

Development and Validation of a Questionnaire to Assess Older Adults Perception About Fall Risks

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Abstract

Introduction: In Brazil, 28% to 35% of individuals over the age of 65 fall each year. Literature suggests that 30% to 40% of falls are preventable through management of risk factors. However, adherence in prevention programs depends on older adults' perceptions about falling.

Objective: To develop and to validate a questionnaire to evaluate older adults' perception about fall risks factors.

Method: This study was developed through qualitative and methodological approaches. Qualitative method was conducted through content analysis and the questionnaire was tested through content and face validity techniques.

Results: The two main categories from qualitative analysis, falls problematization and the perception of risk factors, served as basis for the development of the questionnaire. The proposed research tool, with 36 questions was sent to content validity analysis through evaluation of "judges", in three aspects: clarity of language, importance and theoretical relevance. With these results, it was possible to calculate the validity coefficient (VC).

Introduction

The demographic transition, represented by a significant increase in the number of older adults comparing to younger individuals, is a reality in the current Brazilian scenario. Aging is associated with the development of chronic diseases due to exposure to environmental, behavioral and physiological factors [1-3]. These factors, in turn, increase the risk of falls in older adults [4].

Falling is a public health problem in the elderly. In Brazil, 28% to 35% of people over 65 years old fall each year, and this proportion increases to 32% to 42% in individuals aged 70 or over [4]. Although there are many options of preventive measures, such as physical exercise programs and the assessment of older adults' environment, this percentage remains high. Additionally, there is no consensus in the literature on which preventive method is the most effective [5,6].

It is known, however, that for the success of prevention programs is essential to understand the expectations, motivations and perceptions of older adults about falls [7]. If older adults do not perceive their limitations or the presence of risks in the environment in which they live, they will probably not engage in preventive activities, since behavioral changes require some perception of the risk associated with the outcome [8]. For example, older adults with a low perceived risk of falls are less likely to change their homes to prevent falls [9]. Many people perceive risks in the others, but not in themselves, underestimating falls as a serious health problem [8,10].

There are many questionnaires and tests available in the literature to evaluate older adults who are susceptible to falling, including the falls risk awareness questionnaire (FRAQ). This survey was developed by Canadian researchers in 2006, based on the literature available in

international databases [11]. From the findings, health professionals developed multiple-choice questions to investigate older adults' perception on the risks for falls. The FRAQ was recently validated for the Brazilian population (FRAQ-Brazil), demonstrating excellent reliability and internal consistency [12]. The authors report that there is not another survey in the Brazilian literature with the same objectives [12].

The perception of health risks is directly and indirectly influenced by social and cultural factors [13]. Literature suggests that there is a disparity between causes of falls perceived by health professionals and older patients. Professionals generally focus on the elderly clinical conditions, medication use and vision problems, while the emphasis of older adults is on environmental factors such as walking on slippery surfaces and lack of attention to perceive obstacles [10]. Therefore, it is essential to investigate this problem, from the older adults' perspective, in order to favor the engagement of this population in preventive measures.

The present study aims to present a questionnaire developed with the purpose of verifying the older adults' perception about the risks of falls. The questionnaire differs from the FRAQ-Brazil, since it was elaborated based on an initial qualitative investigation about the older adults' perception in relation to fall risk factors and falling as a health problem.

Methods

This is a methodological descriptive study, carried out between April 2014 and January 2017. In order to achieve the main objective, a qualitative research was first carried out with the purpose of verifying

the older adults' perception about risk factors and the problematization of falls. Data analysis was based on content analysis proposed by Bardin [14] and Minayo [15]. These results can be assessed in a recent publication [16].

The two major categories of analysis in the qualitative research, problematization of falls and perception of risk factors, served as a basis for the development of the questionnaire. Approximately three questions were created for each subcategory of the qualitative research. The questions were elaborated in a closed-ended form in order to provide a quantitative survey for the analysis of falls' perception and their risk factors. The answers to the questions were presented in dichotomous format (yes or no answer) or with Likert scale (score from 0 to 5). Initially, preference was given for the use of the scale, as an exaggerated perception of risks could be related to fear of falling, which is an important factor associated with falls [17].

