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DEVELOPMENT AND VALIDATION OF THE VIOLENCE RISK ASSESSMENT IN ELDERLY SCALE (VRAES)[1]

Flávia Danielli Martins Lima Correio – Doctoral candidate in Nursing. Brazil
Manuel José Lopes – Coordinating Professor (PhD). University of Évora. Portugal
Tiago Jessé Souza Lima Correio – Professor (PhD). Federal University of Paraíba. Brazil

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ABSTRACT

Objective: the present study aimed to develop and obtain evidence of validity and reliability of the Violence Risk Assessment in Elderly Scale (VRAES).

Method: This is a methodological study with a cross-sectional sample composed by 228 older adults, aged 65 years old or over, residents of three regions of Portugal.

Results: In the factorial analysis, the instrument obtained satisfactory evidence of validity and reliability, resulting in the retention of 21 items that were grouped into four factors: trust/security in close relationships, social isolation, functional dependency and financial security. Cronbach's alpha for the total scale was 0.74. VRAES showed good precision with 0.77 Youden's index and 88% sensitivity and specificity.

Conclusion: VRAES can be a useful tool for identifying older people at risk of violence, assisting the decision making of health professionals. However, it is necessary to further replicate this instrument using larger samples of older adults living in different environments and locations, to provide additional evidence to the factor structure obtained.

Descriptors: Older people abuse; questionnaires; validity of tests.

INTRODUCTION

The world's demographic aging generates several phenomena of great relevance to society in general. Among them, there is the issue of violence against older adults, which has gained attention on the part of public health, health professionals, politicians and researchers. This issue has been addressed by several studies, which have indicated that most of the violence suffered by older adults occurs in the family environment, the main aggressors being children, daughters-in-law, sons-in-law and spouses[1-3]. There is also a strong association between violence against older adults and use, on the part of the family, of alcohol and drugs, history of family violence, mental and psychiatric suffering[4,5].

Many international organizations adopt the broader concept of violence, which is often used as a synonym for abuse and ill-treatment. The World Health Organization[6], for example, defines violence against older adults as "a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust that causes harm or distress to an older person." It is an act that has serious consequences for the health and well-being of older people and that can take many forms: physical, psychological/emotional, sexual, financial, or simply negligence, intentional or unintentional[6].

The evaluation of suspected violence against older adults in a geriatric interdisciplinary evaluation environment could provide greater support to the professionals in the prevention and intervention of cases[7]. However, the few studies in the area of violence against older adults have as consequence the lack of knowledge about the related risk factors and violence markers, which can be identified using the evaluation instruments[7]. In this context, due to the complexity of the phenomenon of violence and the difficulties of health professionals to detect cases, some instruments have been developed to facilitate intervention[8-11], since their existence is essential to help professionals refer the cases to the appropriate follow-up service and for subsequent investigations[12].

In relation to the instruments which directly evaluate violence against older adults, in a review of 81 studies on this theme, 17 instruments were identified, and 6 assess violence also from the perspective of caretakers[7]. These include the Hwalek Sengstock Elder Abuse Screening Test (HS-EAST) and the Elder Abuse Suspicion Index (EASI). EASI was constructed and validated in a primary care setting, to be used by physicians during the screening of patients without cognitive deficit[13], having shown 0.47 sensitivity and 0.75 specificity[11]. However, there is evidence that EASI has low sensitivity and specificity levels for including items with highly variable content, which consists in a limitation of this instrument[12]. In addition, the fact of it being for medical use only limits its use by other professionals who also have skills to assess cases of violence against older adults[12].

As for HS-EAST, it was developed in the United States with the goal of identifying both signs of presence (direct) and suspicion (indirect) of abuse in older adults[9,15]. However, most studies that use instruments to evaluate violence in older adults are limited for presenting the measures without having properly verified their psychometric parameters and predictive validity for subsequent uses[7].

