Fall Risk Assessment Scales

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Falls are recognized globally as a major public health problem. Although the elderly are the most affected population, it should be noted that the pediatric population is also very susceptible to the risk of falling. The fall risk approach is the assessment tool. There are different types of tools used in both clinical and territorial settings.

fall scale assessment tool review

1. Introduzione

The phenomenon of falls is recognized globally as a major public health problem. Falling down is globally the number-one health problem, and a common problem of evaluation by healthcare professionals. A fall is defined as a “sudden, not intentional, and unexpected movement from orthostatic position, from seat to position, or from clinical position” [1]. Falls involve elderly people for two main reasons: (1) the decrease of functional reserves that are used to maintain the orthostatic position; (2) the following vulnerabilities or pathologies caused by factors that occur simultaneously, pathological processes, and adverse pharmacological incentives. People over 65 have the highest probability of falling down: 30% of them fall down at least once per year, while the percentages become higher, (about 50%) on people over 80 [2]. Even if elderly people run the highest risk of falling down, it is necessary to point out that the pediatric population runs quite a high risk of downfall as well. About three million children are victims of wounds related to annual falls [3]. Although nearly 40% of the total daily falls worldwide occur in children, this measurement may not accurately reflect the impact of fall-related disabilities for older individuals who have more disabling outcomes and are at greater risk of institutionalization [1].

The financial costs of fall injuries are substantial. For people aged 65 and over in Finland and Australia, it was calculated at USD 3611 and USD 1049, respectively. Evidence from Canada suggests implementing effective prevention strategies with a subsequent 20% reduction of the incidence of falls among children under 10 could create net savings of more than USD 120 million annually [1]. The Joint Commission International for Accreditation Standards for Hospitals specifies that hospitals should aim to reduce the risk of injury from falls to inpatients and outpatients, including appropriate screening or assessment of fall risk tools, a process for re-evaluation, especially if there are changes in the patient’s condition; and implement interventions to reduce the risk of falling [4]. For this reason, risk assessment is important. The expression of risk assessment is based on the following: checklists drafted of different risk factors for fall and numerical indexes to predict the risk. The checklists help the staff to identify the most common factors, while the numerical index is used to predict the risk of an individual using a numerical score that is proportional to the number of risk factors included [5].

However, the characteristics of the patient for a fall risk tool are varied: age, cognitive state, state of health in general, particular comorbidities, hospital or home context. These are just a few features. In fact, in recent studies, particular risk factors have been evaluated such as being hospitalized, being hospitalized in neuropsychiatry, suffering from dementia and delirium, and going to the bathroom [6].

Currently in the literature, there is no study that summarizes the tools available to healthcare professionals according to the different contexts in which they operate. Knowing the fall assessment tools, through the analysis of their characteristics, allows to identify the most suitable scale for each individual patient and to prevent the risk. As described in NICE, 2004, the patients should be cared for by personnel who have undergone appropriate training and who know how to initiate and maintain correct and suitable preventative measures. Staffing levels and skill mix should reflect the needs of patients [6].

2. Fall Risk Assessment Scales

The vast majority of the proposed tools have been developed for use in acute and geriatric settings, in which there are numerous factors that expose individuals to this risk. The target most subjected to the assessment is the elderly population (>65 years), followed by people suffering from pathologies that alter walking and balance skills (e.g., Parkinson's disease, mental disabilities, stroke outcomes, etc.).

Falls Efficacy Scale—International (FES-I). The FES-I scale is the most used tool in literature for the "fear of falling" evaluation, a factor closely related to the genesis of falls [7]. This scale refers only to basic daily activities of frail elderly people or people with disabilities. The FES-I includes 16 daily life activities, and the individual must report the perceived degree of concern in implementing each of the activities listed. It is the ideal tool for investigating the "fear of falling" of the elderly in normal daily activities.

The Activities-specific Balance Confidence Scale (ABC Scale) was developed to assess the perceived degree of confidence in maintaining balance or not becoming unstable in performing various functional tasks. It is a structured questionnaire that measures the confidence of an individual in carrying out activities and consists in attributing a percentage value, between "insecurity" and "complete security", to the 16 proposed activities [8]. The ABC scale is simple to complete, and the time required for filling out can be as much as 20 min, which is why a simplified version has been proposed that includes six of the most challenging activities of the previous scale. The scale has been validated for use with different ratings including people with Parkinson's Syndrome, post-stroke, with lower limb amputations and vestibular disorders; it has also been translated into several languages besides English such as Swedish, Chinese, Canadian French and Arabic [9].

Comparing the two scales, it emerged that the FES-I scale has a greater appropriateness of use in clinical settings than the ABC Scale, whose use is recommended mainly in the elderly living at home [7].

The STRATIFY scale is a predictive tool for the risk of falls in hospitalized patients. The compilation of the scale is not performed through direct observation of the patient, but the evaluator reports the score based on information

obtained from the previous observation or from other caregivers. STRATIFY has been extensively studied in intensive care units in Australia, Europe and Canada [10] and has also been applied in numerous geriatric and rehabilitation departments [11]. In these contexts, it has long been considered the “Gold standard” tool to be used at patient admission thanks to the high sensitivity value demonstrated by numerous studies (between 73.7% and 93.0%) and the simplicity and speed of application (3 min).