The initial questionnaire had 36 questions and a definition for falls, to align with the participants the understanding about the problem that was being addressed. In this format, the questionnaire was submitted to content validity, through the analysis of judges. Content validity has the purpose of demonstrating whether the degree of a set of items constitutes an adequate operational definition for a particular construct [18]. This analysis guarantees that the questionnaire will cover different aspects of its object [19], and is carried out by verifying the organization of the questionnaire, formulation of the questions and their relevance.

The judges selected were health professional experts in the area of aging and falls. The criteria were based on those proposed by Fehring, in which health professionals must have at least a Master's degree in areas related to the questionnaire to serve as judges [20]. The three selected judges from the areas of psychology, physical education and physical therapy, all with masters and/or doctoral degrees in the area of aging, received by e-mail a form requesting to evaluate the questionnaire in terms of clarity of language, importance and theoretical relevance, being requested to return the answered form within 30 days. It was advised that, in relation to the assessment of language clarity, the judges should verify if the language used in the question would be easily assimilated by the group that will respond the instrument, that is, older adults. In the evaluation of importance, judges should check whether the question was important as a part of the questionnaire. In relation to the theoretical relevance, judges should assess whether the question had an association with the matrix of analysis that serves as the basis for the evaluation of the instrument. All questions were evaluated on a scale of 1 to 10, with 1 being the minimum score and 10 being the maximum. Within each question, an open space for comments and suggestions was also available.

After receiving the judges' analysis and suggestions, data were tabulated in an Excel worksheet. In order to verify judges' agreement regarding the evaluation of the questionnaire items, validity coefficient (VC) was calculated. The VC is designed to evaluate the content of the items as well as of the questionnaire in relation to the representativeness of the measure, based on the judges [21]. First, the VC was calculated for each item (VC_i) and afterwards, for the questionnaire as a whole, as proposed by Hernandez-Nieto [22]. Also, for the VC_i, error calculation was performed to discount possible biases of the judges [23]. Questions were considered valid when VC_i reached an approval rate of 0.7 (70%) [24].

Questions were rewritten if they did not reach the expected percentage in the VC_i only in the clarity aspect. Those that did not

reach the VC_i in the other evaluated categories, or in all of them, were excluded. In addition, the open-ended suggestions made by the judges were followed. After this stage, the new questionnaire was sent back to the judges for a second review and final approval in order to carry out the next phase of the study, facial validity.

To verify facial validity, items that remained in content validity, composing the preliminary questionnaire (23 items) were evaluated by the survey target sample. Older adults evaluated the extent to which items were understandable and clear, that is, if they had an apparent validity. The apparent validity or facial validity refers to the subjective judgment that people make about the test. If the test is not perceived in a positive way, it will probably not be answered with motivation, impairing the performance, and consequently, impacting negatively other types of validity [25].

This evaluation was performed through focus groups, composed of 3 to 5 individuals [26]. Focus group is a qualitative research technique that emphasizes interaction among participants. From group interaction, data and insights are produced which would be less accessible if conducting individual interviews. Focus group is used for a variety of purposes, including the development of surveys and questionnaires and obtaining participants' interpretations of results from other surveys [27]. During the execution of this technique, older adults were asked about what they understood of the item, to verify if everyone understood it in the same way. All questions that were not clear in this evaluation were modified or eliminated [26].

Firstly, two focus groups were held in December 2016. Older men and women aged over 60 years were invited to participate in this phase of the study. Participants were older individuals who performed physical activities in a university program in the city of Porto Alegre. The first group had four individuals and the second group had only two. Even though the second group was conducted with a reduced number of participants, the course took place as the first one, with exchange of information between them and discussion of relevant data on the questions evaluated. Therefore, it was still considered in the development of the research. To produce informal discussion, each focus group began with the presentation of the researcher as well as of the study objectives, and participants' individual presentation [28]. The first group lasted 1 hour and 40 minutes and the second 1 hour and 15 minutes; discussions were recorded with prior authorization of participants. In addition, notes were made throughout the questionnaire, pointing out possible problems related to the clarity and understanding of the discussed questions. At the end of the focus groups, the questionnaire was changed respecting older adults' suggestions, modifying or eliminating questions that were not clear.