Thus, despite the emphasis given to the importance of the use of instruments for the detection of abuse in older adults[16,17], protocols or instruments that had been subjected to the psychometric validation and adaptation procedures, and that may be universally accepted for the screening or evaluation of domestic violence in this population, were not observed[18]. As stated earlier, the small amount of available measures with appropriate psychometric parameters in the area of violence against older adults hindered the identification of related risk factors7. However, in Portugal, the ABUEL study (Abuse and health among elderly in Europe), which also involved 7 other countries, used a violence evaluation instrument including 52 items that investigate the frequency of exposure to physical, financial, sexual and verbal violence of older adults. Negligence is measured by 13 items which investigate situations where the older adult needed help

and received it. This instrument was used in the present study's validation process, as it obtained good results in the Portuguese population.

In this context, considering the influence of violence against older adults on the quality of life of this population, and given the lack of instruments for its detection that are available in Portuguese and that can also be used by several health professionals, as well as the lack of uniformity in the studies that have already been conducted, this article proposes the development and obtaining of evidence of the validity and accuracy of an instrument for assessment of the risk of violence against older adults, called the Violence Risk Assessment in Elderly Scale (EARVI).

METHOD

Sample

A total of 228 older adults from three towns in the Alentejo Central region (Portugal), namely Vendas Novas, Montemor-o-Novo and Évora, participated in this study. The participants' mean age corresponded to 75.7 years old (SD = 6.95), and most were women (59.2%), married (63.2%), with complete primary education (61%) and retired (82.9%). The majority (50%) reported living with their partner only. For the sample's calculation, a probabilistic sample with 95% confidence level and 6.5% sampling error was considered.

Instruments

The participants answered a questionnaire containing EARVI and two other scales: the Mini Mental State Examination (MMSE), used to evaluate the cognitive ability of the older adults so that only those without cognitive deficits would be included in the research[19], and ABUEL, an instrument for assessing violence against older adults[20]. The development of EARVI was based on procedures recommended by Pasquali[21] for the construction of a scale, consisting of analytical and empirical theoretical procedures, which are described below.

The research was conducted within the standards required by the Declaration of Helsinki and approved by the Regional Health Administration of Alentejo (ARSA) under opinion number ENT-ACES/2013/1372.

Theoretical Procedures

The development of the instrument was based on a bibliographic review of the main risk factors associated with violence against older adults, as well as on studies that address the use of instruments to assess the risk of violence[22-24]. The review was conducted in databases CINAHL, IBECS, PsycInfo, Scielo and Lilacs. After the analysis of the studies that addressed the risk factors associated with violence against older adults[1,25-27], a search and critical analysis of the instruments used to identify abuse and neglect in older people were conducted. WHO's recommendations[28] about the topic were also assessed, to ascertain the main items needed for evaluation of the risk of violence.

With regard to the violence risk factors found in the analyzed studies, functional limitation, specifically difficulty in carrying out the activities of daily living (ADLs), is one of the most often described[26,29-31]. Behavior issues[26,32,33], the older person's health status[29,34] and cognitive problems, in particular, are also described as risk factors[35], as are depression[25,35], loneliness[25] and violence history[27] in the family environment.

With regard to the characteristics of caregivers, overload is one of risk factors that is most associated with violence against older adults[32], since the fact of caregivers/family feeling burdened in relation to the provision of care to the older adult can make them potentially abusive. Additionally, dependency on and/or financial difficulties of caregivers[34], as well as the abuse of alcohol and/or drugs by them[29,34], can also be associated with the risk of violence against older adults.

Thus, it was based on a theoretical search and on instruments Elder Abuse Screening Test[15] and Elder Abuse Suspicion Index (EASI)[11] that the construction of a new instrument was carried out. This instrument specifies the key indicators that can be used by health professionals in the identification of older adults at risk of violence or who have suffered abuse, and in this way facilitate intervention. The instrument proposed here was named the Violence Risk Assessment in Elderly Scale (EARVI), consisting of 21 items (for example: Has anyone ever taken something that belongs to you from you without your consent?), the participants having been asked to report how often they experience the situations described, using a 4-point scale ranging from "never" to "always".

