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Testing the Psychometric Properties of the Geriatric Anxiety Scale in a Sample of Older Adults in Turkey

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ABSTRACT

Anxiety is a prevalent illness among older adults, and it should be assessed using psychometrically robust diagnostic tools owing to the fact that physical symptoms suppress geriatric anxiety. It is challenging to assess anxiety in older people due to variations in worries, such as older adults being more concerned about their lives and complaining of decreased arousal. The Geriatric Anxiety Inventory (GAI) is a new, well-known, and adaptable measure created to evaluate anxiety in the older population while avoiding the abovementioned issues. The present study aims to measure the psychometric properties of the Turkish version of the GAI in a Turkish sample of older adults (n = 199). In the current research, ninety-four male (47.2%) and one hundred five female (52.8%) participants are enrolled. Confirmatory factor analysis (CFA) proves that the GAI three-dimensional model is statistically significant. Good internal consistency results and corrected item-total correlations prove the inventory's reliability. Additionally, concurrent validity is shown to be reasonable based on the association between geriatric anxiety and many conceptually related variables (general anxiety, life satisfaction, positive and negative affect), and discriminant validity is found to be satisfactory based on the correlation between geriatric anxiety and an unrelated measure (social desirability). The psychometric characteristics of the GAI are discussed in light of current findings on the value of evidence-based evaluation in older people.

KEYWORDS: Geriatric Anxiety Inventory; GAI; older adults' anxiety; psychometric; confirmatory factor analyses; reliability.

KEY PRACTITIONER MESSAGE

1. Appropriate assessment tools are needed to disentangle difficulties that occur as a consequence of aging and the physical and psychological symptoms that accompany it.
2. GAI has a high degree of reliability and validity. Thus, professionals in psychology, gerontology, psychiatry, medicine, and social work may use the inventory to evaluate Turkish older individuals' geriatric anxiety.
3. Research on older people with geriatric anxiety is also encouraged because these studies help clinicians figure out how to help older people improve their health-related quality of life.

INTRODUCTION

Psycho-social and physical challenges in old age render older people more prone to psychiatric problems. Anxiety is one of these issues studied in a population of older people (Areán, 1997; Ayers et al., 2007) with a high prevalence (Kogan et al., 2000). If anxiety is not appropriately managed, the well-being of older people deteriorates. For instance, older people with generalized anxiety disorder had poorer health-related quality of life scores than their counterparts (Wetherell et al., 2004). Contrary to popular opinion, research shows that anxiety in older individuals is a frequent but understudied problem. According to Alwahhabi, this is an "underestimated, undertreated, and understudied condition" (Alwahhabi, 2003, p. 180). The severity of their bodily ailments overshadows their anxiety levels. Some physical symptoms might be caused by anxiety, so it is essential to look at older adults' anxiety with evidence-based practices when diagnosing and treating them (Therrien & Hunsley, 2012). In terms of anxiety, there are certain similarities and differences between adults and older adults. To begin with, the common characteristics in older people and other age groups include certain anxiety features, symptom presentation in panic disorder, social anxiety in social phobia, symptom presentation in obsessive-compulsive disorder, and functional impairment in each anxiety disorder (Wolitzky-Taylor et al., 2010).

Older adults, however, have a number of unique features that make assessing anxiety more difficult and complicated (Gould et al., 2021). It is also said that older people do not suffer from overwhelming and unmanageable anxiety but rather have cognitive worries about their lives (Gould et al., 2021). They are also less likely to report negative emotional experiences (Wolitzky-Taylor et al., 2010), which might be due to changes in sympathetic nervous system activity with aging (Kogan et al., 2000). Older adults are more concerned about their health than younger ones, which is reflected in their level of anxiety (Wolitzky-Taylor et al., 2010). As a result, the nature of anxiety in old age is relatively different from that in other age groups. Additionally, professionals will benefit from assessing anxiety using procedures that are applicable in the real world (Gould et al., 2021).

