

A neurological approach to fear of falling in patients with stroke

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Abstract

Objective: The present study aimed to investigate the factors that affects the fear of falling, also known basophobia, in patients with stroke and the aspects of life quality.

Material and Methods: Stroke patients in the physical therapy were included in this study. Demographic data of the patients were recorded. Patients were asked whether they fell after the stroke and experienced fear of falling. Itaki Fall Risk Scale, Functional Ambulatory Categories, Functional Independence Measure, Beck Depression Inventory and Stroke Specific Quality of Life scale (SS-QoL) have been used. The data of the study were analyzed with SPSS 15 package program.

Results: This study was conducted on 102 patients with stroke. Of these, 36 (35.3%) patients were female with a mean age of 60.97. There was a fear of falling in 65 (63.7%) of the patients. 48 patients (47.1%) fell at least once after the stroke. Falls were significantly high with the ones who were experiencing fear of falling ($p = 0.006$). Fear of falling was significantly high in females, patients with ischemic stroke, elderly and the patients with coexistent systemic diseases ($p < 0.05$). The total score and sub-units of SS-QoL was significantly low ($p < 0.05$) in the group with the fear of falling. The depression score was significantly high in patients with fear of falling ($p = 0.00$).

Conclusion: Fear of falling in patients with stroke negatively affects many sub-units of the quality of life-related to movement, participation, and mood. Thus, the classic rehabilitation program for patients with stroke should include falling prevention training.

Keywords: Stroke, Quality of life, Fear of falling

Introduction

Fall is a common case in patients after stroke. It is seen 14-65% during hospitalization and 37-73% after discharge [1-2]. The localization of the stroke, cognitive deficits (such as anosognosia, somatognosia, and neglect), visual disturbances, sedative or psychotropic medications increase the risk of falls in patients with stroke [3-4]. In addition, balance and mobility problems, need for support for self-care, depression, and history of previous falls have also been found to be associated with falls in stroke patients [5]. Fear of falling is an important individual risk factor of falling for stroke patients apart from all other risk factors [6]. Fear of falling may be associated with falling concurrently with the onset of the stroke and post-stroke body change perceptions. Accompanying neglect and deep sensory impairment increase the fear of falling. Fear of falling in patients with stroke affects in a negative way the quality of life such as limitation of activity and functional independence. Besides, this situation increases the caregiver stress [7-10]. This study was aimed to investigate the factors affecting fear of falling that is one of the most important predictors of falling in patients with stroke and the aspects of the quality of life.

Material and Methods

Stroke patients under the physical therapy were included in the study. Demographic data (age, gender, marital status, the closeness of caregiver) of the patients were recorded. The time and the type (hemorrhagic/ischemic) of stroke and the affected side (left/right) were recorded. In addition, the orthosis which was used by the patients (no orthosis/ foot-ankle orthosis/ knee-foot-ankle orthosis etc.) and the support used for walking (canes, tripods, walkers, etc.) were recorded. This study was approved by the local ethical committee (Ankara Fizik Tedavi ve Rehabilitasyon Eğitim ve Araştırma Hastanesi Eğitim Planlama Kurulu protocol no: 838942379000-773.99-2638) and all participants were informed about the study then written consent form was taken.

Fall Risk Assessment

Patients were asked whether they fell after the stroke and answers were recorded. They were asked whether they experienced fear of falling and answers were recorded as yes or no. To assess the risk of falling, Itaki Fall Risk Scale was used. This scale comprises 19 risk factors which includes probability of the cause patient falls.



Risk factors were categorized as major and minor which 1 point was given to minor risk factors and 5 points were given to major risk factors. Two risk levels were determined over the calculated total score after the evaluation of risk factors. The total score of less than 5 is low risk and total score 5 or above is the high risk [11].

Ambulatory and Functional Assessment

Functional Ambulatory Categories (FAC) was used for assessing the level of ambulation. According to this; FAC 0: No ambulation, FAC 1: While walking on a flat ground the patient does not need more support than manual support of one person so as not to fall yet the manual support is continuous, FAC 2: While walking on a flat ground the patient does not need more than one person's manual support so as not to fall yet, the form of support is continuous or intermittent touching, FAC 3: The patient can walk on flat ground without someone else's manual support, but for safety reasons, someone else is needed to lead the patient, FAC 4: The patient can walk independently on the flat ground, however, needs assistance with stairs and slopes, FAC 5: The patient is able to walk independently on flat ground as well as uneven surfaces [12].

Functional Independence Measure (FIM) was used for assessing the functional status of the patients. Turkish validity and reliability research of FIM had been performed previously [13]. FIM is a scale that measures independence in 18 different activities and evaluates each activity in seven levels. Section 13 is for assessment of motor functions and section 5 is for cognitive functions. Each category is scored from 1 to 7. The total score is between 18 and 126.

