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Use of the Tinetti Index to Assess Fall Risk in Patients with Sequelae of Stroke

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Abstract

Background and Objective: The knowledge about risk of falls in patients with sequelae of stroke by applying a scale constitutes an important factor fort nurses since it allows planning for quality care and consequently improving the quality of life of such patients. The present study aimed to assess the risk of falls of patients with sequelae of stroke using Tinetti Index.

Methods: Transversal descriptive study with 61 hospitalized patients. The data were collected through the application of Tinetti Index, which total score is 28 points.

Results: The index evaluation shows que 47.9% had 19 points under the ideal score, indicating a high risk of falls, 41.7% from 24 to 28, indicating moderate risk and 10.4% from 19 to 23 points, indicating low risk of falls. The final average (15.23), the median (16.50) and standard deviation (±11.034).

Discussion and Conclusions: There is a high risk of falls in this population, a quantification of impaired balance and gait anticipate the future risk of falls. The use of assessment instruments has important implications for a quality of life in patients with symptomatic stroke.

Keywords: Symptomatic stroke; Rehabilitation; Brain stroke; Stroke

Introduction

Brain (stroke) is a disease characterized by acute onset of a neurological deficit persisting for at least 24 hours. Such a condition reflects the involvement of the central nervous system make them a disturbance of function in the cerebral circulation, causing reduction of the supply of oxygen and glucose to the brain cells, with subsequent death of these cells [1].

Due to its cause, the stroke can be classified into: ischemic, when the blood supply to the brain is interrupted or hemorrhagic, when a blood leakage occurs in the subarachnoid or intra parenchymal space resulting in complicating factors, like the occurrence of non-focal lesions and the increase intracranial pressure. In both cases, it sets to be a disease of major repercussions for Public Health [2], for resulting comorbidities as well as behavioral factors that influence the incidence of diseases: high blood pressure, smoking, inadequate feeding, inactivity as well as socio-ecological issues.

Currently, stroke is considered the third cause of death in the World, occurring mainly with male people, with African American Descents and people over 65 years old [3-5]. In Brazil it is considered the first cause of mortality and disability in adults, highlighting that in the year 2003, Northeastern Brazil, the rate of mortality from this disease has come to 54.6/100 000 inhabitants [6].

Due to the secondary neurological deficits becomes evident the deterioration of quality of life of patients [7], indeed justified by at least two-thirds of survivors remain with some degree of disability, becoming dependent mainly to speak, to walk, to see or even feel and sometimes unable to exercise their daily activities [8,9]. Among the as sequelae resulting from the stroke, the study of Aguiar et al. [10] highlighted the body asymmetrical and the postural imbalance like factors that may directly affect the person's ability to perform activities of daily living (ADL), necessary routine activities for getting by.

This issue has been sought new strategies for health evaluation of patients with victims of stroke in order to guide the identification of their real and potential needs in order to prevent or reduce impairments that may interfere in the quality of life of the patients and their families. In this context, the test of balance and gait developed by Mary Tinetti, Richman, and Powell [11] is highlighted. It is an instrument to evaluate vestibular conditions and the gait of the patients. Since then, it has been known as Tinetti index. In 2003, such test was adapted by Siva and Matsura [12] to be used in Brasilian institutionalized population Tinetti index does not require sophisticad equipment to be applied and it is truested to detect significant changes during the gait. The usage of this assessment tool has important implications for quality of life, as it enables prevention, care and rehabilitation [13].

This study is relevant for Nursing, because Tinetti index application in patients with symptomatic stroke will allow better evaluation of such patients, especially to balance, coordination and agility gait, thus demonstrating that the Nurse has an important role in identifying the needs of the patients. It is hoped by the applicability of this scale in the health center unit it is possible to evaluate the physical mobility of patients affected by stroke, as well as identify the main mobility

difficulties and the risk of accidents in order for the nurses may manage later an intervention plan based on evidence. Therefore, this study aimed to evaluate the risk of falls in patients with stroke using the Tinetti Index.

Methodology

Design

This is a descriptive, transversal study of a quantitative approach. The people participation on this study was of individuals with a diagnosis of stroke hospitalized admitted in the intensive care unit of a major hospital in the care of stroke patients in Fortaleza, Ceará.

