



Fall risk assessment: retrospective analysis of Morse Fall Scale scores in Portuguese hospitalized adult patients



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ABSTRACT

Purpose: The Morse Fall Scale is used in several care settings for fall risk assessment and supports the implementation of preventive nursing interventions. Our work aims to analyze the Morse Fall Scale scores of Portuguese hospitalized adult patients in association with their characteristics, diagnoses and length of stay.

Methods: Retrospective cohort analysis of Morse Fall Scale scores of 8356 patients hospitalized during 2012. Data were associated to age, gender, type of admission, specialty units, length of stay, patient discharge, and ICD-9 diagnosis.

Results: Elderly patients, female, with emergency service admission, at medical units and/or with longer length of stays were more frequently included in the risk group for falls. ICD-9 diagnosis may also be an important risk factor.

Conclusions: More than a half of hospitalized patients had “medium” to “high” risk of falling during the length of stay, which determines the implementation and maintenance of protocolized preventive nursing interventions throughout hospitalization. There are several fall risk factors not assessed by Morse Fall Scale. There were no statistical differences in Morse Fall Scale score between the first and the last assessment.

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1. Introduction

Falls continue to be a challenge to health care professionals (Halfens et al., 2013; Panel on Prevention of Falls in Older Persons & British Geriatrics, 2011; van Nie-Visser et al., 2013) and prevention strategies are discussed worldwide (Panel on Prevention of Falls in Older Persons, A. G. S., & British Geriatrics, S, 2011). Falls are a serious problem for hospitalized patients, reducing the duration and quality of life (Aranda-Gallardo, Morales Asencio, Canca-Sanchez, Mora-Banderas, et al., 2013; Aranda-Gallardo, Morales-Asencio, Canca-Sanchez, Barrero-Sojo, et al., 2013; Baek, Piao, Jin, & Lee, 2013). In fact, among hospitalized patients of all ages, falls are a persistent problem in different hospital settings (Nassar, Helou, & Madi, 2014) and, in the majority of cases, there is a combination of various risk factors (Heinze, Dassen, Halfens, &

Lohrmann, 2009). A Brazilian study performed by Nascimento, Toffoletto, Gonçalves, Freitas, and Padilha (2008) showed that falls are the second most common adverse event during hospitalization. Indeed, accidental falls are the most common (but potentially preventable) adverse events experienced by patients in hospitals (Evans, Hodgkinson, Lambert, & Wood, 2001; Wilson, 1998). They reduce patients' quality of life and increase healthcare costs (Nassar et al., 2014).

Therefore, fall preventive methods should be implemented in different care settings (Costa-Dias & Ferreira, 2014; Heinze, Halfens, & Dassen, 2007) and the purpose of fall risk assessment is to identify patients that require preventive measures, their specific risk factors (Heinze et al., 2009) and, finally, to avoid the occurrence of falls (Costa-Dias & Ferreira, 2014). Aware of that, nursing staff at “Centro Hospitalar do Baixo Vouga, EPE” (Aveiro Hospital) have created a preventive protocol based on fall risk assessment which classifies patients in 3 levels of risk and guides specific fall preventing nursing interventions for each level.

1.1. Background

A systematic review led by Myers (2003) critically analyzed 47 articles in which fall risk assessment tools had been developed, tested or

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used, in stand-alone projects or in fall prevention programs. Some of the most cited fall assessment tools are as follows: Tinetti Mobility Test (TMT) (Tinetti, Franklin Williams, & Mayewski, 1986); Morse Fall Scale (MFS) (Morse, Black, Oberle, & Donahue, 1989); Downton Scale (DS) (Downton & Andrews, 1991); Hendrich Fall Risk Model (HFRM) (Hendrich, Nyhuis, Kippenbrock, & Soja, 1995) and Hendrich II Fall Risk Model (HFRM II) (Hendrich, Bender, & Nyhuis, 2003); Saint Thomas Risk Assessment Tool in falling elderly inpatients (STRATIFY) (Oliver, Britton, Seed, Martin, & Hopper, 1997); Care Dependency Scale (CDS) (Dijkstra, Buist, & Dassen) and Conley Scale (CS) (Conley, Schultz, & Selvin, 1999).

According to Costa-Dias and Ferreira (2014), the Morse Fall Scale is the most widely used and disseminated scale in Portugal. It is especially designed for adults in general, with a potential to be applied in the vast majority of Portuguese hospital organizations.

The MFS developed by Morse, Black, et al. (1989) is a rapid and simple method of assessing a patient's likelihood of falling. It consists of six items/variables that are quick and easy to score, and it has been proven to have predictive validity and interrater reliability (Morse, 2008; Morse, Black, et al., 1989; Morse, Morse, & Tylko, 2010). The MFS has been developed through rigorous research design and validated in various settings (O'Connell & Myers, 2002). As tested by Morse in 1997 this scale has high interrater reliability ($r = 0.96$), relatively high sensitivity of 78% and specificity of 83% (Morse, Morse, & Tylko, 1989).