Since their medical illnesses may be part of their psychological well-being, it is critical to identify anxiety in the older adult population (Areán, 1997; Therrien & Hunsley, 2012). Individuals receiving home care are also at risk of developing psychological disorders such as anxiety, which should be assessed by professionals (Diefenbach et al., 2009). Similarly, in order to assess anxiety, professionals would focus on the medical conditions of older people as well as their functional level, both of which complicate evaluation (Ayers et al., 2007). Certain symptoms indicative of physical difficulties may be a result of their anxiety. Distinguishing physical and psychological challenges in old age is tricky. Additionally, as indicated before, specific anxiety symptoms might alter in the sample of older persons (Alwahhabi, 2003); thus, evaluating anxiety in the older adult using generic anxiety measures is deemed "imprudent" (Kogan et al., 2000).

Several self-report questionnaires are available to assess anxiety in a sample of older people, such as the State-Trait Anxiety Inventory (STAI; Kvaal et al., 2005), Beck Anxiety Inventory (BAI; Areán, 1997), Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990), General Health Questionnaire (GHQ; Goldberg & Hillier, 1979), and Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). These instruments are available on scales that are used to measure the anxiety of people of all ages. They are not designed to assess older adults' anxiety or address the objections expressed to such assessments. Researchers attempt to compensate for the shortcomings of such assessments (i.e., STAI) by using equivalent alternative scales and contemplating higher cut-off points for older adults (Kvaal et al., 2005). Additionally, certain items associated with cognitive components of these measures, such as those in the BAI (Areán, 1997) and items including somatic claims (Byrne et al., 2010), do not function properly in the population of older adults. The response style of some of these scales, such as the STAI, has been criticized as being excessively complex for older adults, and reversal items, such as those in the HADS, add to older adults' doubts about such statements (Byrne et al., 2010). Additionally, researchers recommend taking extreme caution when administering these scales (e.g., BAI) to older adults for therapeutic purposes (Areán, 1997).

The Geriatric Anxiety Inventory (GAI) is a well-known questionnaire used to measure the anxiety level of older adults (Pachana et al., 2007). GAI is designed to resolve the aforementioned criticisms by using a less convoluted answer style, fewer somatic items, and no reverse items (Byrne et al., 2010). GAI items are chosen based on existing measurements with the assistance of focus groups that include older people,

geropsychologists, and geriatric psychiatrists (Pachana et al., 2007). The GAI is composed of twenty items arranged in an agree-disagree style. The inventory has high discriminant validity to distinguish patients with and without generalized anxiety disorder (GAD), with satisfactory reliability and validity outcomes. According to receiver operating characteristic analysis (ROC), using a cut-off score of 10/11, 83% of psychogeriatric patients accurately categorized generalized anxiety disorder with high sensitivity (73%) and specificity (80%). When the psychometric features of a sample of older Australian women are examined, it is discovered that the cut-off score of the inventory is 8/9 on the inventory (Byrne et al., 2010). Similarly, the Portuguese adaptation of the GAI demonstrates that a cut-off score of 8/9 differentiates severe anxiety from other types of anxiety in older adults with or without a mental illness (Ribeiro et al., 2011). Similarly, using ROC analysis, the cut-off values for generalized anxiety disorder are determined to be 13 points (83.3% sensitivity and 84.6% specificity) in the Brazilian Portuguese language (Massena et al., 2015).

The inventory developers propose modifying a few terms in the GAI items to improve comprehension when evaluating psychometric properties in another culture (Byrne & Pachana, 2011). The inventory is translated into Brazilian Portuguese (Massena et al., 2015), Portuguese (Ribeiro et al., 2011), French-Canadian (Champagne et al., 2018), Japanese (Kashimura et al., 2021), Spanish (Marquez-Gonzalez et al., 2012), and Persian (Shati et al., 2021). To make cultural sense in the Portuguese translation, the item " I often feel like I have butterflies in my stomach " is changed to " I feel like having a knot in the throat" (Ribeiro et al., 2011). In that version, there are two components to the inventory, according to Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO), with anxiety symptoms accounting for 43.4% of the total variance and somatic symptoms accounting for 18% of the total variance, respectively. In contrast to the two-factor structure, the Spanish version of the study with older adults demonstrates that the GAI has a three-factor structure (cognitive, arousal/physical activation, and somatic dimensions), with varimax rotation accounting for 51% of the variance (Marquez-Gonzalez et al., 2012). The internal consistency of this version is excellent (.91). In recent publications, the one-dimensional structure of the GAI has been discovered in the Japanese version (Kashimura et al., 2021), the Chilean version (Miranda-Castillo et al., 2019), and the French-Canadian version (Champagne et al., 2018), as well as in studies with the geriatric population (Johnco et al., 2015). Furthermore, the inventory's unidimensionality is noted in a meta-analysis of GAI. As a result, there is no consensus on the factor structure of the inventory, as illustrated by a metanalysis of GAI (Champagne et al., 2021).