Assessment of Depression

Beck Depression Inventory (BDI) was used for assessing the depression status in patients. There are 21 questions in BDI. Each question is evaluated in four levels between 0 and 3. The total score is obtained by collecting scores from each question. The total score is between 0-63 points. High scores indicate that depression is more severe [14].

Quality of Life Assessment

Stroke Specific Quality of Life scale (SS-QoL) is used for assessing the quality of life in stroke patients [15]. Turkish validity and reliability study had been performed previously [16]. This scale includes a total of 49 items in 12 areas (self-care, mobility, upper extremity function, language, vision, work, thinking, family roles, social roles, personality, mood, and energy). Each field has at least 3 questions. Each item is evaluated with a Likert-type score ranging from 1 to 5, taking the last week into consideration. To calculate each field's average score on the scale, the points are obtained from all the sections associated with one particular field are summed up and then divided by the number of sections which belong to that field. The total score of the scale (49-245) is calculated by summing up the scores of all fields and subsequently dividing the total score by 12. Higher scores refer to better function.

Statistical Analysis

The data of the study were analyzed with SPSS 15 package program. Descriptive statistics were expressed as mean±standard deviation or median (minimum-maximum). Chi-square test was used to compare two independent groups of qualitative data (gender, stroke type, stroke side, orthosis use, assistive device use, ambulatory group). The Shapiro-Wilkons test was used to investigate whether the distribution of continuous quantitative variables was close to normal. Student-t test was used if normal distribution assumption of quantitative data was provided and non-parametric methods were used when normal distribution assumption was not provided. In this context, the Mann-Whitney U test was used to compare the variables which is obtained by assessment in two independent groups. $p < 0.05$ was considered as statistically significant.

Results

Demographic data

The study was conducted on 102 patients with stroke, 36 patients were female (35.3%) and 66 (64.7%) were male, with a mean age of 60.97 ± 10.81 (39-85 years). The demographic features of the patients are summarized in table 1. The elapsed time after the stroke is an average of 8 (2-36) months. The characteristics of the strokes are summarized in table 2. There was a fear of falling in 65 (63.7%) of the patients. 48 of the patients (47.1%) fell at least once after the stroke. Falls were significantly high with the ones who were experiencing fear of falling ($p=0.006$). In comparison of the group which had falling fear (10.7 ± 4.24) and the group which did not have falling fear (7.1 ± 4.08) in terms of falling risk, the risk of falling was significantly high ($p=0.001$) in the fear of falling positive group. Fear of falling was significantly high in females, ischemic stroke patients, elderly and the patients with coexistent systemic diseases ($p < 0.05$). No relationship was found to be between marital status, side of the stroke, or elapsed time after the stroke ($p > 0.05$). FIM score ($p=0.012$) and ambulation level ($p = 0.000$) were significantly low in the group who had fear of falling. While the use of an orthosis did not affect the fear of falling ($p > 0.05$), the use of an assistive device to walk significantly decreased the fear of falling ($p = 0.012$). However, there was no relationship between risk of falls and gender, stroke type and side, FIM and FAC scores ($p > 0.05$). The score for SS-QoL was significantly low ($p < 0.05$) in the group with the fear of falling. Energy, family roles, mobility, mood, personality, social role, thinking, work sub-units of SS-QoL was significantly low ($p < 0.05$) (Table 3). A significant negative correlation was found between the total scores of qualities of life according to Itaki falling risk scale score ($p=0.008$, $r=-0.261$) and quality of life sub-units' scores which are summarized in Table 4. The depression score was significantly high in patients with fear of falling ($p = 0.00$) while, a significant weak positive correlation was found between the risk of falling and the depression score ($p = 0.024$ $r = 0.224$).

Table 1: Demographic features

		n (%)
Age		60.97 ±10.81 (mean: 61 / 39-85)
Gender	Female	36 (35.3)
	Male	66 (64.7)
Marital Status	Married	82 (80.4)
	Single	20 (19.6)
Primary caregiver	None	6 (5.9)
	Spouse	57 (55.9)
	Daughter/Son	33 (32.4)
	Parent	6 (5.9)
Number of people living at home		3.33±1.47 (mean: 3 / 1-9)

Table 2: Features of Stroke

		n (%)
Side	Right	55 (53.9)
	Left	47 (46.1)
Type	Ischemic	76 (74.5)
	Hemorrhagic	26 (25.5)
Ambulation Level (FAS)	1	15 (14.7)
	2	17 (16.7)
	3	29 (28.4)
	4	24 (23.5)
	5	17 (16.7)
Orthosis	Yes	38 (37.3)
	No	64 (62.7)
Assisting Device	Yes	68 (66.7)
	No	34 (33.3)

