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*Full Length Research Paper*

# Identification and information of fall risk factors at elderly admission in nursing homes

Cristina Lavareda Baixinho<sup>1\*</sup> and Maria dos Anjos Dixe<sup>2</sup>

<sup>1</sup>PhD in Nursing, Master in School of Health, Specialist in Rehabilitation Nursing, Teacher at Lisbon Nursing School, Health Research Unit (UIS)/ Escola Superior de Enfermagem de Lisboa. Avenida Professor Egas Moniz, 1600-190 Lisboa. Portugal.

<sup>2</sup>PhD in Psychology, Master in Nursing, Specialist in Medical-Surgical Nursing, Teacher at Leiria health School, IPL, Health Research Unit (UIS)/ Escola Superior de Saúde do Instituto Politécnico de Leiria; Campus 2 - Morro do Lena - Alto do Vieiro. Apartado 4137 | 2411-901 Leiria - Portugal.

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**This study aim to build a scale to assess identification and information practices related to fall risk factors at elderly admission in nursing homes and to assess its psychometric characteristics. The prevalence of falls during the first weeks of institutionalization is high for being a new environment, with unknown personnel and the valuation of individual risk factors during assessment might not occur. A methodological study with 152 professionals from Portuguese nursing homes. The scale was constituted by 13 items, distributed by two factors that explained 61.803% of variance. The scale's internal consistency was  $\alpha = 0,913$ . Good scale's statistical values allow its use for nursing investigation, training and clinical practice. It is important to associate the scale score with the prevalence of falls during the first weeks of elderly institutionalization.**

**Keywords:** Falls, Elderly, Risk Factors, Caregivers.

## BACKGROUND

Studies refers that above 75 years, falls represent 70% of accidental deaths (Bonner *et al.*, 2007), making this event a clear public health problem. However, falls keep being undervalued because they are faced as an accident, an inevitable health problem or a fatality of advanced age (Morse, 2009).

This view has to be changed because the cumulative effect of falls and secondary lesions in a society with an exponential increase of elderly, translate potential epidemiological risk and risk of health resources'

consumption (Kalula *et al.*, 2011). Due to this reason, fall is more than an event per se; it assumes a subjacent complexity to health problems prevention for elder individuals, for the environment, to the behavior and socio-economic conditions (Kalula *et al.*, 2011).

Facing the exposed, the approach of fall risk factors has to be proprietary in any fall prevention program. However, in a literature review we found that in risk assessment, elderly are stereotyped as homogeneous group, when they are not. They are diverse, of different ages, with a unique aging experience and for this reason, the approach for fall risk management should also be adequate to this heterogeneity (Hanson *et al.*, 2009). The way how risk factors are valued and their communication to elderly by their caregivers, could constitute a risk when

\*Corresponding Author E-mail: [crbaixinho@esel.pt](mailto:crbaixinho@esel.pt); [manjos.dixe@gmail.com](mailto:manjos.dixe@gmail.com); Phone: 933254269, 964881092

not valued or, in contrary, when adequate, as a fall protector and preventive factor.

Lee e Stokic (2008) refers that more than 50% of fall episodes occurred on the first week of institutionalization. Another study refers that one in each five recently admitted elderly fall on the first few days of institutionalization (Leland *et al.*, 2012). The justifications for this phenomenon points to an unknown environment for the senior (Pountney, 2009; Leland *et al.*, 2012) and not knowing the personnel, impeding identification of the risk and its control (Leland *et al.*, 2012), it decreases trust, increasing the risk (Pountney, 2009). We consider that valuation of fall risk factors by nursing home professionals at the admission moment can contribute with a higher or lower valuation of intrinsic risk factors related to the elderly and environmental risks; and this data can contribute with a high prevalence of falls during the first weeks of institutionalization.

