



Risk factors of falls among hospitalized stroke patients[☆]



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KEYWORDS

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Abstract

Objective: To explore the risk factors of falls among stroke patient within hospitalized.
Methods: A quantitative descriptive design was adopted in this study. There were 48 stroke patients selected using consecutive sampling method.
Results: According to the scoring of risk factors of falls, patients were categorized into three levels, namely not risk (10.4%), low risk (33.3%), and high risk (56.2%). This result revealed that dominant patients had a high risk of falls.
Conclusion: Risk factors of falls among inpatient of stroke patients were remains high. Therefore, imperative to identify the risk of falls using screening tools and to provide nursing intervention to prevent the incidence of falls among stroke patient during hospitalized.
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Introduction

Stroke is the second leading cause of death in 10 major diseases, globally.¹ It was reported that, in 2013, globally, there were nearly 25.7 million stroke survivors, 6.5 million deaths due to stroke.² Developing countries have a higher risk of stroke and death from stroke.³

In Indonesia, stroke was the leading cause of death among those aged 45 years, comprising 15.4% of all deaths.² There

has been an increase of 3.3% in the prevalence of stroke in Indonesia based on diagnosed by doctors from 7% in 2013 to 10.9% in 2018,⁴ while the prevalence of stroke is based on diagnosed health workers, and the highest symptoms are found in South Sulawesi (17.9%), and the lowest prevalence was in Riau (5.2%) in 2013. Stroke in the city of Makassar is included in the ten main diseases that cause death.⁴

Most stroke sufferers experience a combination of sensory, motor, cognitive, and emotional disorders, thus limiting their capacity to carry out daily living activities.⁵ Approximately 37% of 1.104 stroke patients reported experiencing a one-time fall in the first six months of post-stroke.⁶ One consequence of a stroke is a postural control disorder that can cause postural instability and has an impact on gait and independence in carrying out daily activities.⁷ Falling after a stroke occurs around 13%, and most occur within the first four days.⁸

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One study showed that strokes patients were more likely to fall when walking due to decreased cognitive control in stroke patients.⁹ The incidence of falls is quite high after the first eight weeks after leaving the hospital or rehabilitation clinic. This is the impact of rehabilitation that is not optimal during the treatment period so that stroke patients have difficulty adapting to the environment related to their conditions.¹⁰

Impact falls, resulting in serious injury, fracture, and fear of being fall puts restrictions on excessive activity, which in the end, making functional deficits and increasing distress for caregivers. There were 37% of post-stroke patients who had suffered injuries need medical care, and 8% of them have broken bone.¹¹ Thus, nurses need to pay attention to risk factors for falls in stroke patients.

Various factors play a role in the incidence of falls in stroke patients at home; they are muscle weakness, chronic conditions, and the use of sticks or walkers, and environmental factors.¹²

Numerous studies have examined among patients with stroke, most of the study on prevalence and risk factors among patient with stroke in the rehabilitation setting or the community setting after discharge. However, the limited study described within hospitalized.¹³ Therefore, this study sought to explore the risk factors of falls among stroke patient within hospitalized.

Methods

A quantitative descriptive design was adopted in this study. This study was conducted inpatient stroke center at a major stroke hospital in East Indonesia. Consecutive sampling method was used. The sampling technique used was using consecutive sampling. The instrument used in this study is to use the Morse Fall Scale (MFS) instrument and is a standard instrument.

Ethical approved was obtained from Institutional review boards of the University. The study was performed following the Helsinki Declaration. Participants have received an explanation of the aims and requirements of the research, written informed consent was obtained.

Data were analyzed using SPSS. Descriptive statistic including frequencies, percentage, the mean, and standard deviation was calculated to describe demographic and risk factors present at the time of the fall.

Result

Thirty-three patients were enrolled in this study. A description of the patients' characteristic is provided in Table 1. The mean age was 54.85 years, and significant gender difference. Most of the participants were male (62.5%). The description of risk factors of falls based on the Morse Fall Scale in Table 2. The data showed that 13 respondents (27.1%) had a history of falls in the last three months and 24 respondents who did not have a history of falls in the last three months. Half of the respondents had a secondary diagnosis (50%), and the majority of patients were assisted by nurses for mobilization (77.1%). For risk factors related to the provision of drug therapy, more than half of the respondents received treatment therapy as many as 37 respondents

Table 1 Distribution of characteristics of respondents by age and sex of ischemic stroke patients at dadi special hospital in south sulawesi province in 2019 (n = 48).