GAI has been recognized as an effective tool for assessing the anxiety of older people living in the community, primary care centers, or geriatric hospital (Byrne & Pachana, 2011; Johnco et al., 2015; Massena et al., 2015). The earlier anxiety measures, which are constructed for an adult population, are insufficient to assess the extent of anxiety in older people. There are several instruments for assessing anxiety; however, the GAI's benefits include being set up for older people, offering an agree/disagree response style, not needing to reverse items, and getting a small number of items. The purpose of this research is to examine the psychometric properties of the GAI in terms of reliability, factor structure, and concurrent and discriminant validity in a sample of older Turkish people. Confirmatory factor analyses are performed to explore the factor structure of the GAI; Cronbach's alpha is calculated to assess the inventory's reliability; and correlations between the scale and related or unrelated constructs such as general anxiety, life satisfaction, positive and negative affect, and social desirability are investigated to figure out the GAI's concurrent or discriminant validity.

METHOD

Participants

The current research included 94 male (47.2%) and 105 female (52.8%) individuals (N = 199), with a mean age of 69.92 (SD = 7.53; range = 60 to 92).The majority (n = 104; 52.3%) of participants are married, while others are single (N = 63; 31.7%), divorced (N = 18; 9.0%), and separated (N = 8; 4.0%). In terms of education, the participants have completed an elementary school (N = 59; 29.6%), a secondary school (N = 18; 9.0%), a high school (N = 41; 20.6%), a two-year vocational school (N = 19; 9.5%), and an university (N = 23; 11.6%), or not completed any school but are literate (N = 39; 19.6%). Over two-thirds of the individuals (67.8%; n = 135) live in apartments, while only one-third (32.2%; n = 64) live in retirement facilities. Additionally, two groups were formed using the responses of participants to the following question: how would you assess your current general health status? Individuals who rated their current health condition as "very bad" and

and "not good" were grouped together, but those who rated it as "good" or "very good" were grouped together. The first group was dubbed "perception of poor health" (N = 105; 52.8%), whereas the second was dubbed "perception of excellent health" (N = 94; 47.2%).

Measures

To assess the Geriatric Anxiety Inventory's psychometric properties, the Beck Anxiety Scale, Satisfaction with Life Scale, Positive Negative Affect Scale, and Social Desirability Scale are employed in the present study.

The Geriatric Anxiety Inventory (GAI) is developed to assess anxiety symptoms in older people with twenty items arranged in an agree-disagree style (Pachana et al., 2007). The inventory's psychometric properties are thoroughly explained in the introduction section.

The Beck Anxiety Inventory (BAI) is a twenty-one-item questionnaire designed to assess the presence of anxiety on a four-point Likert scale (Beck et al., 1988). Cronbach's alpha for the BAI is .92, and its test-retest reliability over a one-week period is .75. The inventory has two subscales: subjective anxiety/panic symptoms and somatic complaints. Although the inventory is not explicitly designed for older adults, it has been utilized in studies conducted with older people (Areán, 1997). Ulusoy et al. (1998) translated the BAI into Turkish with a high internal consistency (.93) and current validity, as shown by STAI.

The Social Desirability Scale-17 (SDS-17) is a true/false format scale designed to evaluate socially desirable responses (Stöber, 2001). A higher score on the scale indicates a greater degree of social desirability. The scale's reliability and validity were investigated with people ranging in age from 18 to 89. The SDS-17's internal consistency is good and acceptable (α = .75), and its scores correlated satisfactorily (varying from .52 to .85) with alternative measures of social desirability in terms of convergent validity (e.g., Eysenck Personality Questionnaire-Lie Scale, Sets of Four Scale, Marlowe-Crowne Scale).

The Satisfaction with Life Scale (SWLS) is a five-item, seven-point Likert-type scale that measures overall life satisfaction (Diener et al., 1985). Higher scores indicate a higher level of life satisfaction. The scale's internal consistency (.87) and test-retest reliability (.82) are acceptable. The scale is composed of a single factor. Scale is adapted into Turkish by Durak et al. (2010).