Table 3: The relation between fear of falling and quality of life

	Total patient (mean ±SD)	Fear of falling No	Fear of falling Yes	p
Total Score	3.40±0.96	3.84±0.74	3.15±0.99	0.001
Energy	3.50±1.24	4.11±0.91	3.15±1.27	0.001
Family	3.72±1.19	4.19±0.84	3.46±1.28	0.02
Language	3.60±1.50	3.71±1.41	3.54±1.55	0.582
Mobility	2.92±1.14	3.47±1.02	2.61±1.10	0.001
Mood	3.36±1.45	4±1.24	3±1.45	0.01
Personality	3.44±1.42	4.05±1.17	3.10±1.44	0.01
Self care	2.87±1.29	3.19±1.26	2.69±1.29	0.63
Social role	3.22±1.42	3.81±1.16	2.89±1.46	0.01
Thinking	3.59±1.32	4.20±1.01	3.25±1.35	0.001
Upper Limb Function	2.72±1.39	2.95±1.30	2.59±1.42	0.22
Sight	4.71±0.65	4.81±0.51	4.66±0.72	0.27
Productivity	3.14±1.27	3.65±0.97	2.86±1.34	0.02

Table 4: The relation between risk of falling and quality of life

	p	r
Total score	0.008	-0.261
Energy	0.002	-0.307
Family	0.01	-0.313
Language	0.144	0.144
Mobility	0.006	-0.270
Mood	0.006	-0.268
Personality	0.78	-0.175
Self-care	-0.195	0.50
Social role	0.015	-0.241
Thinking	0.003	-0.293
Upper limb function	0.132	-0.150
Sight	0.55	0.059
Productivity	0.014	-0.242

Discussion

Falling is an important problem after stroke, which affects both functionality and quality of life [1]. Also fear of falling is an important independent risk factor for falls, apart from all other coexistent reasons for falls [6]. In previous studies, the effect of fear of falling on the quality of life was investigated [7]. In this study, it was aimed to use a scale that is developed specifically for stroke patients, to evaluate the affecting part of the quality of life. Our findings demonstrated that fear of falling has a negative impact on many sub-units of quality of life like movement, participation and mood. 63.7% of the patients had fear of falling which were included in the study. In line with the literature, it was observed that the fear of falling is 32-54% in stroke patients [8, 17-19]. In one study which was conducted by Schmid and Ritmann (2007), evaluated the patients with stroke in the first 6 months, fear of falling and post-stroke falls and post-stroke body shift perception were found to be associated [8]. Likewise, in another study evaluating patients with subacute stroke, fear of falling was found to be associated with muscle strength in the lower extremities of patients [18]. In a study conducted in patients with chronic stroke, it is stated that half of the patients who fell at least once after discharge will experience fear of falling and it was emphasized that this condition will persist in the following years [19]. It was found to be a significant relationship between fears of falling and falls in this study. In addition, it was observed that the fear of falling is increased in females, ischemic strokes, advanced age, and coexisting systemic disease. Likewise, low ambulation level and low functional independence level were found to be associated with fear of falling. However, it did not detect any association with marital status, stroke side, and elapsed time after the stroke. Furthermore, it was found that the use of a hand support that helped to walk reduced the fear of falling while the use of the orthosis had no effect. Fear of falling affects the confidence of the individual's daily life activities negatively thus leads to a less active lifestyle and additional health problems such as muscle atrophy and muscle weakness, especially in the lower extremities [20,21]. There are many studies have showed that fear of falling affects the quality of life negatively for elderly population as well as for stroke patients [17, 20-25]. However, many systems (upper and/or lower extremity functions, language, cognitive functions, etc.) are affected together in stroke patients. For this reason, the use of special constructed scales to evaluate the quality of life in patients with stroke can help to better assessment of the quality of life and identify the problem comprehensively. In one research which was investigated the quality of life in stroke patients via scale, scale scores were found to be significantly low especially in the areas of energy, personality, thinking, personal care, work/productivity and social roles in patients who had a fear of falling, comparing to the healthy volunteers who did not have a fear of falling, furthermore, these patients experienced decreased performance satisfaction and increased anxiety [17]. In our study, it was clearly showed that the patients who had fear of falling have a loss in quality of life in fields of energy, mobility, work/productivity which are related with the loss of movement. Along with these, it was observed that fear of

falling has an influence on sub-units such as family roles, mood, personality, social role, thinking. It was also detected that patients with fear of falling had higher depression scores.

Conclusion

In stroke rehabilitation; not only the improvement of loss on its own but also the improvement of the quality of life and increasing participation of the individual should be aimed. Fear of falling in stroke patients negatively affects many sub-units of the quality of life-related to movement, participation, and mood. Thus, the classic rehabilitation program for stroke patients should include falling prevention training. In addition, cognitive and emotional support to reduce the fear of falling should be placed into the program in order to increase the quality of life of individuals in the short and long term.

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