Empirical procedures

To evaluate the contents, the initial instrument was assessed by three experts for a qualitative and semantic analysis of the items. The participants evaluated the items using a Likert scale with answers ranging from "not understandable" to "understandable". A minimum 80% agreement between the experts, indicating the item as understandable,

was the criterion adopted for the item's retention[36]. The items classified as "understandable, but needs changes" were considered and discussed with the experts, and in this way, 21 items were obtained.

Then, a pre-test was applied to 25 participants aged 65 years old or over, to check the suitability of the instrument and semantically analyze it, i.e., verify the perception and understanding of the older adults in relation to each item. In this context, it was noted that all items were understandable for people aged 65 years old or over with no cognitive deficits (ascertained via the Mini Mental State Examination[19]). Possible doubts and/or confusing or ambiguous expressions were discussed with the participants. All participants claimed to understand the items and answered the questionnaire in 10 to 15 minutes.

Analytical procedures

The data obtained in the previous phase were subjected to statistical analysis to find evidence of the instrument's factorial validity. Exploratory factorial analysis was used to identify the major components of the Violence Risk Assessment in Elderly Scale. To assess the sample's adequacy in relation to the factorial analysis, the Kaiser-Meyer-Olkin test (KMO) and Bartlett's sphericity test were used. The extraction method used was the principal components'.

As criterion for retention of the components, eigenvalue equal to or greater than 1 (Kaiser criterion), Horn's parallel analysis[37] and the interpretability of the components extracted[38] were adopted. The rotation method used was the varimax rotation method. A value equal to or greater than 0.30 was adopted as cutoff point for the factorial loads[37]. To assess the internal consistency of the measure, Cronbach's alpha, values above 0.74 being considered as suitable[40], and the homogeneity index (mean inter-item correlation), admitting values greater than or equal to 0.20[41], were used.

In addition, the metric properties of the scale were evaluated based on its sensitivity and specificity for several possible cut-off points, considering sensitivity and specificity pairs for each point. An analysis of the data via comparison with the results obtained in the application, to the same participants, of the Elder Abuse: A multinational prevalence survey (ABUEL), that identifies the older adults who effectively suffered or suffer violence, making it possible to detect the relationship between risk factors and the violence suffered, was conducted. To better define the cut-off points, the receiver operator curve (ROC) was used, the effectiveness of the instrument having been evaluated based on the area under the curve (AUC) and on Youden's Index, with 95% confidence interval. It is considered that the AUC has a range between 0.5 and 1.0 and its adjustment is

greater the higher its value. Youden's index (J) is equal to sensitivity plus specificity minus one. This index has a range between 0 and 1, with values close to 1 indicating perfect accuracy and 0 corresponding to the accuracy obtained at random[42].

RESULTS

The initial statistics for the appropriateness of the factorial analysis, KMO = 0.74, and Bartlett's sphericity test, χ^2 (210) = 1049.54 p < 0.001, were considered satisfactory, allowing the researchers to carry on with the analyses. An initial analysis indicated the extraction of six components with eigenvalues greater than 1, explaining 55.91% of the variation. However, Horn's parallel analysis indicated the extraction of four components which showed eigenvalues greater than those randomly generated. A new factorial analysis was then performed, fixating the extraction of four components which together explained 44.84% of the variation. The eigenvalues and the variation explained by each component are presented in Table 1.

Table 1 - Total explained variation and reliability coefficient for each component.

Components*	Eigenvalue	Total Explained Variation Percentage	Accumulated Explained Variation	Alpha (α)
1	3,87	18,45	18,45	0,79
2	2,47	11,77	30,22	0,70
3	1,62	7,69	37,91	0,536
4	1,46	6,93	44,84	0,46

*Component: 1 – Trust/Security in close relationships. 2 – Social isolation; 3 – Functional dependency; 4 – Financial security.

