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Validation of the Geriatric Anxiety Inventory in Chilean older people

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ABSTRACT

Objective: Currently in Chile there is a lack of validated tools for measuring anxiety in the elderly population. Considering this, the purpose of this study was to validate the Geriatric Anxiety Inventory (GAI) in the country.
Method: An analysis of the psychometric properties of the GAI was carried out, using a non-clinical sample of 301 older adults in the Metropolitan and Valparaíso regions of Chile. Older people were asked about anxiety, rumination, depression, well-being and sociodemographic data.
Results: An excellent internal reliability was obtained with a Cronbach score of 0.931. An adequate convergent validity was observed with the Depression scales (CES-D) (Rho = 0.549, $p < .01$), Rumination (RSS) (Rho = 0.618; $p < 0.01$) and Experiential avoiding (Rho = 0.485; $p < 0.01$). On the other hand, the discriminant validity of the psychological well-being scale presented a negative correlation of Rho = -0.699 ($p < 0.01$). Finally, and Exploratory Factor Analysis was made, revealing a one-dimensional model of the instrument.
Conclusion: The Geriatric Anxiety Inventory has very good psychometric properties measuring anxiety in elderly people, being an adequate instrument for the screening of anxiety on this population.

1. Introduction

Worldwide, it is estimated that the prevalence of anxiety disorders reaches 3.8% in older adults (World Health Organization, 2017). In Chile, there are still no official figures about anxiety disorders in the elderly; however, it is an emerging challenge if we consider the significant increase in the population in this age group. It is estimated that by 2050 Chilean people over 60 will double their number, reaching 32.9% of the population (Ministerio de Planificación [MIDEPLAN], 2015).

Anxiety disorders are common in the elderly, along with depression and dementia, presenting with a high comorbidity (World Health Organization, 2017). Anxiety in older adults has been related to greater deterioration in functionality, aggravation of other neuropsychiatric diseases, an increased burden of disease and worse results in several health treatments (Pachana & Byrne, 2012). Therefore, it is essential to identify symptoms of anxiety in this age group in order to provide timely and adequate treatment.

Currently in Chile, there is no validated psychometric instrument to assess anxiety in older adults. At present, the Chilean versions of State-Trait Anxiety Inventory (STAI) and the Abbreviated Scales of Depression, Anxiety and Stress (DASS - 21), validated in a sample of university participants, are available (Antúnez & Vinet, 2012). However, it is important to use an instrument designed to measure anxiety which considers the particular needs of old age. The General Anxiety Inventory (GAI), has been validated and translated into multiple countries with good results. It takes into account the particularities of the elderly, for example, it has low emphasis on somatic symptoms related to anxiety because older people usually have comorbidities that can be confused with these sensations. There is also a cut-off score related to groups of seniors, the possibilities of response are dichotomous and with direct scores to avoid confusion (Johnco, Knight, Tadic, & Wuthrich, 2015; Therrien-Poirier, 2013).

Taking into account the evidence mentioned, the main aim of this work was to determine the psychometric properties of the GAI in Chilean elderly population.

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2. Materials and methods

2.1. Participants

The sample consisted of 301 community-dwelling elderly people, over 60 years, mostly attending social recreational centers for older adults in the Valparaíso and the Metropolitan Region of Chile. Either at each center or at participant´s home, informed consent was sought and instruments were administered. The evaluators assisted the participants by answering all possible doubts and providing support during the process. The evaluation time was approximately one hour. This study was part of an international project titled “Psychological impact of life events on older people vs. university students well-being: a cross-cultural study with a Spanish and Chilean sample” which was approved by the Research Ethics Committee of Francisco de Vitoria University, Madrid, Spain.

2.2. Instruments

2.2.1. Anxiety

Geriatric Anxiety Inventory (GAI): This tool measures anxiety in elderly population. It comprises 20 items with dichotomous type of answers (Yes / No), for example: "I cannot stop worrying about things, even those that are not important". In the original version, this inventory showed excellent psychometric properties in both, elderly general population ($\alpha = 0.91$) and clinical population ($\alpha = 0.93$) (Pachana, Byrne, Siddle, & Koloski, 2007). In this study, the Spanish version of the GAI was used. This version had high internal consistency ($\alpha = 0.91$) (Márquez-González, Losada, Fernández-Fernández, & Pachana, 2012).

2.2.2. Rumination

Ruminative Responses Scale (RSS): This instrument measures rumination levels, which is defined as negative and reiterative thoughts or feelings centered on their symptoms or on the causes of their sadness or anguish (for example: "I think that I feel so sad "). It is composed by ten items scored from 0″never" to 3 “always" (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Internal consistency of the Spanish version was 0.86 (Extremera & Fernández-Berrocal, 2006).