After facial validity, the final version of the questionnaire (14 items) underwent a third and final focus group, to confirm the changes performed and verify again the clarity of the survey for the target population. This focus group was carried out in January 2017, with seven older adults from a convenience sample, participants from the elderly group of the Bom Jesus neighborhood Residents' Association, in the city of Porto Alegre, according to the method used previously in the development of focus groups.

This research fully respects the declaration of Helsinki. It was approved by the Institute of Geriatrics and Gerontology Scientific Committee and the Research Ethics Committee of the Pontifical Catholic University of Rio Grande do Sul, at Porto Alegre (number 609.057). All participants were informed about the research's objectives and methods and signed the Informed Consent Term.

Results

The questionnaire proposed had initially 36 items. The first three questions had dichotomous answers (yes or no) and the others were affirmations arranged on a Likert scale, ranging from 1 to 5, with 1 representing the lowest degree and 5 being the highest degree of agreement.

After evaluation by the judges and the VC calculation (Table 1), 13 questions were excluded and 6 were rewritten, thus the revised instrument was composed by 23 questions. Not only has the VC been taken into account in the development of the new questionnaire. Some questions were rewritten or excluded based on the judges' open-ended suggestions. The main suggestions were related to verbal tenses, sentences' subject and also, in relation to redundant questions.

Item	Clarity CVCi	Importance CVCi	Relevance CVCi
Have you had already fallen? **	0.66	0.96	0.96
After you have suffered a fall have you thought more often about how to avoid them?	0.83	0.83	0.80
Have you ever had a fall-related injury/fracture?	0.90	0.96	0.96
From a fall suffered by a relative/acquaintance/friend, you take some action to prevent falls **	0.67	0.83	0.83
You know older adults who have already fallen and this made you worried.	0.80	0.90	0.90
You know older adults who suffered serious consequences due to a fall and it made you think more about them	0.76	0.83	0.83
Prevention of falls in older adults is as important as the prevention of other health problems	0.86	0.90	0.90
Being older you have an increased risk of falling *	0.80	0.86	0.86
When you are doing your daily activities, you think you may fall	0.83	0.86	0.90
You believe you can get seriously injured after falling	0.80	0.86	0.86
After suffering a fall, you believe you will resume your daily activities as before.	0.80	0.96	0.96
Orientations you received about falls in older adults changed your perception about them *	0.66	0.83	0.90
Orientations you received about how older adults can prevent falls helped you avoid them	0.76	0.80	0.80
Orientations you received about consequences of falls in older adults were important for you to prevent them*	0.46	0.50	0.50
You asked someone about how to avoid falls and this helped you*	0.60	0.63	0.63
You looked for information about problems that could be caused after a fall and it was important*	0.53	0.56	0.56
You asked someone to help you avoid falls and this helped you to prevent them*	0.63	0.69	0.70
You were worried about suffering a fall after you almost fell*	0.63	0.73	0.83
After you have almost fallen you have taken some action to prevent a fall	0.90	0.90	0.90
After you have almost fallen you have changed your perception about falls, thinking more often about avoiding them *	0.36	0.36	0.36
Because you are older, your risk of falling is higher compared to younger people	0.90	0.90	0.90
Because you are older, your risk of getting hurt after falling is higher compared to younger people	0.83	0.90	0.90
Falling has the same consequences for a young person and the elderly*	0.73	0.73	0.73
The main way to prevent falls is to "take care of yourself" by avoiding existing obstacles, but not by modifying them*	0.36	0.43	0.43
You understand that your behavior increases the risk of falling	0.80	0.86	0.90
After a certain age, you have modified some behaviors thinking about reducing the risk of falling	0.80	0.86	0.86