All items showed factorial loads above the cutoff point, ranging from 0.37 (Component 4) and 0.82 (Component 1). Items 6, 14 and 18 showed factorial loads greater than 0.30 in more than one factor, but we chose to keep these items because their factorial loads were considerably higher in the factors in which they were retained.

Component 1 included 8 items, with factorial loads ranging from 0.82 and 0.44, related to the relationship of trust and security of older adults with the people close to them, having been named Trust/Security in close relationships. Component 2 included 5 items, with factorial loads ranging between 0.76 and 0.61, related to isolation, having been named Social isolation. Component 3 included 4 items, with factorial loads ranging between 0.79 and 0.42, related to the need for help and care, having been named Functional dependency. Finally, component 4 included 4 items, with factorial loads ranging from 0.73 to 0.37, related to aspects of dysfunctional family relationships associated with financial situation, having been named Financial security. The factorial loads and their reliability indexes are presented in Table 2.

Table 2 - Items retained in each component extracted after varimax rotation.

Itens	Components			
	1	2	3	4
20. Are you scared of someone in your family? How often?	**0,82**	-0,03	0,01	-0,05
21. Have you been feeling upset because someone close to you called you names or talked to you in a way that made you feel embarrassed or threatened? How often?	**0,68**	0,13	-0,01	-0,08
15. Do you have a bad relationship with someone in your family? How often?	**0,66**	-0,07	0,06	0,22
3. Does someone in your family make you uncomfortable? How often?	**0,65**	-0,03	0,08	0,25
14. Has someone close to you tried to hurt you recently? How often?	**0,64**	0,10	-0,02	0,34
11. Has anyone ever forced you to have sex against your will? How often?	**0,55**	0,17	-0,16	-0,24
18. Has anyone ever slapped or pushed you? How often?	**0,46**	0,14	-0,14	0,35
4. Do you trust most people in your family? How often?	**-0,44**	-0,06	-0,10	-0,29
2. How often do you feel lonely?	0,03	**0,76**	0,25	-0,08
17. Is there someone who worries about you? How often?	-0,13	**-0,68**	0,13	-0,22
10. Is there someone who helps you when you need it? How often?	-0,06	**-0,63**	0,18	-0,14
6. How often do you feel sad?	0,11	**0,62**	0,33	0,05
7. Do you feel like nobody wants to be with you? How often?	-0,01	**0,61**	0,11	-0,19
1. How often do you need help to perform your activities of daily living (e.g., take medication, prepare meals, go shopping)?	-0,01	0,19	**0,79**	0,09
12. Do you feel like you give someone a lot of work? How often?	-0,02	0,16	**0,75**	0,09
16. Is there someone in your family who forces you to stay in bed or who tells you that you are sick, even when you know you are not? How often?	-0,01	0,01	**0,44**	-0,07
9. Is there someone who tells you that you give them a lot of work? How often?	0,02	-0,09	**0,42**	-0,06
19. Has someone close to you ever tried asking you for money or material goods? How often?	0,04	0,10	0,08	**0,73**
5. Is there anyone in your family who drinks a lot? How often?	0,10	0,04	-0,13	**0,60**
8. Are you helping someone financially? How often?	0,08	-0,14	0,04	**0,45**
13. Has anyone ever taken something that belongs to you from you without your consent? How often?	0,28	0,22	-0,14	**0,37**
Cronbach's Alpha	0,79	0,70	0,53	0,46
Mean inter-item correlation	0,32	0,32	0,22	0,17

Note: *1 – Trust/Security in close relationships. 2 – Social isolation; 3 – Functional dependency; 4 – Financial security. The factorial loads in bold represent the items retained in each component.