We did not find instruments to assess identification and information practices and behaviors of fall risk factors at elderly admission, by nursing home professionals. In this sense, this study aimed: to build a scale to assess identification practices and behaviors, and information of fall risk factors at elderly admission in nursing homes, to determine its psychometric characteristics and to assess practices and behaviors during identification and information of fall risk factors at the elderly admission in nursing homes.

## METHODS

The investigation brings important challenges to build measures to assess the study's variables. To conduct this methodological study, we considered procedures to guarantee the scale design and, the determination of psychometric characteristics was adequate for the study aim.

### Sample

One hundred and fifty-two direct action helpers, female, who conducted functions in six nursing homes at Lisbon region, Portugal, constituted the sample.

Instrument: Two parts constituted the data collection instrument: the first included sociodemographic and professional data and the second part was built to assess identification practices and behaviors, and information regarding fall risk factor at admission in nursing homes.

Such scale was built based on: the collection of information in databases; context observation; interviews with professionals; material selection to define dimensions and items to englobe in each scale; scale elaboration; scale assessment by experts; pre-test; application and scale validation.

During the pre-test conducted with 23 professionals to verify the comprehensibility of items, professionals were requested to pronounce about items' clarity and

objectivity. There was a reformulation of items, which were not clear for respondents.

The scale for identification of practices and behaviors and identification of fall risk factors at admission was distributed and 21 items constituted it. In this instrument, respondents reported the frequency that they developed identification practices and information of fall risk factors at admission through a Likert-type scale; answer options were never, few times, sometimes, many times, always.

Participants took 10 minutes on average to fill the instrument.

## Data collection and analysis

This study obtained a favorable feedback from the Ethics Commission of the Portuguese Catholic University. During data collection, the informed consent, privacy, and confidentiality were guaranteed (Waltz *et al.*, 2010).

The questionnaire was self-reported, without the investigator's presence. To guarantee anonymity, we placed two sealed boxes in an equipment room, one to place the consent and the other to place the instruments. We opened the boxes 15 days later.

The statistical data treatment was conducted using SPSS (Statistical Package for the Social Sciences), version 19.0. We conducted the following descriptive statistical techniques: absolute and relative frequencies, measures of central tendency (mode, mean and median), measures of dispersion and variability (standard deviation, minimum, and maximum). We tested reliability through analysis of internal consistency using the Cronbach's alpha coefficient (Steiner and Norman, 2008).

For factorial analysis in main components, we used an orthogonal rotation *Varimax* type, and the factors extraction with proper values higher than one. We used the Kaiser-Keyer-Olkin (KMO) test and the Barlett's index to measure the quality of correlations between variables and to test the factorial matrix validity.

## RESULTS

### Sample sociodemographic and professional characteristics

One-hundred and fifty-two direct action caregivers from six institutions constituted the sample. All participants were women, of  $47 \pm 10.3$  years old, and their working time was  $13.1 \pm 8.35$  years.

From the 152 participants, 68% started their professional experience without professional training for direct action, and 66.7% had continuing training after they initiated their professional activity.

For most training actions, themes related to risk of fall (81.7%), risk assessment (80.2%), preventive measures (83.5%) and after-fall care (82.6%) were addressed. The least privileged theme during training was documenting fall episodes (62.2%).

**Table 1.** Pearson's correlation of items composing the scale and the Cronbach's alpha with the total, without the item

Number and content of items	Pearson's correlation of the total without the item	Cronbach's $\alpha$ without the item
1.I identify the use of walking aids	.613	.907
2.I observe if there is difficult to walk	.656	.906
3.I observe if the elderly has balance changes while walking	.730	.904
4.I identify difficulties to sit and stand up from the chair	.656	.907
5.I identify difficulties in standing up from bed and laying down in it	.724	.904
6.I identify if there are difficulties climbing up/down the stairs	.630	.907
7.I identify if the elderly is time and space oriented	.629	.907
8.I identify if there are difficulties in taking a shower	.626	.907
9.I inform about the bathroom localization	.599	.909
10.I inform about the elevator localization	.657	.906
11.I inform about the use of stairs and ramp	.590	.909
12.I inform about the existence of bell/ringer	.719	.903
13.I inform about the existence of light presence	.561	.910
Total Alpha		0.913