Participants

The sample of such study was obtained by contingency, involving 48 patients who met the following inclusion criteria: having a diagnosis of stroke; be preserved to the level of awareness because of the commands of the scale; having hemodynamic conditions of balance and gait because of the tests related to them. The exclusion criteria was conceded to those who were under analgesia, making it impossible to obey commands, as well as those with impaired balance and gait prior to the stroke, such as Parkinson's.

Measurements

Data collection took place from February to May 2013 using the application of Tinetti index [8], which, in turn, consists of two parts: the first seeks balance evaluation and it has nine items, totaling 19 points; the second corresponds to gait evaluation, and it has seven items corresponding to 12 points. In total the index has therefore 16 items matching together 28 points. All the scale items represent commands and assessment occurs by observation. For each item checked, the appraiser assigns a score between 0 and 2 points, depending on the assessed parameter. A total score lower than 19 points indicates fivefold higher for risk of falls, so the lower the total score the higher the risk of falls in patients evaluated [11].

Data analysis

Data were organized in an Excel spreadsheet Microsoft Windows 2013 version and then imported into the Statistical Package for the Social Sciences System - SPSS, version 19.0. The data were presented in tables, graphs, absolute numbers and percentages. The findings were discussed in light of relevant literature. The ethical aspects of the research were respected at all stages of the research project was approved by the Ethics Committee of the Hospital, Opinion No. 255 551/2013.

Results

In this study, 54.1% of participants were male, and to 45.9% female, with an average of 51.19 years old and standard deviation of ±16.009. Regarding the type of stroke, ischemic were 100%.

For better understanding of the results, it is shown in Table 1, the aspects that were evaluated to determine the balance and gait, based on Tinetti index.

According to Table 1 among the 16 evaluated items the most prevalent ones will be highlighted, will be featured as those more prevalent. In items 1-9 the balance was evaluated and it is perceived that 79.2% have seated balance; 39.6% stand upright without using their arms; 60.4% stand at only one attempt; 54.2% stand at stable way at the first 5 seconds; 39,6% stand evenly without support nor base; 43.8% balanced at the game of three turns; 60.4% get out of balance when they closed their eyes; 54.2% when rotated 360º showed discrete steps; 50% get out of balance when rotated 360 ° and 50% remained stable; 64.6% when sat remained safe to the handling grave.

Rating Scale Balance*		f	%
1. Sitting Balance	Leans or slides in chair	10	20.8
	Steady, safe	38	79.2
2. Rises from chair	Unable to without help	14	29.2
	Able, uses arms to help	15	31.2
	Able without use of arms	19	39.6
3. Attempts to rise	Unable to without help	12	25.0
	Able, requires >1 attempt	7	14.6
	Able to rise, 1 attempt	29	60.4
4. Immediate standing Balance (first 5 seconds)	Unsteady (staggers, moves feet, trunk sway)	15	31.2
	Steady but uses walker or other support	7	14.6
	Steady without walker or other support	26	54.2
5. Standing balance	Unsteady	17	35.4
	Steady but wide stance and uses support	12	25.0
	Narrow stance without support	19	39.6
6. Nudged**	Begins to fall	17	35.4
	Staggers, grabs, catches self	10	20.8
	Steady	21	43.8
7. Eyes closed **	Unsteady	29	60.4
	Steady	19	39.6
8. Turning 360 degrees	Discontinuous steps	26	54.2
	Continuous	22	45.8
	Unsteady (grabs, staggers)	24	50.0
	Steady	24	50.0
9. Sitting down	Unsafe (misjudged distance, falls into chair)	11	22.9
	Uses arms or not a smooth motion	16	12.5
	Safe, smooth motion	31	64.6
Gait Assessment Scale***		f	%
10. Indication of gait	Any hesitancy or multiple attempts	16	33.4
	No hesitancy	32	66.6
11. Step length and height	a) Right foot	21	43.8
	Does not exceed the left foot	27	56.2
	Beyond the left foot	22	45.8
	Not completely out of the ground	26	54.2
	Completely out of the ground		
	b) Left foot	22	45.8
		26	54.2

	Does not exceed the right foot Exceeds the right foot Not completely out of the ground Completely out of the ground	22 26	45.8 54.2
12. Step symmetry	Right and left step length not equal	30	62.5
	Right and left step length appear equal	18	37.5
13. Step continuity	Stopping or discontinuity between steps	28	58.3
	Steps appear continuous	20	41.7
14. Path	Marked deviation	22	45.8
	Mild/moderate deviation or uses w. aid	10	20.8
	Straight without w. Aid	16	33.4
15. Trunk	Marked sway or uses w. aid	19	39.6
	No sway but flex. knees or back or uses arms for stability	8	16.7
	No sway, flex., use of arms or w. aid	21	43.8
16. Ankles distance	Separate ankles Ankles almost touch the floor	34 14	70.8 29.2

Table 1: Assessment of Balance and Gait Index according to Tinetti. Fortaleza, Ceará, Brazil. 2013. *Punctuation=16; ** The external examiner gently pushes the patient, which should stand feet together; *** Punctuation=12.