You carry out daily activities that increase your risk of falling to maintain your independence**	0.60	0.86	0.86
Objects and spaces related to the domestic environment (residence) increase the risk of older adults to fall**	0.53	0.90	0.83
Objects and spaces related to places outside the residence increase the risk of older adults to fall**	0.56	0.73	0.73
You can take steps to make your home safer and reduce the risk of falling.	0.76	0.83	0.83
It is harder to fall at home than outside, because your home offers less risk**	0.69	0.76	0.76
Changes in the body experienced by the elderly increase the risk of falling over the years.	0.83	0.90	0.90
Regular physical activity improves your physical condition and consequently decreases your risk of falling*	0.90	0.96	0.90
Health problems causes limitations that increase the risk of falling	0.86	0.96	0.96
Falls are caused by several factors that act simultaneously*	0.53	0.69	0.69
Different factors that increase the risk of falls interact with each other and increase the risk of falls in older adults*	0.56	0.76	0.80
VCt (for each category evaluated)	0.71	0.80	0.80
*Excluded questions; **Rewritten questions based on Clarity CVCi (Source: author results, 2017)			

Table 1: Validity coefficient after judges' assessment.

Regarding importance and relevance, the questionnaire presented a VC of 80%, even before the suggested adjustments. According to the literature, we can say that the instrument measures what it proposes to measure [24]. The new version of the questionnaire, with 23 questions, was sent back to the judges for a second evaluation, to confirm the changes made in the items. It is important to note that one of the three judges questioned the use of affirmations and the use of the Likert scale, suggesting that asking questions with dichotomous answers would be easier to the target population. This suggestion was brought to the focus group discussion.

In the implementation of the focus groups, the first topic of discussion was the definition of falls, since there is no consensus in the literature and is often subjective, rooted in a cultural and social understanding [29]. The elderly considered the definition used by the Kellogg group ("An unintentional event that results in the change of position of the individual to a lower level in relation to the initial position, without being an intrinsic determinant factor, such as a stroke or syncope, or an unavoidable accident") [30]. Thus, the definition was changed to the one recommended by the World Health Organization, which defines falls as "an unexpected event in which the individual rests on the floor or on a lower level" [31].

Regarding the items that make up the questionnaire, 10 questions were excluded and a new question elaborated. The excluded questions did not seem to be clear for the target population and/or led older adults to give identical answers to previous questions. For example, the small difference between an item questioning about daily life activities performed and another question about behavior in performing these activities had the same understanding and response. In addition, questions related to the perception of falls acquired by vicarious learning were excluded because the perception was related to the risk of the other person to fall again, but not in relation to themselves.

Moreover, after the development of the focus groups, all affirmations were replaced by questions with dichotomous answers (yes and no) and some of them with a third alternative of answer. This change was made based on a suggestion firstly made by the judges. Then, when questioning the elderly about the use of the Likert scale, many of them stated that they would have difficulties in intermediate grades.

As the last stage of face validity, a last focus group was performed to verify the clarity of the final questionnaire. After conducting this group, only minor changes related to the answers of two questions were modified. The instrument was thus finalized with 14 questions, as presented in Table 1.

Discussion

The elaborated questionnaire went through several stages until achieving the presented version. We emphasize that other analyzes are still necessary to have a final and conclusive version of the survey. Because of this, is important to disseminate this knowledge, so that other professionals can analyze it. The improvement of the questionnaire depends on these contributions [32].

In relation to content validity, the number of judges required for the technique has been quite divergent in the literature [21]. In order to carry out the present analysis, three judges were selected because, according to Pacico [26], at least two judges should be used in content validity, in order to have a comparison of at least two evaluations; however, three judges are recommended to allow tiebreaking. A large number of judges can make the evaluation quite complicated, not necessarily improving the quality of the questions [26]. We chose VC as a measure of content validity because it is the most used measure in health, especially in nursing, to evaluate this type of validity [18]. After observing the results of VC, it was possible to verify that the questionnaire was reduced; of the 36 initial items, 14 were left.

According to Pasquali [33], a larger number of items than expected should be elaborated, because some will be discarded by judges, others will not be understood by the target population or will be eliminated in the analysis [33].