At the same time, some studies criticize its reduced specificity, or identify its scarce usefulness if applied in different or specific contexts such as rehabilitation from traumatic brain injury, or in patients younger than 65 years old. The Hendrich II Fall Risk Model (HIIFRM) was designed to identify adult patients at risk of falling in acute care hospitals [12]. Unlike the STRATIFY scale, the history of previous falls was not considered as a risk factor. They are also taken into account due to drug categories that are at greater risk for falls and side effects than other drug categories. The time required for its compilation is approximately similar to that of the STRATIFY scale. The scale was tested on acute phase patients with different diagnoses (diabetes mellitus, stroke, heart failure), demonstrating that its effectiveness varies according to the patient group, the healthcare professional’s skill level and the clinical units in which is applied.

The Johns Hopkins Fall Risk Assessment Tool (JHFRAT) was used for the multi-factorial assessment of the risk of falling in departments for acute patients [13]. The JHFRAT scale is a tool that makes possible to implement a multi-factorial assessment of the risk of falling in a simple way, which requires an average of 5 min for its completion and is widely used in adult departments in the acute phase [14]. However, there are discordant results in the literature regarding its statistical characteristics: in some studies, a high sensitivity is reported, but a low specificity, vice versa in other studies, which consider it weak if used in specific contexts, such as in the departments of medicine [14][15].

The Tinetti Mobility Test (TMT) or the Performance-Oriented Mobility Assessment (POMA) consists of the combined use of the useful components drawn from both approaches [16]. The total POMA (POMA-T) consists of two sub-scales: the balance rating scale (“balance scale” or POMA-B) and the gait rating scale (“gait scale” or POMA-G) [17]. The scale is also used in different clinical contexts: its effectiveness was analyzed on patients with Parkinson’s disease, with amyotrophic lateral sclerosis, Huntington’s disease and community-resident elderly [17]. The time taken is 5–10 min, but it requires training for the examiner as a prerequisite and requires some equipment (stopwatch, chair, 5-pound object = about 2.5 kg and a space to walk 15 feet = about 5 m). It can also be burdensome for patients. There is a “long” version of the scale consisting of a total of 40 points that assesses the individual in more depth, but consequently requires more time for its application [6].

The Aachen Falls Prevention Scale was developed in order to allow the elderly to perform a self-assessment of their risk of falling [18]. The Aachen Fall Prevention Scale is an easy-to-understand tool that investigates various factors that contribute to the genesis of falls and introduces a quick and safe test; it allows the individual to perform a self-assessment and increase the degree of self-perception. The authors have also created an evaluation index, the “Aachen Mobility and Balance Index” to measure the physiological risk of falling in the elderly at home; this includes the execution of performances characterized by the progressive increase of difficulty in the components of

balance, mobility and grip strength required for the completion of the test. The index demonstrated a strong correlation with the Tinetti POMA Scale and a good degree of discrimination between individuals at risk of falling and not, but the time required to execute the performances and the necessary equipment make it more complex.

The Fullerton Advanced Balance (FAB) Scale is a multidimensional tool for assessing balance developed for functionally independent seniors. It aims to identify highly active seniors who are at increased risk of suffering fall-related injuries due to sensory impairments [19]. The validity of its contents is based on a theoretical analysis of the components of the static and dynamic balance, the reception and integration of the sensory components and the anticipatory and reactive postural control. Berg Balance Scale (BBS) was developed for the evaluation of both static and dynamic balance capacity. It provides a detailed balance assessment and has been extensively tested in various contexts: United States, Canada, Brazil, Australia, China, Japan, Korea and United Kingdom. It has shown accuracy in predicting falls in different types of population (elderly living in communities or suffering from chronic diseases or with intellectual and visual disabilities) and a greater sensitivity was highlighted when applied in populations affected by diseases that affect the balance (e.g., neuromuscular pathologies) both in clinical and home settings [20]. Compared to the FAB scale, it has a “ceiling effect” that does not allow it to be administered to physically active elderly people [21]. It also requires a much longer application time, about 20 min.

The Balance Evaluation Systems Test (BESTest) aims to identify the disordered systems underlying postural control responsible for poor functional balance in adults. It is widely used to evaluate six balance control systems; however, it is difficult to apply in clinical situations due to the long administration time (approximately 20–30 min). The BESTest has two shorter versions: the Mini-BESTest [22], developed in 2010, allows the evaluation of four balance control systems (compared to the six total of the original) and has been used with different clinical populations and has shown particular psychometric properties in individuals with Parkinson’s syndrome [23]. The test, however, requires a moderate amount of equipment to be completed and, moreover, it focuses on dynamic balance, without evaluating all the stability control systems; while the Brief-BESTest, developed in 2012, is a reduced version, consisting of eight items that allow an analysis of all six balance control systems evaluated by the BESTest; moreover, it requires even less time and material to complete it [24]. The comparison of the two tests shows that the Brief-BESTest is recommended as a guide for planning interventions, while the Mini-BESTest is more appropriate as a screening tool for the dynamic balance of patients [23].

3. Conclusions

Between most of the tools analyzed, 23 tools target hospitalized patients, eight are used for risk assessment in home residents, while seven are applicable to both populations. The primary purpose of using a fall risk assessment tool is not to reduce falls, but to identify individuals at high and low risk [20]. In this way, the subjects that need a more in-depth analysis are identified, and the healthcare professional’s attention is focused on the main risk factors responsible of falls. To these subjects should be offered a multifactorial falls risk assessment [6].

According to some studies, to maximize the predictability characteristics of each instrument, it would be recommended to use two tests in combination.

Indeed, due to the multidimensional nature of the risk of falling, there is no “ideal” a single tool that can be used in any context or that performs a perfect risk assessment. A simultaneous application of several instruments is recommended and a direct and in-depth analysis by the healthcare professional is essential [6]. The results of the risk assessment should be discussed within the multi-professional team in order to identify the most effective interventions for preventing falls, especially among people with cognitive disorders, where the risk of fall is very common and have different etiologies [25].

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