The Portuguese version of the MFS was built and validated for the Portuguese population in 2011 (Costa-Dias, Ferreira, & Oliveira, 2014). As a result of the validation process, a version that was semantically and culturally equivalent to the original one was created, having good reliability and validity (intraclass correlation coefficient of 0.838 and interrater reliability between 0.615 and 0.964) (Costa-Dias, Ferreira, et al., 2014).

According to Morse (2008), ideally the cut-off point of MFS should be calibrated to each unit, so the fall prevention strategies are targeted to those most at risk (within a range of 25 to 55 points). So, different cut-offs (Baek, Piao, Jin, & Lee, 2014; Schwendimann, De Geest, & Milisen, 2006) were identified in different care settings. Costa-Dias, Martins, and Araújo (2014) determined that MFS is a good instrument to identify patients with high fall risk in hospital settings, particularly in medical and surgical, long-term and palliative care inpatient wards, and identified the cut-off point of 45 points as the optimal cut-off value for the studied population (Portugal).

In 2011 Aveiro Hospital adopted the MFS to identify patients at risk of fall, and the evaluations are performed by nursing staff on all (adult) hospitalized patients at admission and repeated every 48 hours. Following institutional recommendations for all (adult) inpatient settings, nursing staff categorize the patients in 3 levels of risk: "low risk" (MFS < 25 points), "medium risk" (MFS 25–50 points) and "high risk" (MFS > 50 points) and implement guided preventive measures according to the identified risk level.

Nevertheless, this raised some concerns and suspicions that lead us to do some research questions: What are the characteristics of patients classified in each level of risk? Are there changes in Morse Fall Scale score during the length of stay? Is there any relation between the ICD-9 principal diagnosis and fall risk, assessed by the Morse Fall Scale?

2. Methods

2.1. Aims

The main aim of this study was to analyse the Morse Fall Scale scores assessed in hospitalized adult patients in association with their characteristics, diagnoses and length of stay.

2.2. Design and sample/participants

This was a retrospective cohort study of electronic health records database (medical and nursing) from adult patients admitted to medical

and surgical areas of the Aveiro Hospital. The study period was 1 year, from January 1, 2012 to December 31, 2012.

The inclusion criteria were as follows: (1) patients 18 years or older at the time of admission; (2) patients admitted and discharged in 2012; (3) patients with urgent or programmed hospital admission. The exclusion criteria were as follows: (1) patients with less than 24 hours' length of stay; (2) patients admitted in the intensive care unit. Applying those criteria, the sample size for this study was 8356 adult patients.

2.3. Data collection

The first ten and the last evaluations of total Morse Fall Scale scores were extracted from electronic health record database. Other demographic and clinical data were extracted from this database, and included the following variables: age; gender; type of admission (emergency service or programmed); specialty unit (medical versus surgical); length of stay; patient discharge (discharge, decease or transference to other hospital); and principal diagnosis by the ICD-9. The variable length of stay was arbitrarily dichotomized according to a cut-off of 20 days of hospitalization and the variable age was divided into seven groups, namely 18–29, 30–39, 40–49, 50–59, 60–69, 70–79 and ≥ 80 .

2.4. Ethical considerations

The study was performed after Hospital Ethics Committee approval. Confidentiality of the participants was maintained and no names or no identifying information was recorded.

2.5. Data analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) software, version 21.0. Descriptive statistics were calculated for the demographic and clinical variables and sample characterization. The data were not normally distributed as determined by Kolmogorov–Smirnov test. Thus non-parametric tests (Mann–Whitney and Kruskal–Wallis) were used for comparison of means. Odds ratio (OR) were calculated by logistic regression. Multivariate linear regression was calculated using stepwise method with probabilities of entry and removal of 0.05 and 0.1, respectively. Wilcoxon test was used to compare the first and the last assessment of Morse Fall Scale scores. In all analyses, a p -value < 0.05 indicated statistical significance.

2.6. Morse Fall Scale

The Morse Fall Scale is composed by six items/variables. Each variable receives a score ranging from 0 to 30 points, and the total MFS score ranges from 0 to 125 points. The six main variables measured by the MFS are the following: (1) "history of falling; immediate or within 3 months" [0 = no, 25 = yes]; (2) "secondary diagnosis" [0 = no, 15 = yes]; (3) "ambulatory aid" [0 = no help/nurse assist/bed rest/wheelchair, 15 = crutches/Canadian crutches/cane/walker, 30 = grasps on furniture for support to walk]; (4) "intravenous therapy" [0 = no, 20 = yes]; (5) "gait/transferring" [0 = normal/bed rest/immobile, 10 = weak, 20 = impaired]; and (6) "mental status" [0 = oriented to own ability, 15 = forgets limitations] (Morse, 2008).

Ideally the cut-off point of MFS should be calibrated (within a range of 25 to 55 points) to each care setting/unit (Morse, 2008). A recent study identified the cut-off point of 45 points as the optimal cut-off value for the Portuguese population (Costa-Dias, Martins, et al., 2014). However, at Aveiro Hospital we still categorize the patients in 3 levels of risk and implement guided preventive measures according to the identified risk level (as described in the "Background" section).

So, in our data analyses we considered the 2 levels of risk (based on optimal cut-off value for the Portuguese population) and the 3 levels of risk (based on institutional recommendations).

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