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Awareness about falls and elderly people's exposure to household risk factors

José Antonio Chehuen Neto [1]
Nícolas Augusto Coelho Braga [1]
Igor Vilela Brum [1]
Gislaine Fernandes Gomes [1]
Paula Liziero Tavares [1]
Rafael Teixeira Costa Silva [1]
Mariana Rodarte Freire [1]
Renato Erothildes Ferreira [1]

Abstract *Objectives: to describe the awareness about falls among elderly people living in their households in communities, to measure the other risks that they are exposed to in their homes and to evaluate the influence that knowledge on falling brings in the adoption of preventative measures. Method: The FRAQ-Brazil questionnaire was used on 473 elderly people as well as a questionnaire on elderly people being exposed to 20 household risk factors. Associations between the variables were analyzed using the chi-squared test with a confidence interval of 95%. Results: The age range was between 60 and 95 years with the average being 70.6 years. The majority of those interviewed were female (58.4%) who were earning 2 minimum wages (46.3%). The average amount of correct answers given with the use of the FRAQ-Brazil questionnaire was 19.5 out of 32 points and the elderly participants were, on average, exposed to 7.8 household risk factors. 180 of them stated that they had already received information on falls. Conclusion: The majority of the elderly population displayed little knowledge on falls and were exposed to a variety of daily risk factors. Individuals who were more advanced in years and who had more knowledge on falls, were exposed to less household risk factors. This may well have been due to the adoption of preventative measures through changing domestic environment.*

Key words *Accidental falls, Accidents, Home, Risk factors, Health literacy*

[1] Departamento de Cirurgia, Faculdade de Medicina, Universidade Federal de Juiz de Fora. R. José Lourenço Kelmer s/n, Martelos. 36036-330 Juiz de Fora MG Brasil. chehuen.neto@yahoo.com.br

Introduction

Aging is a process that is biological, progressive, and universal which requires there to be constant revisions of socioeconomic measures in countries especially in relation to health[1,2]. In Brazil, according to the Brazilian Institute for Geography and Statistics (IBGE), by the year 2020 approximately 11% of the population was going to be older than 60 years old[3]. This critical fact of an aging population demands changes in the attention given to elderly people, with special focus being placed on health promotional measures with a view to guaranteeing their autonomy and independence[4].

One of the major threats to the well-being of the elderly is the occurrences of falls and the ensuing temporary and permanent consequences. These can have negative impacts on their quality of life and the lives of their relatives[3,5]. Studies have shown that such falls are a result of synergistic multifactorial interactions[2,3,5-7] whose factors can be classified in the following ways: intrinsic (related to the clinical condition of the elderly person), extrinsic (related to the environment) and behavioral. The last two are strongly related to half of all falls[5].

The National Policy for the Health of the Elderly[4] that provides for the use of collective and individual measures in the promotion of health for the over 60s, requires there to be an identification of the possible risk factors related to falls in the community. It also reinforces the importance of self-care and highlights the importance of family members and carers to actively participate in the prevention of falls for the elderly[8,9].

Although the prevalence of risk factors for falls have been greatly explored in national specialist journals[2,3,5,6], there are no objective measures through the use of standardized and validated questionnaires to assess the level of knowledge that elderly people in the community have concerning falls and related conditions. This limits the amount of actions that can be done by health care professionals and managers. As mentioned in the Global Report from the World Health Organization (WHO) called Falls Prevention in Older Age, apart from evaluating the risk factors, it is fundamental to know the level of awareness that older people have on this issue. This is because prevention will only be possible if the individual and family members are aware of these relational aspects[8,10].

Our research was done based on this context whose remit was to enquiry into the knowledge of older people on risk factors related to falls through the questionnaire *Falls Risk Awareness Questionnaire* (FRAQ-Brazil). The idea was to identify modifiable risk factors related to the adoption of preventative measures.

Method

This was a transversal study which was exploratory, descriptive and quantitative in nature[11]. This was an applied and original study that was carried out in the city of Juiz de Fora, Minas Gerais, between May and June of 2015. We received internal funding from the Federal University of Juiz de Fora which supported the research.