The Positive and Negative Affective Scale (PANAS) is a five-point Likert-type scale with twenty items assessing positive and negative affect (Watson et al., 1988). The scale assesses both positive and negative aspects of affect. For the Turkish version of the scale, Gencoz (2000) found that the factors' internal consistency ranged from .83 to .86, while their test-retest reliability ranged from .40 to .54.

Procedure Control of Data for Analyses

Prior to data collection, permission was obtained from the inventories' creators for adaptation. GAI items were translated into Turkish by four independent English-speaking translators who were fluent in Turkish and specialists in the field of psychology. Following that, the text's authors double-checked the accuracy of the item translations. Any disagreements were settled by a joint agreement. The inventory items were then translated backward from Turkish to English, and English-Turkish comparison forms were sent to the GAI developers. The measures were given to older adults who live at home or in two rest homes. All participants were informed of the goal of the present study, and their permission was obtained.

RESULTS

Control of Data for Analyses

The descriptive statistics and correlational analyses were conducted using IBM's SPSS-26 software (IBM-Corp, 2019). Confirmatory factor analysis (CFA) is used to validate the GAI's factor structure using the AMOS-26 program (Arbuckle, 2019). The p-value threshold was set at .05 in all analyses to determine significance. In order to prevent probable outliers in the data from influencing the results, data cleaning and outlier control were carried out (Tabachnick & Fidell, 2013). After one multivariate outlier was eliminated from the analysis, analyses were performed on the remaining 199 cases.

Confirmatory Factor Analyses

To examine the adequacy of the unidimensional and three-dimensional (cognitive, arousal/physical activation, and somatic anxiety) models of the GAI, confirmatory factor analyses are performed by AMOS 26 program (Arbuckle, 2019). Those factorial solutions are mentioned by psychometric studies of the GAI in different languages (Champagne et al., 2018; Kashimura et al., 2021; Marquez-Gonzalez et al., 2012; Massena et al., 2015; Ribeiro et al., 2011; Shati et al., 2021).

The confirmatory factor analysis (CFA) was used to ascertain the inventory's unidimensionality and multidimensionality based on model fit indices. The Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Incremental Fit Indices (IFI), p of Close Fit (PCLOSE), Root Mean Square Error of Approximation (RMSEA), Chi-Square (X^2), and Standardized Root Mean Square Residual (SRMR) were all employed to determine model fit (Hu & Bentler, 1999; Kline, 2016). If a model's fit indicators of IFI, TLI, and CFI exceed .90 (Bentler & Bonett, 1980), it is deemed more fit. Additionally, RMSEA and SRMR values between 0 and .05 and PCLOSE values greater than .05 are important markers of the best fitting model owing to their ability to detect subtle model changes (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003).

The model was tested to investigate the association between previously identified factorial structure and data acquired from Turkish older adults using AMOS 26 (Arbuckle, 2019). The tested one-factor solution did not satisfy the desired criteria; X^2 (167, N = 199) = 466.84, p = .001; RMSEA = .094, IFI = .861, TLI = .843, CFI = .860, X^2/df = 2.76. On the other hand, three-factor solution presented better adequate fit, X^2 (167, N = 199) = 363.72, p = .001; RMSEA = .077, IFI = .908, TLI = .894, CFI = .907, X^2/df = 2.178. Freeing parameter constraints between e2 (Item-10) and e3 (Item-13) may help improve the model, as shown by modification indices. The model fit improved considerably further when the covariance between error terms of two items was taken into account as a free parameter in the new analysis; X^2 (166, N = 199) = 336.72, p = .001; RMSEA = .072, IFI = .920, TLI = .908, CFI = .920, X^2/df = 2.028. The standard regression weights in this analysis are demonstrated in Figure-1. The three-factor solution model matches the data better than the single-factor solution model, based on these findings.

Internal Consistency Results

The internal consistency was assessed independently for the whole scale and each factor. Internal consistency coefficient for the whole inventory was .94, with corrected item-total correlations ranging between .45 (item-12) to .77 (item-17). In terms of three factors; internal consistency coefficient for cognitive anxiety was .91, with corrected item-total correlations ranging between .53 (item-2) to .78 (item-17), internal consistency coefficient for arousal/physical activation was .84, with corrected item-total correlations ranging between .56 (item-20) to .73 (item-10), internal consistency coefficient for somatic anxiety was .78, with corrected item-total correlations ranging between .42 (item-6) to .67 (item-19).