Definition for Fall: "An unexpected event in which the individual rests on the floor or on a lower level"
1. In the last 3 years, have you had fallen? (ss) Yes (s) No (If no, skip to question 3).
2. Have you ever suffered any injury related to a fall? () Yes () No
3. Is prevention of falls in older people as important as preventing other health problems such as high blood pressure, diabetes, and high cholesterol? () Yes (s) No
4. Do you think you can get seriously hurt after a fall? () Yes () No () Sometimes (depends on the fall)
5. Do you think a fall can interfere in the way you carry out your activities? () Yes () No
6. Have you received orientations from health professionals about how to prevent falls? () Yes (s) No (If no, skip to the question 8).
7. Have you put into practice the orientations you have received to prevent falls? () Yes (s) No (s) Some
8. Because you are older you are at higher risk of falling than younger people? () Yes () No
9. Do you perform daily activities even though you know they can increase your risk of falling? () Yes () No () Sometimes
10. Does your home environment have objects and/or spaces that may increase the risk of falling? (s) Yes () No
11. Are there objects and/or spaces on the streets that can increase the risk of falling? () Yes () No
12. To reduce the risk of falling, can you take steps to make your home safer? () Yes () No
13. Your house offers less risk, so are the chances of falling at home lower than the chances of falling outside? (ss) Yes () No
14. Do health problems cause limitations that can increase your risk of falling? () Yes () No (s) Sometimes

Table 1: Questionnaire to assess older adults' perception about fall risks.

All validation steps are quite rigorous, and therefore, tend to reduce considerably the set of items of the questionnaire, since only the best ones are selected [26]. Therefore, Pacico suggests that the initial questionnaire should have a set of items 3 to 5 times greater than what is needed in the final version [26]. Currently, there is a tendency to prioritize instruments with fewer items since researchers often have limited time to conduct data collection and participants may become weary in the application of longer surveys, especially when the target population is older adults [34,35].

For face validity, three focal groups were performed, according to the orientation of Pacico [26]. This author suggests that generally two or three focus groups, with different people, are enough to complete the clarity of the items [26]. After groups were held, questions that presented the highest number of exclusions were related to vicarious learning. When older adults were asked about their perception of falls after a friend, acquaintance, or family member had fallen, the answers were tied to helping the person who fell to avoid a new fall, but not to the perception that they could have the same problem. This can be explained by the fact that many older adults perceive the risk of falls in others, but not in themselves [8,10].

In relation to replacing the Likert scale by dichotomous answers, studies have already observed that the use of this type of scale depends on respondents and their characteristics, such as adequate cognition, involvement and knowledge about the subject. In addition, there is no consensus on the appropriate number of items to be used in the scale, which may hamper its application, since the increased number of items can make the responses more complex, incrementing the possibility for respondents to choose a fast and simplified answer [36,37]. Older adults' participants from the focus groups, who reported difficulties in

graduating the intermediate answers, stated that they would always give the minimum or maximal level of agreement.

The understanding of falling was also taken into account in the focus groups. The use of a simplified definition for falls favors the population's understanding about the problem. It is important to use a definition since the interpretation is subjective and, thus, varies between individuals and researchers [29], and, because of this, can influence the results [36]. It is suggested that a clear definition should be used to facilitate data collection, estimates epidemiological data and conduct surveys [38].

The present research is the beginning of a new proposal to be adopted in the prevention of falls. In addition to suggesting a questionnaire that may help health professionals and researchers to identify older people who perceive falls as a health problem and its risk factors and those who do not, the results also make us reflect on other, more subjective issues. Perhaps the difficulty in preventing falls is associated with a reduced importance to this subjectivity associated with the perception of health risks.

Some limitations can be pointed out. The small number of participants in the second focus group and the use of a convenience sample in the third group can be listed as limitations. As mentioned earlier, this is not a definitive questionnaire since the construction and validation of a new survey can take many years [39]. Therefore, more research is needed to verify fundamental questions about validity and reliability of this research tool.

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