At least one of the reliability indexes of components 1, 2 and 3 (Cronbach's alpha and mean inter-item correlation) were within those recommended in the literature, although the alpha of components 3 and 4 was below 0.70. Component 4 showed an alpha value below the recommended; however, its mean inter-item correlation index is close to the 0.20 cutoff point. The reliability index of the scale as a whole was also calculated, and the resulting Cronbach's alpha was 0.74.

ROC curve analysis was subsequently performed, having indicated a critical value greater than 8 as cutoff point for the evaluation of risk of violence against older adults (Figure 1), using as gold standard the application of an instrument for assessment of the violence suffered by older people, the Elder Abuse: A multinational prevalence survey (ABUEL).

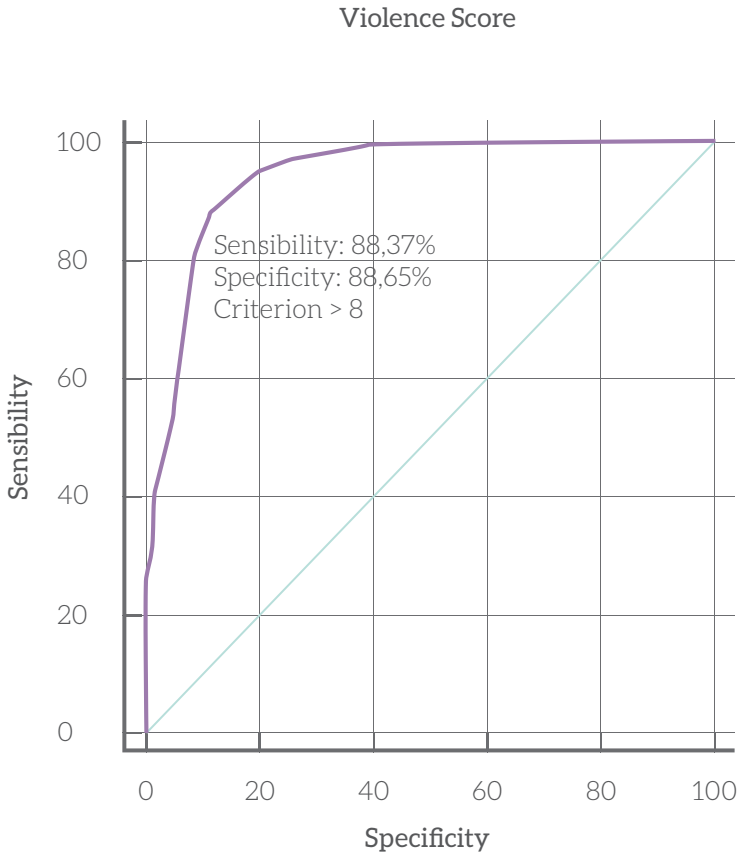

Figure 1 – *Elder Abuse: A multinational prevalence survey* (ABUEL).

The area under the curve was 0.944 ($p < 0.001$) with 88% sensitivity and 88% specificity for the cutoff point greater than 8 (Table 3). Youden's index was 0.77, demonstrating good accuracy of the instrument. The sensitivity, specificity and Youden's index values are presented in Table 3.

Table 3 - Estimated sensitivity, specificity and Youden's index values of different cut-off points for the questionnaire of evaluation of the risk of violence against older adults.

Score	Sensitivity (%)	Specificity (%)	Youden's Index
>5	100,00	59,46	0,59
>6	99,67	74,05	0,74
>7	95,35	80,00	0,75
>8	88,37	88,65	0,77
>9	81,40	91,35	0,73
>10	65,12	93,51	0,59
>11	51,16	95,68	0,46

DISCUSSION

The results obtained indicate that EARVI showed satisfactory initial evidence of factorial validity and reliability and can be used by professionals in the field of health and social assistance for the identification of risk factors related to violence against older adults.