2.2.3. Depression

Center for Epidemiological Studies (CES-D): This instrument measures the frequency of depressive symptoms during the last week, through 20 items (for example: "I felt sad"). It has a Likert response format from 0 “rarely or never” to 3 “all the time” (Losada et al., 2012; Radloff, 1977). Good psychometric properties have been obtained in Spanish elderly population, with a Cronbach´s alpha score of 0.9 (Soler et al., 1997).

2.2.4. Experiential avoiding

The Acceptance and Action Questionnaire (AAQ): It is a 9 items questionnaire with a Likert scale, where people is asked about their level of acceptance of several distressing psychological situations. Higher scores are related with less acceptation which means a more use of experiential avoiding. The Spanish version used in this study showed a good internal consistency (0.74) and stability over time (test-retest 0.71) (Barraca-Mairal, 2004).

2.2.5. Psychological well-being

Psychological Well-being Scale: It contains 39 items ordered by 6 subscales: self-acceptance, autonomy, positive relationships with other people, control of the environment, purpose in life and personal growth. Responses score from 0 “never” to 5 “Always” (van Dierendonck, 2004). The Spanish version showed a good internal consistency, with values of Cronbach's α greater than or equal to 0.70 (Díaz et al., 2006).

2.3. Statistical analyses

Analyses were performed using the software IBM SPSS version 24.0. Assessment of normality (Kolmogorov-Smirnov test) showed a non-normal distribution of GAI total score ($D(301) = .146$, $p < .05$). For this reason, non-parametric test were used to assess the psychometric properties of the instrument. For internal reliability, Cronbach's alpha coefficient was used and for convergent and divergent validity, Spearman correlation coefficient with levels of significance $p < .01$ and $p < .05$ were used. Finally, an Exploratory Factor Analysis (EFA) was performed, using the extraction method of Principal Axis Factoring which is recommended for non-normal data distribution (Costello & Osborne, 2005). An oblique rotation and a cut-off point of the coefficients of 0.4 were considered (Field, 2009).

3. Results

3.1. Characteristics of the participants

Three-hundred and one older persons (72.1% women) from the regions of Valparaíso (79.7%) and Santiago (20.3%) participated in the study. All participants were over 60 years old, with an average of 72.2 years (SD = 7.9). The average years of formal education was 11.7 (SD = 4.9). Forty-two percent were married, widowed (27.6%), single (15%), separated (7.3%) and divorced (6.6%). In relation to their socioeconomic condition, 64.1% considered it favorable and 33.9% insufficient to cover expenses and needs. Although a high proportion of older people (74.4%) reported having a diagnosed disease: 38.7% for hypertension and 40.9% for other diseases, many of them consider their health as normal (44.2%) or good (31.2%) (Table 1).

Table 1
Sociodemographic characteristics of the participants (N = 301).

Item	Category	Frequency	%
Sex	Female	217	7.1
	Male	84	27.9
Age	60-69 years	118	39.2
	70-79 years	127	42.2
	> 80 years	56	18.6
Marital Status	Married	127	42.2
	Widower	83	27.6
	Single	45	15
	Divorced	20	6.6
	Separated	22	7.3
	N/R	4	1.3
Economic Condition	Sufficient	193	64.1
	Insufficient	102	33.9
	N/R	6	2
Quality of Health	Very Good	19	6.3
	Good	94	31.2
	Normal	133	44.2
	Bad	49	16.3
	Very Bad	2	0.7
	N/R	4	1.3
Presence disease	Yes	224	74.4
	No	73	24.3
	N/R	4	1.3
N° of people with whom he lives	Alone	49	16.3
	1-3	170	56.5
	> 4	82	27.2
Attendance to health control	Regular	194	64.5
	Irregular	55	18.3
	N/R	52	17.3
Health System	Public	205	68.1
	Private	43	14.3
	N/R	53	17.6

N/R = No Response.

3.2. Face validity

In order to check on cultural and linguistic differences, the items of the Spanish version were reviewed by a group of independent older adults. According to that, the following items were modified: item 9″I can't help worrying about even trivial things" was changed to "I can't help worrying about things, even those which are not important"; item 16″I think that my worries interfere with my life" was modified to "I think that my worries complicate my life"; item 19″I miss out things because I worry too much" was changed to "I don't do things because I worry too much". Thus, items kept their original meaning and they were understood by Chilean older people.