**Table 2.** Matrix of main components after Varimax rotation of 13 scale items

Number and content of items	H2	F1	F2
1.I identify the use of walking	.628	.773	
2. I observe if there is difficult to walk	.686	.804	
3. I observe if the elderly has balance changes while walking	.720	.793	
4. I identify difficulties to sit and stand up from the chair	.772	.869	
5. I identify difficulties in standing up from bed and laying down in it	.626	.645	
6. I identify if there are difficulties climbing up/down the stairs	.520	.636	
7. I identify if the elderly is time and space oriented	.500	.595	
8. I identify if there are difficulties in taking a shower	.485	.477	
9. I inform about the bathroom localization	.589		.738
10. I inform about the elevator localization	.564		.665
11. I inform about the use of stairs and ramp	.534		.687
12. I inform about the existence of bell/ringer	.729		.799
13. I inform about the existence of light presence	.679		.818
Total explained variance		61.803	
% of explained variance by factor		33.53	28.26
Kaiser-Meyer-Olkin Measure		.870	
Bartlett's Test of Sphericity	1149,298; p<0,001		

### Psychometric characteristics of the scale

To determine the psychometric characteristics, we considered the following criteria:

- Items which coefficient was lower than 0.20 were eliminated as proposed by Striner and Norman (2008).
- Items which Cronbach's alpha was higher than the global alpha were eliminated.
- Items with loading in more than one factor with a difference lower than 0.1 were eliminated.
- The Kaiser-Meyer-Olkin (KMO) and the Barlett's test were the two statistical procedures conducted for measuring the quality of correlations between variables, in a way to follow with the factorial analysis.

We verified that applying this criteria, 21 items were eliminated, and eight items had an internal consistency of  $\alpha = 0.913$ , a value considered excellent.

The total-item correlation without the item varied between 0.561 and 0.730 attesting homogeneity of the set of statements (Table 1).

To assess the scale validity, an exploratory factorial analysis proceeded with extraction of factors by the technique of the main components (Kaiser), with Varimax rotation. For this scale, the Kaiser-Meyer-Olkin (KMO) test indicated a 0.870 value, and 1149.298 value for the Barlett's test for a  $p < 0.001$ . Thus, we can affirm that the KMO value as well as, the Barlett's test value allows measuring the quality of the correlations between variables (Pestana and Gageiro, 2008).

In Table 2 analysis, we still verified that 13 items were organized in two factors explaining 64.803% of variance. Thus, highlighting good values among items (0.485 – 0.772).

**Table 3.** Caregivers' characteristics regarding identification and information of risk factors at the elderly admission

Number and content of items	Mean	SD
1. I identify the use of walking aids	4.43	.88
2. I observe if there is difficult to walk	4.37	.92
3. I observe if the elderly has balance changes while walking	4.32	.88
4. I identify difficulties to sit and stand up from the chair	4.37	.87
5. I identify difficulties in standing up from bed and laying down in it	4.36	.85
6. I identify if there are difficulties climbing up/down the stairs	4.19	1.00
7. I identify if the elderly is time and space oriented	4.05	1.00
8. I identify if there are difficulties in taking a shower	4.37	.94
9. I inform about the bathroom localization	4.34	1.05
10. I inform about the elevator localization	4.30	1.02
11. I inform about the use of stairs and ramp	4.11	1.15
12. I inform about the existence of bell/ringer	4.36	.98
13. I inform about the existence of light presence	4.21	1.10
Total of the practices' scale	55.78	12.69
F1- Practices of assessment/identification of risk factors	34.46	7.37
F2- Information to elderly about prevention practices for fall risk	21.32	5.32

Having the content of each one of the factors, we attributed the following names: Factor 1: Practices and behaviors for assessment/identification of risk factors; Factor 2: Practices and behaviors of information to elderly about preventive measures for fall risk.