Items from 10 to 16 evaluate gait and it is noted that 66.6% start the gait without hesitation; at the length and the height of the steps on the right foot, 56.2% surpasses the left foot and 54.2% the foot is completely out of the ground; and height of steps with left foot, 54.2% surpasses the right foot and 54.2% the foot is completely out of the ground at the symmetry of the steps, 62.5% had different steps and 37.5% had similar steps. At the continuity of the steps, 58.3% had discontinuous steps 41.7% continuing Steps at the direction, 45.8% had expressive gait deviation; during the gait the body in 43.8% come without bending and balance without the arms support or any other kind of support, 70,8% kept the ankles apart during the gait, and 29.2% ankles almost touch each other when they walk.

Following are willing, in Figure 1, the statistic description of Tinetti index application on the balance and gait assessment. In Figure 2, the global scores of Tinetti Index.
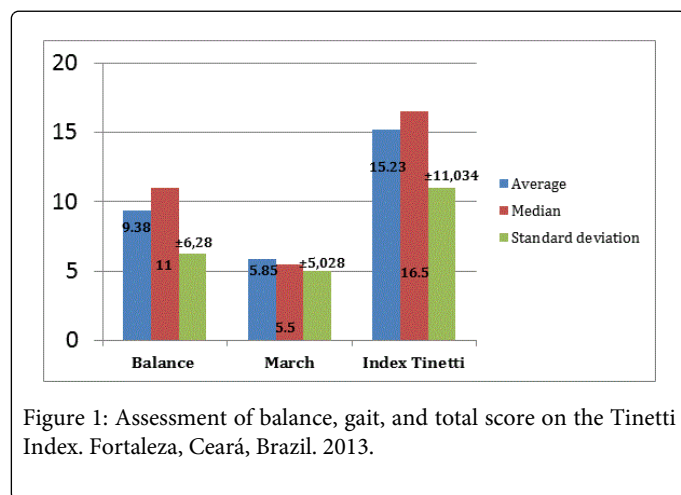

Figure 1: Assessment of balance, gait, and total score on the Tinetti Index. Fortaleza, Ceará, Brazil. 2013.
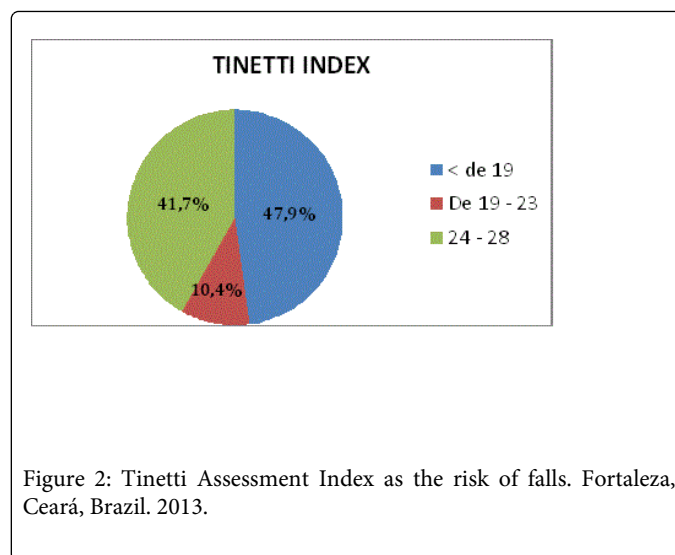

Figure 2: Tinetti Assessment Index as the risk of falls. Fortaleza, Ceará, Brazil. 2013.

According to the Figure 1, the balance, the average was (9.38), the median 11 and standard deviation of ± 6.28. For the gait obtained an average of (5.85), the median (5.5) and standard deviation ± 5.028. In total index media obtained was (15,23), the median of 16.5 ± standard deviation 11,034. It can be inferred that: There were no significant statistical results.

