

THE TIGHTROPE CHRONICLES: A DEEP DIVE INTO FALL RISK AND INJURIES AMONG HEMIPLEGIC STROKE PATIENTS

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ABSTRACT

Background: Stroke among elders is the most common cause that leads to impairment and disability. In daily clinical practice, falls in the elderly are a common issue that frequently results in a loss of mobility and independence.

Objective: The purpose of the study was to find the prevalence of risk of falling and fall-related injuries in chronic stroke patients by using the Berg Balance Scale and Dresden Fall Questionnaire.

Methodology: A cross-sectional study was carried out in 60 hemiplegic stroke patients (Male and Female) aged between 40-70 years for four months. The data was collected from Faisal Hospital and Allied Hospital, Faisalabad. The balance was found utilizing the Berg Balance Scale (BBS), and fall-related injuries were evaluated by the Dresden Fall Questionnaire (DREFAQ).

Results: A total of 60 participants were selected in this sample. The mean \pm SD of age is 53.78 ± 9.042 . BBS's last three questions; placing another foot on the stool, front standing unsupported on foot and one leg standing were the most difficult to perform ranging from 50%, 78.3%, and 83.3% respectively.

Conclusion: The BBS score shows that the last three questions; putting an alternative foot on the stool, standing unsupported on the front foot, and standing on one leg, were the hardest. DREFAQ scores indicate moderate fall risk. Balance exercises were recommended for stroke patients to build strength and confidence about falling.

Keywords: Balance Berg scale, Dresden Fall Questionnaire, Hemiplegic Stroke, Risk of Fall.

I. INTRODUCTION

Among the elders, a common cause of impairment and disability is stroke, and in developing countries, it is the major leading cause of mortality and disability (1, 2). After a stroke, there is a high rate of falls, both in a clinic and after they are discharged. According to the research, falls can occur anywhere between 14% and 65% of the time among stroke patients who are hospitalized with incidence rates ranging from 7% in the first week following to 73% in the first year following hospital discharge (3, 4).

In daily clinical practice, falls, particularly in the elderly, are a common issue frequently resulting in a loss of mobility and independence (5). According to a community-based cross-sectional survey, one-fourth and one-third of those 65 and older reported falling in the previous year (6). Between 10% and 15% of falls among the elderly produce significant injuries, while between 5% and 10% result in fractures (3).

A high rate of falls in neurological patients is anticipated as a result of the typical consequences of neurological illnesses that impact integrative motor processes including balance regulation and gait, which may be an underappreciated issue (7). Most frequently, other less serious injuries from falls result in hematoma, laceration, and soft tissue

damage (8). In contrast, more serious consequences include fatal outcomes, open and closed bone fractures, luxations, cerebral hematomas, and significant bleeding (8, 9).

After a stroke, cognitive abnormalities are prevalent with poor ADL recovery and poor rehabilitation outcomes. The capacity to complete functional tasks is correlated with attention problems following a stroke. Fallers had impaired selective attention and split attention abilities as well as faster reaction times (10). Reduction in motor activity decreased balance and impaired cognitive function all have been described as fall risk factors for the stroke subjects (11). Most stroke victims have some degree of disability after being discharged from the hospital. When examining falls in stroke patients, clinical proportions of equilibrium such as the BBS (a 14-item test with 56 maximum focus points that rates each item on a 5-point scale) are appropriate and delicate measurements to utilize (12-14).

The majority of stroke victims continue to live with genuine limitations that are immobilized, which may encourage a sedentary lifestyle and the ensuing discretionary complications (15).

Exercises that were specifically targeted included standing, moving between surfaces, getting objects

from the floor, and remaining on one leg while sitting with arms down (16).

Dresden Fall Questionnaire also abbreviated as DREFAQ is a 5-item questionnaire (scored from 0-3) intended to assess the frequency of falls, near falls, injuries related to falls, and the fall causes. Falls, especially among stroke patients, are a prevalent problem in normal clinical treatment and usually result in immobilization (17, 18).