Concurrent and Discriminant Validity

To examine concurrent validity, participants' scores on GAI are compared with conceptually related constructs of general anxiety (BAI scores), life satisfaction (SWLS scores), and positive and negative affect (PANAS scores). The GAI was positively correlated with general anxiety (r = .50 p = .001) and negative affect (r = .57, p = .001).

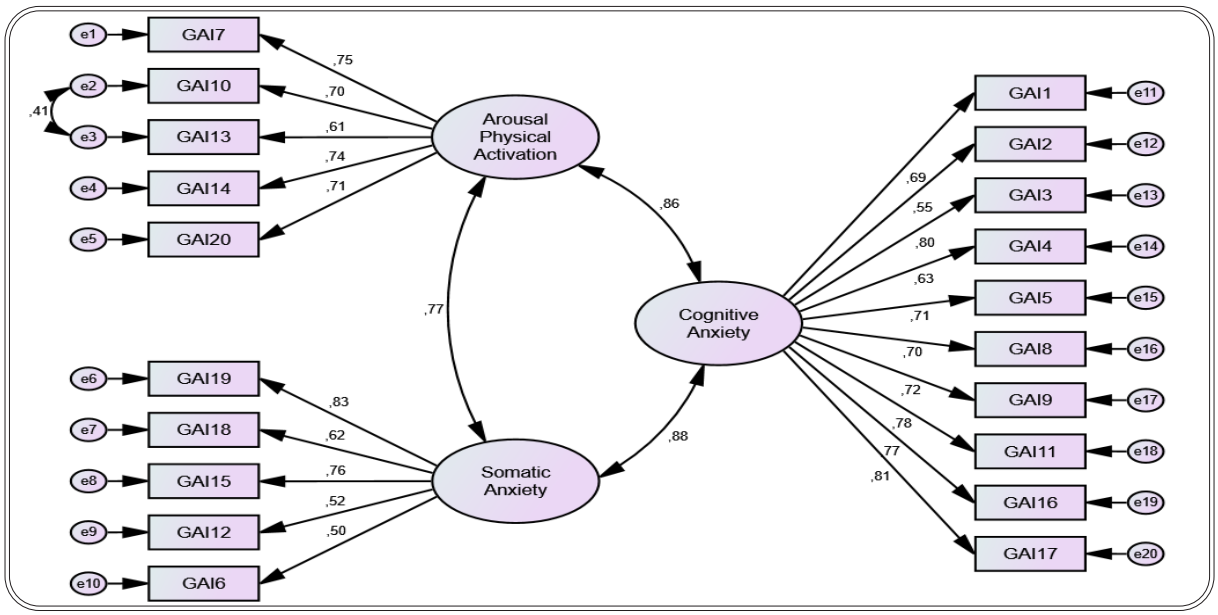

Figure-1. The standard regression weights

On the other hand, the GAI was negatively correlated with positive affect (r = -.29, p = .001) and SWLS (r = -.19, p = .008) (see Table-1). To examine discriminant validity by social desirability, participants' scores on GAI were compared with SDS-17. The GAI was not significantly correlated with social desirability (r = .02, p = .822) (see Table 1). Furthermore, the discriminant validity of the GAI was tested using an independent-samples t-test. GAI scores for the perception of poor health group (X = 6.66, SD = 6.18) were significantly higher than for excellent health group (X = 4.05, SD = 5.39), t(197) = 3.15, p = .002.

ratio of X^2 to df revealed that the GAI's three-factor solutions provided the most satisfactory fit.