In order to guarantee the random nature of the socioeconomic conditions of the participants, we randomly chose sectors that had been the subject of a census for every region in the city. In the randomly selected roads that had been subject to a census, we went to the homes of the over 60s. The collection of the questionnaires was done on every road in about two days at different times, in order to increase the proportion of interviews per sector.

We included in this study the over 60s who were resident in the city of Juiz de Fora (MG). People with the following ailments were not included in this study: those with a hearing or visual disability, those with speech problems, people with poor or extremely poor health conditions, and those with cognitive disorders. We also did not include those that had been placed in an institution for the elderly. We considered as losses, questionnaires that had not been completed for whatever reason or if they contained incomplete data.

The data collection tool used was the FRAQ-Brazil that was translated and validated for use in Brazil in the Portuguese language[10]. The questionnaire evaluated the level of awareness and the knowledge of older people on falls in their different dimensions. It had 25 closed questions that amounted to a total of 32 points. In our analysis we took the view that the best level of understanding on falls would be reached if the respondent obtained the highest number of correct answers reflecting the satisfactory nature of such a score and they that had a score that the authors considered to be an adequate level of awareness.

Aside from the questionnaire FRAQ-Brazil, a second data collection tool was developed that covered 20 extrinsic and behavioral risk factors

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for falls (later referred to as "household risk factors", the objective of this study). They are frequently described in the specialist journals as being associated with the highest chances of falls for older people such as: lighting, safety bars, slippery floors, the height of furniture, obstacles in their way, long clothes and safety shoes[2,9]. The participants were approached in a standard fashion by trained researchers. They were fully briefed on the details of the study and were invited to take part in the study. Voluntary consent was obtained through the signing of a consent form (TCLE).

The researchers were trained to submit the research firstly to a pilot study using 20 individuals in order to identify problems on understanding the questions. This was to ensure the highest quality of the data collected and to ensure better participation from the respondents. These interviews were not considered in the data analysis phase, in order to maintain the random nature of the sample.

The variables that were assessed were divided into two groups: continuous quantitative variables (age, score concerning perception of fall, exposure to risk of falling down) and continuous qualitative variables (sex, region where someone lives, income and education). What then followed was the production of descriptive and exploratory statistics from the data using: absolute frequencies (n), relative frequencies (%), measures of central tendency (average) and measures of dispersion (changes from the norm).

In order to analyze the responses, a 2x2 contingency table was produced containing the absolute frequencies (n) and the relative ones (%). To check for any associations amongst the variables, the Chi-Square test of Independence was used (without corrections). The Odds Ratio (OR) was used to express risk which aided in assessing the relations between the chances of an exposed individual having a condition of interest, compared to someone not exposed. The significant level was p-value ≤ 0.05 for a confidence interval of 95%.

An analysis of the statistical associations with the socioeconomic variables was carried out based on the scores from the FRAQ-Brazil questionnaire and the number of household risk factors to which individuals are exposed. Aside from this, Pearson's Correlation Coefficient was calculated to check the level of correlation between the scores from the FRAQ-Brazil questionnaire and the number of household risk factors. In order to analyze the statistics and to put together a database the statistical *Software* SPSS Version 15.0®, 2010 was used.

Approval for the study was given by the Ethics Committee in Research at the Federal University of Juiz de Fora under case number 43917915.6.0000.5147. The research was deemed to present few risks for the participants, meaning that there would be no risks of the researchers affecting the physical, psychological or social well-being of the participants. This was in compliance with the scope of the study governed under Resolution 466/12 from the National Health Council which provides guidelines in relation to studies involving human beings.

Results

In order to obtain the desired sample, 601 individuals were approached that fit the selection criteria of which 101 refused to respond (a rejection rate of 16.8%). 27 interviews were considered as losses because there was incomplete filling in of the questions or the participants refused to respond to crucial questions. 473 interviews were considered to be valid and were thus used in the data analysis phase. Further on in this paper, the frequencies are presented in text form leaving the tables for the analysis of statistical correlations and the exposure inferred for household risk factors.