II. METHODOLOGY

A cross-sectional (descriptive) study was performed in Faisal Hospital and Allied Hospital, Faisalabad, Pakistan for four months; September-December, 2023. A total of 60 patients (39 males and 21 females) aged between 41-70 years, with a Mean \pm SD of 53.78 ± 9.042 , having a hemiplegic stroke for 6 months to a year were selected via a purposive sampling technique by a formula given below

$$n = \frac{Z^2 \times p \times (1 - p)}{d^2}$$

However, Patients with musculoskeletal problems, Visual impairment, Orthopedic injury, Leg Length Discrepancy, and Psychological disorders were excluded from the study. The data collection tools in the current study were the Berg Balance Scale (BBS); which is a 14 questions scale (56 focuses greatest) utilizing a 5-point scale ranging from 0 to 4 to rate, and the Dresden Fall Questionnaire (DREFAQ); a 5 question scale with a score ranging from 0-3. All patients completing screening tests were included in the study. The results were analyzed by SPSS V22, expressed in frequency and percentage. The study had no ethical issues because the patient was not put in the trial and no medication was given during the study. Informed consent was obtained from the patients after explaining the procedure. Moreover, the ethics committee of Faisal Hospital (FIHS), Faisalabad, Pakistan, duly approved the study dated 16/05/2023, numbered FIHS/23/14.

III. RESULTS

Figure 1 shows the gender distribution of the population sample, 21 (35%) were females and 39 (65%) were males.

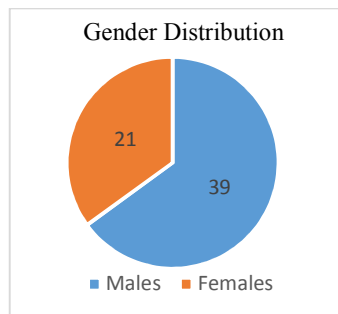


Figure 1. Gender Distribution of Sample

Table 1 shows the age distribution of 60 participants aged 41-70 years with a Mean \pm SD of $53.78 \pm$

9.042. There were 24 individuals in the 41-50 years age group, 20 individuals in the 51-60 years age group, and 16 in the 61-70 years age group.

Table 1: Age distribution of 60 individuals

Age Group	Number	Percentage
41-50 years	24	40%
51-60 years	20	33%
61-70 years	16	27%

Table 2 represents the scoring of all 14 questions of the Berg Balance Scale. Regarding 1st question (sitting to standing) 17 (28%) needed minimal aids while 5 (8%) were able to stand without using their hands. Regarding 2nd question (standing unsupported) 36 (60%) needed several tries to stand unsupported for 30 seconds while only 4 (7%) were able to stand solely for two minutes. Regarding 3rd question (sitting with back unsupported) 26 (43%) were able to sit for 30 seconds while only 4 (7%) were able to sit properly without support for two minutes. Regarding the 4th question (standing to sit) 12 (20%) were able to sit independently but with uncontrolled descent while 13 (27%) were able to sit with minimal usage of hands. Regarding the 5th question (ability to transit) 32 (53%) needed one person for assistance while only 2 (3%) were able to move with minimal use of hands. Regarding the 6th question (standing with eyes closed), only 1 needed help to keep from falling while 2 (3%) were able to stand for 10 seconds. Regarding the 7th question (standing unsupported with feet together), 2 (3%) needed help to retain the position for 15 seconds while only 2 (3%) were able to stand for one minute. Regarding the 8th question (outstretching arm while standing) 3 (5%) lost their balance while outstretching their arm, however, only 2 (3%) were able to outstretch their hand for up to 10 inches. Regarding the 9th question (pickup object from the floor while standing), 4 (7%) were not able to pick it up while 2 (3%) were able to pick it up safely. Regarding the 10th question (looking behind over right and left shoulder while standing) 6 (10%) needed help to prevent from falling while 2 (3%) were able to look behind from both sides. Regarding the 11th question (turning 360°) 10 (17%) needed assistance while turning but only one was able to turn safely. Regarding the 12th question (placing foot on the stool) 30 (50%) needed assistance to prevent falling while 6 (10%) were able to stand and complete 8 steps safely. Regarding the 13th question (placing one foot in front), 47 (78%) lost their balance while stepping and only one could stand properly for 30 seconds. Regarding the 14th question (standing on one leg) 50 (83%) needed assistance to prevent falling while only one could withhold the standing position for 3 seconds.

Table 2: Frequency of scores of Berg Balance Scale

Question	Type	N	%
Question 1	Needs Aid	17	28%
	Able to stand	5	8%
Question 2	Several tries to stand	36	60%
	Stand solely for 2m	4	7%
Question 3	Sitting without support for 30s	26	43%
	Sitting without support for 2m	4	7%
Question 4	Sitting with uncontrolled descent	12	20%
	Sitting without utilizing hands	13	27%
Question 5	Need assistance to move	32	53%
	Able to move	2	3%
Question 6	Need help to prevent falling	1	1%
	Able to stand for 10s	2	3%
Question 7	Need help to retain position	2	3%
	Able to stand for 1m	2	3%
Question 8	Lost balance outstretching arm	3	5%
	Able to outstretch arm	2	3%
Question 9	Not able to pick an object	4	7%
	Able to pick objects from the floor	2	3%
Question 10	Need help looking behind	6	10%
	Able to look behind	2	3%
Question 11	Need help to turn 360°	10	17%
	Able to turn 360°	1	1%
Question 12	Cannot place a foot on a stool	30	50%
	Able to place a foot on a stool	6	10%
Question 13	Cannot take a step	47	78%
	Able to hold step for 30s	1	1%
Question 14	Cannot stand on one leg	50	83%
	Able to stand on one leg for 3s	1	1%