3.3. Reliability: internal consistency

The Chilean version of the GAI obtained an Alpha of Cronbach equal to 0.93, demonstrating an excellent internal consistency.

3.4. Construct validity

3.4.1. Convergent and divergent

The anxiety inventory was positively related to depressive symptomatology (Rho = 0.549; $p < 0.01$), rumination (Rho = 0.618; $p < 0.01$) and experiential avoiding (Rho = 0.485; $p < 0.01$), showing good convergent validity. Furthermore, a negative correlation was observed with the psychological well-being scale (Rho = - 0.469, $p < 0.01$), which shows adequate divergent validity.

3.4.2. Exploratory factor analysis

The Kaiser-Meyer-Olkin (KMO) test, for sampling adequacy, was 0.936, indicating an adequate sample size to perform a factor analysis. Bartlett's Sphericity test was significant ($p < 0.01$), showing multicollinearity among the items and therefore allowing a factor analysis to be carried out. The first analysis was done with non-a priori grouping of the factors, with an oblique rotation, where 3 components were identified with eigenvalues greater than 1, of which the first eigenvalue equal to 8.7 explained 43.6%, the second of 1.2 explained 6.1% and the third factor 1.1 explained 5.4% of the variance. The "break" point on the scree plot showed clearly that one factor should be extracted (Fig. 1).

Table 2
Exploratory Factor Analysis: Principal Axis Factoring.

GAI Items	Factor I
5. I often cannot enjoy things because of my worries	.7854
10. I often feel nervous	.739
17. My worries often overwhelm me	.722
16. I think that my worries complicate my life	.712
1. I worry a lot of the time	.712
13. I think of myself as a nervous person	.698
11. My own thoughts often make me anxious	.674
9. I can't help worrying about things, even those which are not important	.654
4. I find it hard to relax	.650
8. I think of myself as a worrier	.645
19. I don't do things because I worry too much	.643
20. I often feel upset	.629
12. I get an upset stomach due to my worrying	.618
15. I often feel shaky inside	.601
3. I often feel jumpy	.597
18. I sometimes feel a great knot in my stomach	.591
14. I always anticipate the worst will happen	.521
2. I find it difficult to make a decision	.516
6. Little things bother me a lot	.513
7. I often feel like I have butterflies in my stomach	.504

A second analysis, with a fixed extraction of one factor, resulted in 20 items with loadings greater than 0.5 (Table 2). This result reinforced the unidimensionality of the instrument.

4. Discussion

The main aim of this research was to determine the psychometric properties of the Geriatric Anxiety Inventory in Chilean elderly people living in the community. The importance of carrying out the validation of the Geriatric Anxiety Inventory (GAI) relies in the creation of better opportunities for early diagnosis and epidemiological studies related to anxiety in Chilean elderly population.

Internal consistency in this study was quite high and consistent with previous studies, such as the Spanish, Portuguese, Canadian and Australian versions (Hooper, Coughlan, & Mullen, 2008; Johnco et al., 2015; Márquez-González et al., 2012; Ribeiro, Paúlac, Simoes, & Firmino, 2011). Regarding the convergent and divergent validity, there

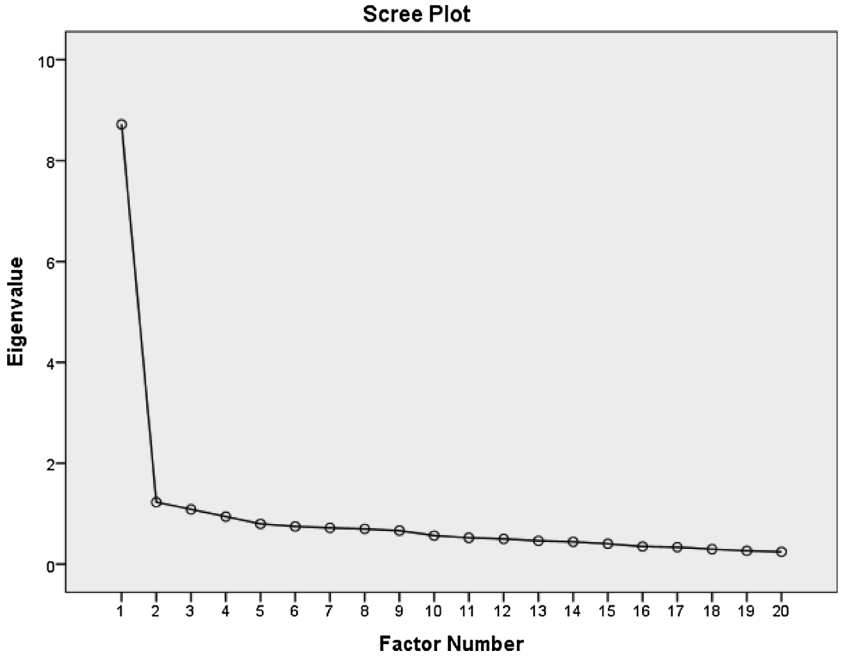

Fig. 1. Exploratory Factor Analysis Scree Plot.