The age of the respondents varied between 60 and 95 years old, with the average age being 70.6 years old. For the dichotomization of the data, we adopted the age of 75 from which there was the highest amount of exposure to falls resulting in injuries. This corresponded to 21.8% (n = 103) of the interviewees. The majority of the interviewees were female (n = 276, 58.4%) and were white (n = 285, 60.3%).

Their family income was up to 2 minimum salaries for 46.3% (n = 219) of the interviewees. Out of the participants in the study: 7.8% (n = 37) had completed their university education, 26.4% (n = 125) had completed their high school education and 35.5% (n = 168) had completed primary school. 8.9% of those that took part, stated that they could not read or write.

When questioned on the feeling of imminently falling, 44.0% (n = 208) stated that this was a risk that they considered could occur. Aside from this, 35.9% (n = 170) stated that they had never received information on falls for older people.

Based on the interview with FRAQ-Brazil, we observed that the total amount of points varied between 7 and 29 with a total of 32. There was an

average of 19.5 and a median of 19 which was the value used to dichotomize the data. There were no interviews in which the interviewees managed to answer all of the questions correctly. The question with the lowest amount of correct answers was question 22 concerning the chances of someone falling based on their sex, in which 20% of the interviewees obtained a correct answer. The question with the highest amount of correct answers was question 23 concerning the chances of someone with "weak bones" hurting themselves, having a 97% correctness value.

What stood out was that 11.2% (n = 53) did not identify the amount of older people in the population that were more likely to fall than young people (question 1). Also 18.4% (n = 87) did not think that older people could adopt preventative activities (question 2).

For the questions drafted to specifically identify household risk factors, we noted that the values varied between 0 and 15 with a total of 20. The average was 7.8 and the median was 8 and this value was used to dichotomize the data. The household risk factor that was most evident was the habit of leaving the light off during the night 77% (n = 364). There was only one interview in which none of the household risk factors were identified. The frequency of every variable can be seen in Table 1.

Table 1. The presence of household risk factors (N = 473)

Risk factors for falls	Present	
	N	%
Lights turned off at night	364	77,0
Getting up at night	341	72,1
Bathrooms with slippery floors or without protection	311	65,7
No staircase banister	288	60,9
Objects out of arms reach	256	54,1
Lights out in dark places	255	53,9
Living alone or with other older people	253	53,5
Seats without arms or backs	224	47,3
Uneven floors	208	44,0
Animals in the house	182	38,5
Obstacles in the house that are in peoples way	177	37,4
Slippery floor	138	29,2
Corridor without protection	137	29,0
Using clothes that are long in the home	132	27,9
Consuming alcohol	114	24,1
Dresser with a lamp	93	19,7
Children in the house during part of the day	80	16,9
Using inadequate footwear	66	14,0
High mattresses or beds	55	11,6
Inadequately high toilets	17	3,6

The associations were established with reference to the total amount of points from the level of perception of the risk of falling down (FRAQ-Brazil) and the total amount of household risk factors present in relation to: age, sex, ethic/racial identification, income and level of formal education. The information is shown below in Table 2.

It is possible to observe that the determinants of the awareness level for the FRAQ-Brazil scores are: income, the area where the person lives and their ethnic/racial identity. The total amount of domestic risk factors was related to the age of the respondents.

The associations between the total amount of household risk factors according to the total amount of points in the FRAQ-Brazil questionnaire were also evaluated, as well as the guidance given on falls and the fear of falling down. This was done in order to define which determinants needed to be considered as a guide in influencing any changes made in an environment or place, as shown Table 3.

It is interesting to note that the interviewees that stated that they had been informed on falls affecting older people in the population, did not show higher scores than those that had not been informed.

Individuals that stated that they were scared of falling had higher points than those that did not feel this way (p-valor = 0,041). There was an association between the awareness of falling down (the FRAQ-Brazil questionnaire scores) with the presence of household risk factors having a negative correlation in the order of 20.8% (p-valor < 0,001). This would suggest less exposure of household risk factors between older people with a greater knowledge on falls.