Regarding the Cronbach's alpha, we verified the value of 0.902 for factor 1 and 0.859 for factor 2.

After determining psychometric characteristics, 13 items grouped in two factors constituted the scale and, its scoring varies between 13 and 65 possible points, and best practices correspond to values that are more elevated.

### Practices and behaviors for identification and information of fall risk factors in elderly admission

Relating to practices and behaviors for identification of fall risk factors at the admission (Table 3) and having the median of each indicator (3.5), we noted the risk factors that direct action caregivers give more attention is during the identification of elderly using walking aids (4.43±.88). The less valued items in practices and behaviors are "I identify if the elderly is time and space oriented" (4.05±1.00) and "I inform about the existence of light presence" (4.22±1.10).

## DISCUSSION

The complexity of risk factors associated with falling determines the necessity to diversify the investigation to phenomena that have not been explored in the investigation.

The built and validated scale in the study presents two factors. The first allows assessment of practices and

behaviors of assessment/identification of risk factors by direct action caregivers of nursing homes, and the items are directed to mobility and balance difficulties, difficulties performing hygiene self-care actions and, with time and space orientation. The importance of assessing these intrinsic risk factors of elderly could influence the decrease of fall prevalence and overall, of recurrent ones. As Morse (2009) affirms, recurrent falls express the presence of intrinsic etiologic factors (secondary diseases, use of multiple medications, sensorial changes, balance changes, changes of the conscience state), while accidental fall is associated with extrinsic factors related to the person, as environmental risk or risk attitudes.

For this reason, to determine elderly with high risk of fall is the first step to help professionals to prevent falls and lesions associated to it (Barker *et al.*, 2009; Wagner *et al.*, 2011). The following step is to use the information obtained by risk assessment to guide provided care (Wagner *et al.*, 2011).

The fall risk assessment should be evidence-based, so certain measures could be associated to the elderly in an adequate moment (Baixinho and Dixe, 2012). We consider that for this adequacy, it is important to assess clearly the importance that caregivers give to intrinsic risks of each elderly, because without these valuation, individualized implementation of preventive measures are not possible.

We can consider that the sample had good practices and behaviors of identification and information of fall risk factors at admission as for factor 1 - practices and behaviors of assessment/identification of risk factors -, a maximum of 40 points was possible and the sample score was 34.9.

The indicator with higher score for identification of risk factors is to identify if the elderly uses a walking aid, with 62.1%, due to the fact of walking to be the self-care action that most interfere with other self-care actions (Baixinho, 2008) also, for being unanimous that changes in walking are a major risk factor for falling (Baixinho and Dixe, 2014).

The second factor to allow identification of practices and behaviors of information to elderly about fall risk prevention measures, in regarding the location of the bathroom, the elevator, stairs and ramps, the existence of bell and the presence of light.

While analyzing the mean score of each one of factors (4.3 and 3.4 for factor 1 and factor 2, respectively), we noted that it is in the information field that caregivers have lower frequencies of practices and behaviors, and from 25 possible points, obtain 17.

At admission, the given information relates to the existence of bell ( $\bar{X}=4.36$ ,  $SD=.989$ ), bathroom location ( $\bar{X}=4.34$ ,  $SD=1.051$ ), elevator location ( $\bar{X}=4.30$ ,  $SD=1.020$ ), the presence of light ( $\bar{X}=3.21$ ,  $SD=1.107$ ) and the use of stairs and ramps ( $\bar{X}=4.11$ ,  $SD=1.157$ ). This information about different spaces in the nursing home, the accessibility, and ways of signaling are important measures to increase not only elderly knowledge about the physical structure of their new home, but it allows increment of trust when they move around in it. For the ACSQHC (2009), the information given at admission is an important preventive measure, as many elderly fall in the first few days in the institution.