Characteristics of respondents	Frequency (n)	Percentage (%)	
<i>Gender</i>			
Man	30	62.5	
Women	18	37.5	
Characteristics of respondents	Mean	Standart deviation	Min–Max
Age (years)	54.85	6.09	40–64

Table 2 Distribution of falling risk factors: fall history, secondary diagnosis, physical mobility, drug therapy, walking and cognitive functions in ischemic stroke patients at the dadi special hospital in south sulawesi province in 2019 (n = 48).

Risk factors	Frequency (n)	Percentage (%)
<i>Fall history</i>		
Not	35	72.9
Yes	13	27.1
<i>Secondary diagnosis</i>		
Not	24	50
Yes	24	50
<i>Physical mobilization</i>		
Bed rest/assisted nurses	37	77.1
Buffer/walking	5	10.4
stick/walker/wheelchair/wheelchair		
Gripping furniture	6	12.5
<i>Drug therapy</i>		
Not	11	22.9
Yes	37	77.1
<i>How to walk</i>		
Normal/bed rest/immobilization	36	75
Fatigue/weakness	9	18.8
Disturbed/abnormal (limping/dragging)	3	6.2
<i>Cognitive function</i>		
Normal/according to self ability	25	52.1
Forgetting self limitations/lowering consciousness	23	47.9

(77.1%). More than half of the respondents experienced immobilization (75%) while cognitive functions more than half were by their abilities (52.1%).

According to the scoring of risk factors of falls, patients were categorized into three levels, namely not risk (10.4%), low risk (33.3%), and high risk (56.2%). This result revealed that dominant patients had a high risk of falls (Table 3).

Table 3 Distribution rate rate risks fall in ischemic stroke patients at the Regional Special Hospital Provincial Dadi South Sulawesi 2019 ($n = 48$).

Risk level	Frequency (n)	Percentage (%)
Not risky	5	10.4
Low risk	16	33.3
High risk	27	56.2

Discussion

The results of this study highlight potential risk factors of falls among stroke patient within hospitalized. Findings are similar to one study that reported a higher incidence of falls among male patients with stroke.¹³ Most of the participants were elderly, fall risk in the elderly due to low bone mass, the presence of osteoporosis, and low muscle strength.¹⁴

Falling risk is a complication that increases a person's vulnerability to falling and can cause physical harm.¹³ Findings indicated that a higher percentage of a patient with no history of falls. This falling experience can lead to physical limitations and decreased capacity to carry out activities.¹⁵ Limitations in activity result in muscle weakness and slow walking.¹⁶

Secondary diagnosis is one of the predictors of the risk of falls. Vision problems increase the incidence of falls in stroke patients.¹⁷ In addition to visual impairment, the disrupted vestibular system can also lead to dizziness and vertigo and can affect balance¹⁸ Chronic illnesses such as hypertension can be a cause of falls.¹⁹ The study examined that equal to the participant with the secondary diagnosis.

The use of walking aids such as walkers, sticks, and wheelchairs is one of the causes of balance and falling disorders. This is related to differences in the size, type, and method of using these walking aids.²⁰ The results of this study indicated that 77.1% of respondents assisted by nurses for physical mobilization and most occurred in women. This is in line with the statement that the incidence of immobility can affect the decline in musculoskeletal system function and cause an increased risk of falling.²¹

Drug therapy in this study was a therapy given during the treatment period in the form of intravenous therapy. Effects of drugs caused dizziness or unsteadiness, which predisposes to fall.¹⁴ Medication could hurt functional ability,¹⁵ functional ability could be affected a patient's ability in activities, for example, in caring for himself who needs help from others.²² This study reported that most of the stroke patients got drug therapy.