In relation to the number of factors obtained, we chose to follow Horn's parallel analysis method[37], which has been recommended in the literature[38], resulting in the extraction of four components. The results showed that the four components extracted could be properly interpreted. The components found are related to circumstances considered to be associated with the presence of ill-treatment, such as social isolation. As found in another study, the identification of circumstances associated with abuse should be the focus in the development of an instrument, as they may be present before the abuse occurs[15]. In this way, the obtained components were named as: Trust/Security in close relationships (Component 1), Social isolation (Component 2), Functional dependency (Component 3) and Financial security (Component 4).

Regarding the first component, Trust/Security in close relationships, the sense of trust and security of older adults in relation to those close to them results from the type of relationship that exists between them and those whom they live with. A Korean study, for example, found that older people who claim to have a "very bad" relationship with the members of their family are more likely to be abused, compared to those who reported having a good relationship with them[43]. In this way, it is possible that conflicting relationships between older adults and their families occur as a result of cohabitation, since living in the same household can both provide more exchanges in the relationships between family members, stimulating solidarity and help, and also generate conflicts, leading to domestic abuse[44].

In this context, the forms of violence against the older adult can result from the conflict of interests between generations. The fact of older adults being considered, in society, as unproductive subjects, dependent in many ways and obsolete from a cultural point of view (for not keeping up with the new forms of attitude and worldview), excludes and marginalizes them, leading those who are younger to adopt a negative stance in relation to this population[45].

With regard to the characteristics of functional dependency, found in the second component, several previous investigations confirmed its relationship with violence against older adults[46,47]. One explanation for this association is that the older adults' physical decline may decrease their ability to defend themselves or escape from a potentially abusive situation[48]. As found in the second component, items related to the older adults' dependency in relation to other people to carry out activities of daily living proved to be important in the evaluation of violence. In this context, older people who suffer from some pathological process that causes them to be functionally dependent become vulnerable to situations of ill-treatment committed by family members, caregivers or those close to them.

The third component included items related to social isolation. Isolation, in conjunction with feelings of loneliness, can reflect even more the vulnerability and dependency of older adults, which may give rise to conditions that contribute significantly to the risk of abuse[49]. As found in the literature, social isolation can be associated specifically with psychological abuse and neglect, demonstrating that the lack of support, especially from a trusted person, is a risk factor for violence against older adults[35]. In this context, the older adults who do not socialize regularly are more likely to be victims of violence than those who socialize in a consistent way with friends and/or family members[50].

With regard to the latter component, some studies have indicated that financial exploitation is one of the most common forms of abuse committed against older adults, being related to other forms of violence[51]. It is an upsetting experience that can result in a daily life characterized by fear, lack of confidence and, in the beginning, acute and chronic anxiety[52]. In this way, the fourth component found has items related to financial exploitation, which is often committed by family members who financially depend on the older adults and cohabit with them.

In addition, the fact of the item that addresses alcohol dependence on the part of the abuser being found in this component stood out. However, some studies show that certain features of the abuser can contribute to financial exploitation, such as abuse of alcohol and/or drugs, mental health, gambling addiction and financial problems[53]. Thus, the early detection of financial exploitation is an opportunity for intervention to protect the financial assets of the victim and possibly prevent physical damage and loss of independence[54].

With regard to the scale's reliability, all the factors showed values equal to or above the recommended for at least one of the indicators, Cronbach's alpha or the mean inter-item correlation. However, two factors showed alpha values below the recommended. Despite the extensive scientific literature on the applications of Cronbach's alpha coefficient in the different fields of knowledge, there is yet no consensus among researchers about this coefficient's value in the interpretation of a questionnaire's reliability[55]. That is, no minimum limit has been set; a generally accepted inferior limit for α is 0.70, although it can decrease to 0.60 in exploratory researches[56,57]. In this way, the reliability estimated based on Cronbach's alpha (α = 0.74) for the instrument composed of 21 items is within the limits proposed as criteria for exploratory studies. Furthermore, Cronbach's alpha tends to be a conservative estimate of a measure's reliability, as the real reliability estimate has low probability of being smaller and high probability of being greater than the reported value[58]. In addition, the characteristics of the construct and of the sample employed may also affect it, as phenomena that show little variability of response tend to exhibit values under the commonly recommended[59].