Correlations between errors might obfuscate model testing findings and diminish the likelihood of a repeatable perfect fitting model. Using comparable language or phrases with remarkably similar meanings while building a scale, on the other hand, increases the possibility of correlations between error terms. This perspective is consistent with Bollen and Lennox's (1991) statement that researchers often assume errors are unrelated in order to facilitate

Table-1. Correlations between variables and descriptive values of the variable

		1.	2.	3.	4.	5.	6.
1. Geriatric Anxiety (GAI)			.50***	-.29***	.57***	-.19**	.02
2. General Anxiety (BAI)				-.28***	.57***	-.29***	-.15*
3. Life Satisfaction (SWLS)					-.40***	.32***	.10
4. Negative Affect (PANAS-P)						-.22**	-.17*
5. Positive Affect (PANAS-N)							-.04
6. Social Desirability (SDS-17)							
	X	5.43	14.42	25.31	16.94	30.44	11.05
	SD	5.95	12.08	5.96	5.57	6.95	2.75
	Min. (Possible)	0	0	5	10	10	0
	Max. (Possible)	20	63	35	50	50	17

Note (1). ***p ≤ .001, **p ≤ .01, *p ≤ .05

Note (2). X = mean, SD = standard deviation

DISCUSSION

Aging includes several physical and psychological difficulties that are overshadowed by each other. Therefore, as evidence-based practices, proper assessment tools are necessary to differentiate problems (Therrien & Hunsley, 2012). As one of the well-known and widely used measures in different languages, the present study aims to evaluate the psychometric aspects of the GAI.

Based on the GAI results in distinct cultures, the unidimensionality of the factor structure is assessed by CFA. The findings proved that the evaluated one-factor solution did not satisfy the essential criteria for model fit. Multidimensionality of inventory is revealed in Portuguese (two-factor structure, Ribeiro et al., 2011) and Spanish (three-factor structure, Marquez-Gonzalez et al., 2012) versions of the GAI, while mostly unidimensionality of the inventory is supported in other versions (French-Canadian version Champagne et al., 2018; Japanese version, Kashimura et al., 2021; Chilean version Miranda-Castillo et al., 2019). CFA results by fit indices and the debate. However, correlations between error terms are permissible when applied conservatively other than random changes to improve model fit. After performing confirmatory factor analysis (CFA), the model fit was even better when the covariance between e2 (Item-10) and e3 (Item-13) was taken into account as a free parameter in the new analysis. Both items are related to the same latent factor (arousal/physical activation). "I often feel nervous" (item-10) and "I think of myself as a nervous person" (item-13) are comparable statements that sound equal to the ear.

The inventory's internal consistency is satisfactory as the original version of the inventory (Pachana et al., 2007). Regarding concurrent validity examinations by conceptually related constructs, the GAI significantly correlated with BAI, supporting Pachana et al.'s (2007) results. Like Diefenbach et al.'s study (2009), GAI with BAI's factorial structure relations is consistent. Furthermore, GAI's concurrent validity with SWLS and SPANE is also satisfactory. As expected, there is a positive correlation between the GAI and negative affect, and there is a negative correlation between

the GAI and positive affect and satisfaction with life. As proved by discriminant validity with SDS-17, the inventory's relations with social desirability are in the expected range. Therefore, the GAI can be a more distinct concept than desirability.

There are methodological limitations in the present study. Test-retest reliability of the inventory cannot be examined in the present study. Also, factor structure cannot be examined in terms of the living place of older adults (at home versus in institution), physical health problems (having problems versus not having problems) (Gould et al., 2014), and presence of having an anxiety disorder. Also, the role of cognitive impairment on psychometric findings cannot be compared in the present study, which is evaluated by (Rozzini et al., 2009). The psychometric aspects of the GAI are recommended to be assessed with different older adult groups in future studies.

The GAI has satisfactory reliability and validity results. Therefore, the inventory can be used by professionals (psychologists, gerontologists, psychiatrists, physicians, social workers) in the professional field to evaluate Turkish older adults in describing their geriatric anxiety. Additionally, the inventory may be used to assess three subdimensions of geriatric anxiety. With GAD, it will be feasible to identify the anxiety areas of older adults and tailor the therapeutic process to the sub-area (cognitive, arousal, or somatic) in which they score the highest. For instance, practitioners may save time using cognitive psychotherapy strategies with older adults with high cognitive geriatric anxiety scores. Similarly, depending on the amount of arousal, it may occur to apply behavioral approaches in the first place in those who feel anxiety. Strengthening communication skills to assist clients with high somatic anxiety ratings in lowering their anxiety would save the expert time. Further studies exploring psycho-social difficulties in geriatric anxiety are also encouraged. Those studies help professionals set a target of help in promoting health-related quality of life among older adults.

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