole OO, Ogunlana MO, Oritogun KS, Gbiri CA. Post-stroke disability and its predictors among Nigerian stroke survivors. Disabil Health J 2016;9:616-23.
18. Lee JD, Hu YH, Lee M, Huang YC, Kuo YW, Lee TH. High risk of one-year stroke recurrence in patients with younger age and prior history of ischemic stroke. Curr Neurovasc Res 2019;16:250-7.
19. Farzadfard MT, Andalibi MSS, Thrift AG, Morovatdar N, Stranges S, Amiri A, et al. Long-term disability after stroke in Iran: evidence from the Mashhad Stroke Incidence Study. Int J Stroke 2019;14:44-7.
20. Şenocak Ö, El Ö, Söylev GÖ, Avcılar S, Peker Ö. [Factors affecting quality of life following stroke]. J Neurol Sci 2008;15:164-70. [Article in Turkish]
21. Lazar RM, Boehme AK. Aphasia as a predictor of stroke outcome. Curr Neurol Neurosci Rep 2017;17:83.
22. Flowers HL, Skoretz SA, Silver FL, Rochon E, Fang J, Flamand-Roze C, et al. Poststroke aphasia frequency, recovery, and outcomes: a systematic review and meta-analysis. Arch Phys Med Rehabil 2016;97:2188-201.
23. Prynn JE, Kuper H. Perspectives on disability and non-communicable diseases in low- and middle-income countries, with a focus on stroke and dementia. Int J Environ Res Public Health 2019;16:3488.
24. Soyuer F, Özarslan M, Soyuer A. [Ischemic stroke: impairment and disability]. Erciyes Med J 2004;26:19-24. [Article in Turkish]
25. Gelaw AY, Janakiraman B, Gebremeskel BF, Ravichandran H. Effectiveness of home-based rehabilitation in improving physical function of persons with stroke and other physical disability: a systematic review of randomized controlled trials. J Stroke Cerebrovasc Dis 2020;29:104800.
26. Regenhardt RW, Biseko MR, Shayo AF, Mmbando TN, Grundy SJ, Xu A, et al. Opportunities for intervention: stroke treatments, disability and mortality in urban Tanzania. Int J Qual Health Care 2019;31:385-92.
27. Memis D, Kozanoglu E, Kelle B, Goncu MK. Assessment of demographic and clinical characteristics on functional status and disability of patients with stroke. Neurosciences (Riyadh) 2016;21:352-7.
28. Koyama T, Uchiyama Y, Domen K. Outcome in stroke patients is associated with age and fractional anisotropy in the cerebral peduncles: a multivariate regression study. Prog Rehabil Med 2020;5:20200006.
29. Katan M, Luft A. Global burden of stroke. Semin Neurol 2018;38:208-11.