are certain concepts in common with previous studies, for example, the comparison with depression scales. There is controversy regarding the use of depression scales as a reference for convergence. On one hand, it is advisable to use depression scales due to the high comorbidity between depression and anxiety, on the other hand, there is lack of specificity in not separating the phenomenon of anxiety from depression, in which some symptoms can overlap. Beyond this debate, most previous investigations have considered some scale of depression in order to validate the convergence between them (Champagne, Landreville, Gosselin, & Carmichael, 2018; Diefenbach, Bragdon, & Blank, 2014). The present study included, in addition to depression, both, a measure of rumination (which originally was studied more closely with depression but lately has expanded to a sense of discomfort across other diagnoses, such as anxiety) (Diefenbach et al., 2014, Drost, van der Does, van Hemert, Penninx, & Spinhoven, 2014) and a scale about experiential avoiding (which previously has been found related to anxiety symptoms) (Miranda-Castillo et al., 2018; Roberts, Merrick, Fletcher, & Furness, 2017) finding good convergent validity.

Regarding the factorial structure analysis, literature show diversity of results found by previous studies on the dimensions of the GAI. Consistent with the present investigation, the original and the Canadian version show the one-dimensionality of the scale (Champagne et al., 2018; Pachana et al., 2007). However, the Chinese and Spanish validation disagree with this, considering the GAI as a three-factor instrument, including a cognitive dimension of the symptoms, the exaltation related to anxious symptoms and somatic symptoms (Márquez-González et al., 2012; Yan, Xin, Wang, & Tang, 2014). There is also a study that identified four factors in the population of older Americans (Diefenbach et al., 2014). However, these mentioned studies, showed also that higher factor loadings, higher explained variance and most of the items of the instrument, were markedly contained in only one of the factors found.

Champagne et al. (2018) pointed out that the one-dimensionality in an anxious phenomenon draws attention, considering the different areas affected (cognitive, behavioral and somatic) (Champagne et al., 2018). However, in order to avoid confusion with older people comorbidities, the GAI minimize the emphasis on somatic symptoms of anxiety, therefore, it is not surprising that a somatic factor did not emerge.

Molde et al. (2017) pointed out that different factor structures observed in several studies might be the result of different reasons, such as, cultural issues, linguistic aspects, sample characteristics, etc. The authors performed a bifactor analysis in order to test the unidimensionality of the GAI. It was found that, despite the fact that some specific factors are included in the tool ("worry", "somatic symptoms" and "worrying about trivial things"), the GAI is essentially a unidimensional measure. Thus, the authors recommend to use an interval sum score across all items.

It would be relevant to continue investigating the structure of the GAI in different samples, clinical, non-clinical and among other cultures. For example, a second analysis of the Spanish population confirmed the results of the original Spanish version of the three-dimensional factorial structure with a large sample ($n > 600$), which could be replicated in other populations to clarify where factorial differences come from (Mababu Mukiur & Ruiz Sánchez, 2016).

Cultural aspects play an important role in validation of instruments. For example, in the original Spanish version, the difficulty of translating certain items from the original English version, especially those involving somatic sensations. In addition, despite using the same Spanish language, the present Chilean version had to be modified in three items, allowing its semantic validity. In the French-Canadian validation, the item related to stomach discomfort and anxiety had very low correlation with other items and it was questioned whether this particular population did not associate an upset stomach with anxiety.

One of the limitations of this study was to consider only older people living in the community who were mostly engaged in social centers. However, participants included people from different cities in Chile and sample size was adequate to perform the analyses. It is suggested that future research includes older people from clinical settings in order to increase the validation and use of this instrument. In addition, a confirmatory factor analysis of the extracted one-dimensional model will add to the validity of the tool.

5. Conclusion

The Geriatric Anxiety Inventory has very good psychometric properties for evaluating anxiety in elderly people, being a useful and adequate instrument for the screening of anxiety in the Chilean population. This is considered a first step to increase, improve, develop and renew explorations and research of anxiety in Chilean older people. Finally, as mentioned previously, an important new goal would be to expand this study to clinical samples and continue future research on this subject.

Declarations of Interest

None.

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