**Validation of the Geriatric Anxiety Inventory in Chilean older people.**


**Running title:** Chilean Validation of Geriatric Anxiety Inventory

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**Word Count:**

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**Abstract:**

**Objective:** Currently in Chile there are no 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.

**Result:** 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.

**Keywords**: anxiety, elderly, reliability and validity

**Key-points:**

- There is no validated instrument to measure anxiety in older adults in Chile.

- The Geriatric Anxiety Inventory was validated in Chilean older people showing very good psychometric properties: good internal consistency, convergent and divergent validity and a factor structure of one dimension.

- Anxiety score was directly related with rumination, experiential avoidance and depression, and negatively related with well-being.

- The Geriatric Anxiety Inventory (GAI) is a useful and adequate instrument for the screening of anxiety, allowing better opportunities for early diagnosis and epidemiological studies related to anxiety in Chilean elderly population.

**INTRODUCTION**

Worldwide, it is estimated that the prevalence of anxiety disorders reaches 3.8% in older adults[1]. 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[2].

Anxiety disorders are among the most prevalent psychiatric disorders in the elderly, along with depression and dementia, presenting with a high comorbidity[3]. 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[4]. 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[5,6]. 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[7,8].

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.

## MATERIALS AND METHODS

### 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 international project was approved by the Research Ethics Committee of Francisco de Vitoria University, Madrid, Spain.

### Instruments

**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 ($\alpha = 0.93$)[9]. The Spanish version also had high internal consistency ($\alpha = 0.91$)[10].

**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"[11]. Internal consistency of the Spanish version was 0.86[12].

**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" [13,14]. Good psychometric properties have been obtained in Spanish elderly population, with a Cronbach´s alpha score of 0.9[15].

**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) [16].

**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"[17]. The Spanish version showed a good internal consistency, with values of Cronbach's α greater than or equal to 0.70[18].

**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 [19]. An oblique rotation and a cut-off point of the coefficients of 0.4 were considered[20].

## RESULTS

### 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).

INSERT TABLE 1 HERE

**Face Validity**

All the items were reviewed by a group of independent older adults and by the research team. 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".

**Reliability: internal consistency**

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

**Construct validity:**

**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 = - .469, $p < 0.01$), which shows adequate divergent validity.

**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 (Figure 1).

INSERT FIGURE 1 HERE

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.

INSERT TABLE 2 HERE

**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 [5,8,10,21-24]. Regarding the convergent and divergent validity, there 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[22,25]. 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[25-27]) and a scale about experiential avoiding (which previously has been found related to anxiety symptoms [28-30]) 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[9,22]. 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[10,31]. There is also a study that identified four factors in the population of older Americans[25]. 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, Landreville, Gosselin, Carmichael [22] pointed out that the one-dimensionality in an anxious phenomenon draws attention, considering the different areas affected (cognitive, behavioral and somatic)[22]. 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.

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[23].

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.

**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.

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**TABLES**

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

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

N/R= No Response

**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 |

Figure 1. Exploratory Factor Analysis Scree Plot