Table 3 shows that 60 (100%) of the population had a history of falls upon analysis by Dresden Fall Questionnaire (DREFAQ). Regarding 1st question; 28 (47%) of individuals have mild severity of fall risk and 32 (53%) have moderate fall risk with a

Mean ± SD of 1.53 ± 1.18. Regarding 2nd question; 21 (35%) of individuals have mild near falls, 27 (45%) have moderate near falls, and only 12 (20%) have severe near falls with a Mean ± SD of 1.85 ± 0.73. Regarding 3rd question; 28 (46%) of individuals have a mild fear of falls, 20 (33%) have a moderate fear of falls, and only 12 (20%) have a severe fear of falls with a Mean ± SD of 1.73 ± 0.77. Regarding the 4th question; 29 (48%) of individuals have not any injury due to falls, and 31 (52%) have bruises and scratches due to falls with a Mean ± SD of 1.00 ± 0.00.

Table 3: Frequency of scores of Dresden Fall Questionnaire

Question	Type	N	%	Mean	S.D
History of Falls	Mild	28	47%	1.53	0.50
	Moderate	32	53%		
Near Falls	Mild	21	35%	1.85	0.73
	Moderate	27	45%		
	Severe	12	20%		
Worry about falling	Mild	28	46%	1.73	0.77
	Moderate	20	33%		
	Severe	12	20%		
Injury due to fall	No	29	48%	1.00	0.00
	Yes	31	52%		

IV. DISCUSSION

The findings from the current study underscore the intricate interplay between stroke-related factors and balance impairment among chronic stroke patients. Notably, the severity and side of stroke were significantly correlated with balance impairments. Additionally, consistent correlations emerged between risk factors for falls, such as poor postural control and fear of falling.

The incidence of falls in a cohort, in contrast to this study, was higher than the statistics published (50 percent within 3 months), highlighting the relevance of this consequence (19). The 4 fractures in 82 individuals over 3 months underlined the negative personal and monetary effects of falling. In comparison to comparative prospective studies (20) or bigger population-based assessments (21), the incidence of severe injuries was higher. In the current study, findings concluded that the history of

falls was 93.3% with 48.3% of subjects not having any injury due to falls.

In contrast to the findings of Afshin et al., which reported a 46% fall risk among subjects, our study identified a significantly higher prevalence, with 93.3% of chronic stroke patients having a history of falls. Moreover, while Afshin et al. documented associated injuries in 15% of cases (22). However, the given investigation reported a notably higher rate of 51.7% experiencing bruises and scratches due to falls.

These results not only diverge from Afshin et al.'s study but also differ from various other earlier investigations. For instance, other studies have shown varied prevalence rates of balance issues, with a higher frequency of balance (83%) noted in a study conducted in the United Kingdom, whereas research in Sri Lanka (16.7%) and Nigeria (36.8%) found lower prevalence rates (23-25).

While the given study demonstrated higher incidence rates (93%), a 2012 study indicated that among participants aged 85 years or older, 21.3% reported experiencing falls in the previous three months, with only 7.2% reporting fall-related injuries requiring medical attention or restricted activity for a day or longer (26).

Studies highlighting fall incidence post-stroke demonstrated a wide-ranging occurrence, spanning from 37% to 73% within the initial six months, indicating a heightened risk in later stages compared to non-stroke individuals (27). The given study, focusing on ambulatory patients, shed light on the importance of considering functional status and mobility.

V. CONCLUSION

The study argued that balance among stroke patients needs to be closely monitored because everyone needs to develop confidence and strength regarding their risk of falling. Patients should also be required to undergo training in balance exercises, with an emphasis on older patients in particular. As the BBS score represents the last three questions placing an alternative foot on the stool, being able to stand unsupported on the foot in front, and being able to stand on one leg was most difficult to perform. DREFAQ score shows that subjects have mild to moderate severity of fall risk. To provide for the daily needs of an individual and allow them to be independent in carrying out their everyday activities following a stroke, they need to modify their daily routine, lifestyle, and habits.

DECLARATIONS

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