Discussion

The household risk factors that were most common and frequently mentioned in this study (slippery bathroom floor, getting up in the night and not having the lights on continuously) drew our attention for being classically described as synergistic for the outcome of the fall. In general, these factors relate themselves to the common health conditions in the aging process highlighting the pathological nocturia[12] which leads to frequently waking up in the night in order to

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Table 2. Awareness and presence of household risk factors according to sociodemographic variables. (N = 473)

Scores in the interview	Awareness of Risk (FRAQ-Brazil)						Presence of Risk Factors					
	Up to 19 points		> 19 points		OR	p-value	Up to 8 present factors		> 8 present factors		OR	p-value
	N	%	N	%			N	%	n	%		
Sociodemographic variable												
Age												
Up to 74 points	189	51,1	181	48,9	0,948	0,809	200	54,1	170	45,9	0,606	0,030*
> 74 years	54	52,4	49	47,6			68	66,0	35	34,0		
Gender												
Female	134	48,6	142	51,4	0,762	0,146	154	55,8	122	44,2	0,919	0,654
Male	109	55,3	88	44,7			114	57,9	83	42,1		
Ethnic-Racial Identification												
Non-White	110	58,5	78	41,5	1,612	0,012*	99	52,7	89	47,3	0,764	0,154
White	133	46,7	152	53,3			169	59,3	116	40,7		
Income												
Up tp 2 minimum salaries	123	56,2	96	43,8	1,443	0,048*	119	54,3	100	45,7	0,831	0,319
> 2 minimum salaries	119	47,0	134	53,0			149	58,9	104	41,1		
Level of Education												
Primary school education incompleted or illiterate	104	49,5	106	50,5	0,868	0,446	117	55,7	93	44,3	0,939	0,738
Primary school education completed as well as high school or university education	139	53,1	123	46,9			150	57,3	112	42,7		
Region where they live												
Center	57	68,7	26	31,3	2,404	0,001*	47	57,3	35	42,7	1,027	0,914
On the outskirts of the city	186	47,7	204	52,3			221	56,7	169	43,3		

Key: n = absolute sample; % relative sample; OR = Odds Ratio, * statistically significance.

Table 3. The presence of household risk factors according to awareness, information and fear of falls. (N = 473)

	Presence of Risk Factors					
	Up to 8 present factors		> 8 present factors		OR	p-value
	N	%	n	%		
Awareness of fall (FRAQ-Brazil)						
Up to 19 points	122	50,2	121	49,8	0,580	0,004*
> 19 points	146	63,5	84	36,5		
Guidance on falls						
Yes	180	59,8	121	40,2	1,453	0,053
No	86	50,6	84	49,4		
Feeling of imminent fall						
Yes	116	55,8	92	44,2	0,963	0,839
No	148	56,7	113	43,3		

Key: n = absolute sample; % relative sample; RR = relative risk.

urinate. Aimed at reducing the impacts, it has become necessary to have better clinical control measures for these illnesses and intersectoral actions such as social assistance and standardized architectural projects. Such measures should be supported by effective public policies aimed at providing the population with safety as seen in other countries[8,13].

The way how the project was designed permitted the simultaneous identification of various household risk factors, which is important, given the synergistic character of many of the factors[2,3,5-7]. Elevated frequencies were also regularly found in studies on changing a person's domestic environment with the objective of reducing the number of falls[14,15]. In the national specialist journals, the household risk factors are usually evaluated in emergency censuses related to the outcome of falls for one element[16]. In spite of being useful for identification purposes, it does not allow for preventive approaches beyond not considering the synergism of the multiple risk factors.

It was also observed that only the variable of "age" was a sociodemographic determinant for the presence of household risk factors. This suggested that amongst those that are older, the preventative habits are established based on prior experiences of falls[17]. Considering that individuals with a greater understanding of these issues presented a lower presence of household risk factors, this fact infers that the actual situation can be changed with the implementation of reading strategies on health and healthy life style habits that are universally objective when dealing with the prevention of falls[8,18]. We understand that this type of education for older people is aimed at broadening their awareness of this issue so that they can take actions through looking after themselves. As was frequently observed, older people with greater awareness of the issue opted to modify their dwellings to reduce domestic[17] risks. Many of these modifications were easily identifiable and remediable.