The results of this study showed that more than half of the respondents experienced immobilization in the age of the elderly. The assessment of how to walk based on the Morse Fall Scale questionnaire is how to walk or move respondents whether respondents experience immobility, fatigue, and disorders such as limping or being dragged. The perceived immobility can reduce the quality of life and health status.³ The finding of the study reported that numerous of stroke patient had cognitive impairment. This study was appropriate with one study widely conducted study in ten countries showed that around 30% of ischemic stroke patients showed cognitive impairment determined by

Mini-Mental State Examination (MMSE) scores with results lower than.²³ Falls are highly prevalent in individuals with cognitive decline.²⁴

The risk assessment category for ischemic stroke in the Morse Fall Scale questionnaire was divided into three, namely, high risk, low risk, and not at risk. Based on the results of this study, 56.2% of participants have a high risk of ischemic stroke patients. In line with other study stated that about one in three stroke patients almost falls every month in the first month after a stroke after discharge from the hospital.²⁵

Limitations of this study include sample took in the single-site. However, the study setting was a significant center of stroke hospital. The small sample size does limited generalizability. Nevertheless, findings contribute to insight and knowledge on risk factors for falls among hospitalized stroke patients.

Conclusions

Risk factors of falls among inpatient of stroke patients were remains high. Therefore, imperative to identify the risk of falls using screening tools and provide nursing intervention to prevent the incidence of falls among stroke patient during hospitalized.

Conflict of interest

The authors declare no conflict of interest.

References

1. Johnson W, Oyere O, Mayowa O, Sonal S. Stroke: a global response is needed. *Bull World Health Organ.* 2016;94, <http://dx.doi.org/10.2471/BLT.16.181636>, 634–634A.
2. Venketasubramanian N, Yoon W, Pandian J, Navarro C. Stroke epidemiology in south, east, and south-east Asia: a review. *J Stroke.* 2017;19:286–94.
3. Wu X, Zhu B, Fu L, Wang H, Zhou B, Zou S, et al. Prevalence incidence, and mortality of stroke in the Chinese island populations: a systematic review. *PLOS ONE.* 2013;8:e78629, <http://dx.doi.org/10.1371/journal.pone.0078629>.
4. Kementerian Kesehatan Republik Indonesia. Profil Kesehatan Indonesia. Available from: <http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Data-dan-Informasi.Profil-Kesehatan-Indonesia-2018.pdf>.
5. Lee HH, Jung SH. Prediction of post-stroke falls by quantitative assessment of balance. *Ann Rehabil Med.* 2017;41:339, <http://dx.doi.org/10.5535/arm.2017.41.3.339>.
6. Kerse N, Parag V, Feigin VL, McNaughton H, Hackett ML, Bennett DA, et al. Falls after stroke: results from the Auckland Regional Community Stroke (ARCOS) study, 2002 to 2003. *Stroke.* 2008;39:1890–3, <http://dx.doi.org/10.1161/STROKEAHA.107.509885>.
7. Bahureksa L, Najafi B, Saleh A, Sabbagh M, Coon D, Mohler MJ, et al. The impact of mild cognitive impairment on gait and balance: a systematic review and meta-analysis of studies using instrumented assessment. *Gerontology.* 2017;63:67–83, <http://dx.doi.org/10.1159/000445831>.
8. Persson CU, Kjellberg S, Lernfelt B, Westerlind E, Cruce M, Hansson PO. Risk of falling in a stroke unit after acute stroke: the Fall Study of Gothenburg (FallsGOT).