It is noteworthy that implementing effective preventive measures for falls has special relevance in autonomy and mobility improvement, with benefits at the individual and collective health level (DGS, 2012) of institutionalized elderly.

An accepted point in mostly all investigations is that for fall, there are two or more risks (CDC, 2012), making it a multifactorial phenomenon (Whitney *et al.*, 2012), knowing that environmental risk factors contribute to half of falls (CDC, 2012), which justifies a clear investment from teams in information for elderly about environmental risk factors. According to ACSQHC (2009), extrinsic factors are constituted by environmental factors, as irregular paths, slippery floors, insufficient light, existence of stairs and domestic animals, as well as atmospheric conditions, which elderly should be informed of.

In any prevention program, nurses should encourage elderly at risk of fall and their families to participate, providing oral and written information about preventive measures (Duffy, 2013).

Apparent simple aspects, as a bell out of sight, make it to be out of the mind and the person can lose balance when trying to reach it. Lighting itself, if not adequate, can become a risk. The presence of light should help one seeing the bell, shoes, the bed, as well as the bathroom-bedroom path (Morse, 2009).

The bathroom is another place with a high incidence of falls, Rapp *et al* (2012) refers that about 75% of falls occur in the bedroom and bathroom and to minimize these values, elderly should be assessed regarding difficulties in hygiene self-care; also in the motion to the bathroom, sitting down/standing up from the toilet, and safety conditions of this space in terms of being dry or not should be considered. The item that better scores in the second factor is information about the bathroom location, with 62.4% when referring to "always" level of this practice, which might be due to the elevated number of falls that occur in bathrooms from nursing homes (Baixinho and Dixe, 2014).

Trained and motivated teams that have discussion moments about risk factors and preventive measures can contribute for change of practices and, consequently, decrease the incidence of falls and lesions caused by them. This work should be performed by multi-professional teams (ACSQHC, 2009), with roles and responsibilities designed for each member.

The assessment of practices and behaviors for identification and information of fall risk factors at the admission in nursing homes is a low cost intervention and future studies should associate practices of risk assessment and information with the prevalence of falls. As affirms Teresi *et al* (2013), the development of low cost evidence-based programs can result in decrease of falls and costs. However, Damián *et al* (2013) consider that beyond the large impact that falls have on elderly, evidence is still lacking about the efficacy of preventive interventions. Robertson *et al* (2013) consider that there are many studies with good evidence for fall preventions in the community, but little evidence about efficacy of these interventions for institutionalized elderly.

It is crucial for this evidence to be used by professionals to promote quality practice, in terms of holistic assessment and implementation of effective interventions, improving quality of life and autonomy of residents, who probably already have diseases and disabilities (Duffy, 2013).

## CONCLUSION

The bi-factorial scale, designed and validated in this study has 13 items, scoring between 13 and 65 possible points. The best practices for identification and information to elderly corresponds to more elevated values and, presents good psychometric properties that can be used in the investigation, training and clinical practice.

In the investigation, it is important to associate the total score and the individual items that constitute it, with the prevalence of falls in the first weeks of admission in nursing homes.

It can be used to define training programs for professionals who work in nursing homes because it allows identification of which intrinsic and environmental factors are valued by caregivers of institutionalized elderly, as well as their information practices to elderly about prevention measures for fall risk.

In the clinical practice, it can constitute an instrument to facilitate the nurse to monitor identification of risk practices and to inform elderly about fall preventive measures.

The prevention and falls in elderly population is a challenge with almost intangible objectives due to the multifactorial aspect of fall etiology. In institutions that provide elderly care, as hospitals and nursing homes, this complexity is aggravated by the presence of other people (professionals, patients, residents), whose practices and behaviors can be protective or constitute a risk per se. It can also be an unknown environment for elderly. Considering this, to identify intrinsic fall risk factors of elderly and to inform them about measures to promote safety in the new environment are crucial practices to decrease the prevalence of falls in nursing homes.

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