Moreover, by comparing the factorial structure of the scale proposed in this work (EARVI) with others already adapted to Portuguese, such as HS-EAST[58], it may be noted that EARVI's factors have better indicators of internal consistency. In the HS-EAST scale's adaptation to Brazil, three factors (potential abuse, violations of rights and characteristics of vulnerability) obtained Cronbach's alpha values corresponding to 0.53, 0.49 and 0.26, respectively[60]. For the entire scale, the alpha obtained was 0.64[60]. The indicators of internal consistency shown by EARVI, both for the scale as a whole and for

the factors, were superior to the reliability rates found in studies that used HS-EAST[9,60] and within the acceptable limit for the analysis of a measure's reliability.

The simultaneous application of EARVI, which assesses situations of risk of violence, and ABUEL, which identifies older adults who suffer violence, made the analysis of EARVI's discriminant capacity possible, allowing the identification of a cutoff point in the scale that indicates greater propensity of older people to suffer violence. The area under the ROC curve has been one of the most widely used indexes to summarize the curve's "quality"[61,62]. That is, the area under the ROC curve is a measure of the instrument's performance, and the value obtained in the analysis (0.934; $p < 0.001$) indicates a satisfactory performance. In this context, the sensitivity and specificity values show that 88% of individuals will be identified as true positives (at risk of violence) and 88% will be identified as true negatives (not at risk of violence). In comparison with the Elder Abuse Suspicion Index (EASI), for which sensitivity was 0.47 and specificity was 0.7514, a better result was obtained. Therefore, these data indicate that EARVI also features positive criterion validity[63], seeing as, by identifying the factors of risk of violence against older people, it can accurately predict (88%) which older people suffer violence and which do not.

Most existing screening tools have adequate sensitivity, but low specificity[10,11,64]. In case of low specificity, there is a substantial risk of identifying false positives for abuse[23]; that is, the analysis may highlight a considerable number of individuals suspected of suffering abuse and considered to be at high risk, when in fact, they are not suffering any abuse. As a result, professionals, protection services and the older adults and their families may be subjected to discomfort and stress in the follow-up of misclassified cases. On the other hand, in instruments that have shown reasonable sensitivity, the risk of a false negative, that is, of not identifying a person who actually suffers violence, is also possible. This can result in the professional failing to consider the possibility of violence in subsequent meetings[23].

The Violence Risk Assessment in Elderly Scale (EARVI) showed good sensitivity and specificity, which facilitates the proper classification of individuals as suffering risk of abuse or not. However, in a complimentary way, the professionals must work with a multidisciplinary team to obtain further information about the older adult, for the better identification of individuals that require monitoring and intervention.

FINAL CONSIDERATIONS

The Violence Risk Assessment in Elderly Scale (EARVI) showed satisfactory initial psychometric evidence of factorial validity, criterion and internal consistency, since its reliability index was within the expected value and 4 factors had items with acceptable factorials loads. In addition, it showed good sensitivity and specificity, facilitating the correct classification of individuals as suffering risk of abuse or not, indicating the scale's validity of criterion. Despite the results obtained, it is necessary that the scale's factorial structure is tested in larger samples of older adults featuring contexts and localities with greater diversity of participants to replicate the results observed here, using a confirmatory approach to verify whether the pattern of factorials loads and number of factors persist. Other studies that asses the scale's validity and accuracy parameters in a more extensive manner are also necessary, testing, for example, its convergent and discriminant validity with other measures related to this theme.

However, in view of the values obtained, the version of the instrument for assessing the risk of violence against older adults presented here can be applied to those who have no cognitive deficit. Its use is also facilitated due to it being a short instrument that is easy to apply. In addition, given the items' clarity and/or objectivity, it may be applied to older adults with various education levels.

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Correspondence: fdmlima@gmail.com