- Clin Rehabil. 2018;32:398–409, <http://dx.doi.org/10.1177/0269215517728325>.
9. Hyndman D. Stops walking when talking as a predictor of falls in people with stroke living in the community. *J Neurol Neurosurg Psychiatry*. 2004;75:994–7, <http://dx.doi.org/10.1136/jnnp.2003.016014>.
 10. Verheyden GS, Weerdesteyn V, Pickering RM, Kunkel D, Lennon S, Geurts AC, et al. Interventions for preventing falls in people after stroke. *Cochrane Database Syst Rev*. 2013;CD008728, <http://dx.doi.org/10.1002/14651858.CD008728.pub2>.
 11. Batchelor F, Hill K, Mackintosh S, Said C. What works in falls prevention after stroke? A systematic review and meta-analysis. *Stroke*. 2010;41:1715–22, <http://dx.doi.org/10.1161/STROKEAHA.109.570390>.
 12. Spoelstra SL, Given BA, Given CW. Fall prevention in hospitals: an integrative review. *Clin Nurs Res*. 2012;21:92–112, <http://dx.doi.org/10.1177/1054773811418106>.
 13. Cox R, Buckholz B, Bradas C, Bowden V, Kerber K, McNett MM. Risk factors for falls among hospitalized acute post-ischemic stroke patients. *J Neurosci Nurs*. 2017;49:355–60, <http://dx.doi.org/10.1097/JNN.0000000000000322>.
 14. Milos V, Bondesson Å, Magnusson M, Jakobsson U, Westerlund T, Midlöv P. Fall risk-increasing drugs and falls: a cross-sectional study among elderly patients in primary care. *BMC Geriatr*. 2014;14:40, <http://dx.doi.org/10.1186/1471-2318-14-40>.
 15. Kristin R. Falls in older people: risk factors and strategies for prevention. *JAMA*. 2010;304:1958–9, <http://dx.doi.org/10.1001/jama.2010.1599>.
 16. Brach JS, VanSwearingen JM. Interventions to improve walking in older adults. *Curr Transl Geriatr Exp Gerontol Rep*. 2013;2:230–8, <http://dx.doi.org/10.1007/s13670-013-0059-0>.
 17. Teasell R, McRae M, Foley N, Bhardwaj A. The incidence and consequences of falls in stroke patients during inpatient rehabilitation: factors associated with high risk. *Arch Phys Med Rehabil*. 2002;83:329–33, <http://dx.doi.org/10.1053/apmr.2002.29623>.
 18. D'Silva LJ, Lin J, Staecker H, Whitney SL, Kluding PM. Impact of diabetic complications on balance and falls: contribution of the vestibular system. *Phys Ther*. 2016;96:400–9, <http://dx.doi.org/10.2522/ptj.20140604>.
 19. Sibley KM, Voth J, Munce SE, Straus SE, Jaglal SB. Chronic disease and falls in community-dwelling Canadians over 65 years old: a population-based study exploring associations with number and pattern of chronic conditions. *BMC Geriatr*. 2014;14:22, <http://dx.doi.org/10.1186/1471-2318-14-22>.
 20. Gell NM, Wallace RB, LaCroix AZ, Mroz TM, Patel KV. Mobility device use in older adults and incidence of falls and worry about falling: findings from the 2011–2012 National Health and Aging Trends Study. *J Am Geriatr Soc*. 2015;63:853–9, <http://dx.doi.org/10.1111/jgs.13393>.
 21. Struksnes S, Bachrach-Lindström M, Hall-Lord ML, Slaasletten R, Johansson I. The nursing staff's opinion of falls among older persons with dementia. a cross-sectional study. *BMC Nurs*. 2011;10:13, <http://dx.doi.org/10.1186/1472-6955-10-13>.
 22. Memel D. Assessing functional ability is important. *Br J Gen Pract*. 2008;58:835–6, <http://dx.doi.org/10.3399/bjgp08X376159>.
 23. da Costa FA, daSilva DLA, daRocha VM. Estado neurológico e cognição de pacientes pós-acidente vascular cerebral. *Rev da Esc Enferm da USP*. 2011;45:1083–8, <http://dx.doi.org/10.1590/S0080-62342011000500008>.
 24. Allali G, Launay CP, Blumen HM, Callisaya ML, De Cock A-M, Kressig RW, et al. Falls cognitive impairment, and gait performance: results from the GOOD initiative. *J Am Med Dir Assoc*. 2017;18:335–40, <http://dx.doi.org/10.1016/j.jamda.2016.10.008>.
 25. Wagner LM, Phillips VL, Hunsaker AE, Forducey PG. Falls among community-residing stroke survivors following inpatient rehabilitation: a descriptive analysis of longitudinal data. *BMC Geriatr*. 2009;9:46, <http://dx.doi.org/10.1186/1471-2318-9-46>.