The older people that had greater knowledge on falls were those that lived outside of the city. One possible explication for this is that they have greater contact with health workers at their municipal health center where prevention policies are greatly emphasized for the benefit of the health service users[6,19]. In spite of this, we did not observe less exposure to household risk factors for these individuals. It is therefore necessary to train health care professionals so that they can identify and intervene in domestic dwellings[2].

The awareness of older people about falls, taken from the FRAQ-Brazil evaluation, was inferior to that which was found in other countries[20-22]. However, the values found in the international specialist journals are also considered insufficient, showing that older people in general have little information in relation to the issue. This means that the population is not given guidance on the process of aging and the inherent greater risks of falling which occur when the risks are underestimated or certain preventative activities are not taken[17,22].

In order to effectively increase the level of awareness in the population on aging and the adoption of preventative measures for falls, it is necessary to intervene in a timely manner on the life style habits of the elderly. It is also necessary to provide support, albeit non-material in nature, through alerts on the theme promoting activities that reflect the reality of the elderly population[8,17].

It has been noted internationally that changing a person's home in itself is not sufficient in preventing falls[15]. This fact is even more evident in areas that already have regulations in place with reference to this issue and the homes are prepared to house vulnerable people which, in itself, is outside of the Brazilian reality[23].

A low level of knowledge on the theme coupled with a deficit in perception that falls represent a serious hindrance for the health of older people, can signal a negative factor where they lose their autonomy. It can also mean social harm and psychological problems for them[2,24]. This also makes it difficult for changes to be made in habits based on professional advice as there is no motivation to prevent accidents which can be avoided or mitigated[8,14,18]. This would reduce public spending in hospital admissions, treatments and rehabilitation[18] as well as empowering the population to live a life with independence as noted in the Health Policy for the Elderly[4] and has been applied internationally [18,23].

Conclusions

The majority of the elderly population do not see themselves as being a part of a vulnerable group subject to falling down. They also do not recognize the domestic risks that contribute to the occurrence of this phenomenon. Also older people are unaware of the seriousness of the injuries that occur due to falls and the impacts caused by these accidents on their quality of life.

In order to prevent the occurrence of falls, the population in general ought to receive quality support with reference to this phenomenon and its risk factors, as an increase in awareness of the accidents can mean a reduction in exposure to trigger factors. This will prepare individuals for the process of aging, principally when there is financial and racial vulnerabilities.

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Through this information, it is possible to develop policies geared towards the promotion of health for the elderly which can be done not just by health care professionals but those that work in the area of architecture and urban planning.

As we dealt with research based on interviews, the information concerning the domestic environment may be different from the reality. This means that other studies may be necessary on extrinsic risk factors and behaviors in which the scientific teams directly analyze a person's place of abode and include both family members and carers in any evaluations on life style habits. Additional information can also be obtained through longer lasting research in order to establish any relations for causes and effects between the education for older people and changes made in their homes. The speed of any changes and the level of preventative measures brought in, should also be evaluated.

Collaborations

JA Chehuen Neto worked on the design and elaboration of research, data analysis, information extraction, critical review of the text and was responsible for scientific quality and respect for ethics. RE Ferreira worked on the design of the research, statistical analysis of the data, critical textual review and was responsible for scientific quality and respect for ethics. NAC Braga and IV Brum worked in the design and elaboration of the research, data collection, data analysis, extraction of information, textual elaboration and were responsible for scientific quality and respect for ethics. GF Gomes, PL Tavares and RTC Silva worked on the elaboration of research, data collection, extraction of information, writing of the text and were responsible for scientific quality and respect for ethics. MR Freire worked on refining research, data collection, data analysis, textual writing and were responsible for scientific quality and respect for ethics.

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