In Figure 2, is observed that 47.9% of the patients that had a score under 19, thus, featuring so high risk of falls; 41.7% ranged from 24 to 28 points, low risk of falls and the other 10.4%, between 19 and 23 points, moderate risk.

Discussion

This study points out the need to discuss some relevant aspects, in particular on the risk of falls, as well as some questions regarding the use of Tinetti Index in patients with stroke.

According to Costa et al. [14], the occurrence of falls is one of the health problems faced by both institutionalized elderly population as at home. Several factors are involved in this event, for example, problems in physical mobility, functional, visual and cognitive. These changes, in turn, are caused by physiological and inevitable process of aging, and are more pronounced when added to the complications of non-communicable chronic diseases. In this context, it is stroke, disabling disease of high potential which is more prevalent in age groups of 60 years or more and that can increase the risk of falls.

In this study, it is highlighted the following aspect: 41.7% of the patients achieved the total score lower than 19 points according to Tinetti Index, meaning high risk of falls [11]. This finding, in a sense, was expected, considering that people affected by stroke, depending on the location of ischemia, may exhibit postural imbalance, sensory changes, motor and mobility difficulties who directly commit the greater incidence of falls [15].

The study by Morais et al. [15], regarding the application of the index Tinetti, found results consistent with this study. Among 37 patients evaluated, 43.3% showed impaired physical mobility, indicating high risk of falls. At the time, the scale was administered to a population that belongs to a group of rehabilitation in the chronic phase of the disease, different from the study population. This fact may

indicate that the risk of falls for patients suffering stroke begins at time of acute illness, remaining elevated during the chronic phase.

Costa et al. [14] found in his study that impaired balance contributes to the increased risk of falls, according to the application of the Tinneti scale, highlighted the fact that intrinsic factors are the most identified with the fall event. It was emphasized that further changes of static and dynamic postural balance influence the functional capacity of older adults living in the community and can be a significant risk factor of falls, thus influencing the quality of life of this population.

According to Oliveira et al. [16], this data is alarming and should serve as a warning to health care professionals and, since the vast majority of times a person experiences a situation of fall, impaired quality of life occurs. Therefore, efforts should improve the identification of the most vulnerable people to falls in order to prevent injury.

In a study by Borges, Marinho Filho and Mascarenhas [17] to check the environmental risk of fall, mentions that 56% of households had a high risk of falls for elderly as well as the balance difficulties presented by the patients with stroke, which points to a worrying condition about the risk of falls that are subject to these people.

Even with the implementation of Tinetti Index, 52.1% of the assessed patients had scores between 19-28 points, representing from low to moderate risk of falls. It is believed that this prevalence is related to the age of those involved, as this study found a mean age of 54.19 years, standard deviation of ± 16.009, ie, people who do not have the mobility problems that is common with elderly. Senescence provides sensory disorders of balance, postural control, level of cognitive and motor response, which makes the individual more conducive to falls [18]. As in this study the average age of patients victims of stroke was lower than compared to the one was expected for the disease, the occurrence of low to moderate risk of falls in part of the study population can be justified.

When the results for each of the items it was observed that the scale assesses balance and gait, it was also observed that the average score corresponds respectively to 9.38 and 5.85 points. And related to index in general, there is an average score of participants of 15.23 points, which therefore points back to a high risk of falls in this population. This fact becomes relevant in studies such as Nogueiro et al. [19] showing that independence in activities of daily living is strongly related to the risk of falls. What shows that perhaps the study population requires a high degree of dependence.

In this direction, this study confirms the magnitude of falls in people with stroke sequelae, such as a public health phenomenon that considering the impact on the lives of its clientele in the healthcare system and represents social and economic costs. Based on these findings, it becomes necessary to establish measures to prevent falls, so acting etiological factors, either intrinsic or extrinsic character, to reduce the incidence and subsequently damaging consequences to the patient, thereby acting in promoting health of this elderly.

Conclusions

In conclusion, the Tinetti index enabled us to evaluate balance, coordination, and walking agility to determine fall risk in patients with sequelae of stroke and maximize the knowledge of nurses and nursing students in this regard. This can facilitate the planning of nursing care focused on the individual needs of each patient. The clinical evaluation of fall risk using appropriate scales constitutes an important tool for assessing the functional abilities of patients with stroke. The Tinetti index is one such scale that sheds light on the nuances of care for individuals with ambulatory difficulties.

Acknowledgements

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