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Aging Anxiety Scale for Middle-Aged Adults: Turkish validity and reliability study

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Abstract

The older population is increasing. As age increases, many changes occur in individuals' lives, physically, socially, psychologically, and this situation varies from individual to individual. The uncertainty about how this period will pass can cause anxiety in individuals. Therefore, valid and reliable tools are needed to investigate ageing anxiety and potential factors that increase this anxiety, especially in the ageing population. This article presents the results of a Turkish validity and reliability study of the Aging Anxiety Scale for Middle-Aged Adults. The study sample consisted of 293 middle-aged adults. Content validity, face validity and construct validity methods were applied to measure validity. Item analysis, Cronbach's alpha and test-retest methods were used to measure internal consistency in the reliability analysis. The content validity index of the Aging Anxiety Scale for Middle-Aged Adults was found to be 0.97 based on expert opinion. Model fit indices were calculated as $\chi^2 = 473.583$, $df = 275$, $\chi^2/df = 1.722$, CFI = 0.95, GFI = 0.89, IFI = 0.95, TLI = 0.94, RMSEA = 0.05, RMR = 0.06 and SRMR = 0.05. The analysis results indicated that the scale model values were within accepted limits and that the 5-sub-factor and 26-item structure of the scale was confirmed. It was concluded that the Turkish version of the Aging Anxiety Scale for Middle-Aged Adults was a valid and reliable measurement tool to enable Turkish society to determine middle-aged individuals' ageing concerns.

Keywords: ageing anxiety; attitudes; beliefs; middle-aged; reliability; validity

Introduction

Life expectancy at birth and the older population are rapidly increasing worldwide (World Health Organization 2022) and this older group constitutes 9.8 per cent of the world's population. The countries with the three highest older population ratios are Japan (29.9%), Italy (24.1%) and Finland (23.3%), and Türkiye (9.9%) ranks 66th of 184 countries (Turkish Statistical Institute (TURKSTAT) 2023). However, it is predicted that the world population of people aged ≥ 65 , which was 761 million in 2021, will more than double and reach 1.6 billion in 2050 (United Nations 2023).

Biological ageing, a result of the progression of molecular and cellular damage over time, leads to a decrease in physical and mental capacity, the risk of disease and ultimately death. As age increases, individuals may experience various health problems, and the likelihood of experiencing more than one complex health problem at the same time increases (World Health Organization 2022). As age increases, many changes occur in individuals' lives, not only physically but also socially and psychologically, and this situation varies from individual to individual. The uncertainty about how this period will pass can cause anxiety in individuals.

Ageing anxiety is defined as anxiety or fear that arises owing to concerns and expectations of negative physical, mental and personal losses that may occur during the ageing process (Lasher and Faulkender 1993). It can occur in adults at any age. However, individuals who reach middle age and begin to experience symptoms caused by ageing see physiological ageing as the loss of youth and perceive this situation as a threat (Oh and Park 2022). Interestingly, research has primarily focused on young and/or older adults, and the psychological consequences of ageing anxiety among middle-aged adults have been relatively understudied (Bergman and Segel-Karpas 2021). In addition, some studies have shown that ageing anxiety peaks in individuals between the ages of 40 and 50 (Kruger 1994) and 50 and 64 (Ross and Drentea 1998). The increasing number of older people in the world affects both the way society perceives the older and ageing, as well as individuals' beliefs, attitudes and anxiety about ageing (Erkuran 2020). Individuals' anxiety levels regarding ageing must first be determined to design appropriate interventions to reduce ageing anxiety. Therefore, valid and reliable tools are needed to investigate ageing anxiety and potential factors that increase this anxiety, especially in the ageing population. Although the scale developed for this purpose, 'The Aging Anxiety Scale for Korean Middle-Aged Adults', has been proven to be valid, reliable and applicable (Cronbach's $\alpha = 0.95$; correlation between the sub-factors $r:0.47-0.73$), its applicability in different cultures has not yet been investigated.

In Türkiye, there are inventories intended to measure ageing anxiety for middle-aged women, menopausal women and individuals of different age groups (Aydin and Kabasakal 2021; Çay *et al.* 2023; Daşikan *et al.* 2022; Kalaycı 2021). However, there is a need for a valid and reliable measurement tool to evaluate the ageing anxiety of men and women in the middle-aged group who begin to experience symptoms caused by old age. The ageing seen in the Turkish population day by day and the negative perceptions of ageing in Turkish culture – such as being a burden, being dependent on others, loss of physical strength, being sick and being alone – can create anxiety (Şahan and Kılavuz 2024). In this context, the research aimed to introduce to the Turkish literature a tangible measurement tool that can be used to determine the ageing anxiety of middle-aged individuals in Türkiye.

Methods

Study type

A descriptive and methodological design was used. The aim was to conduct a reliability and validity study to adapt the 'Aging Anxiety for Middle-Aged Adults' scale, which was developed by Oh and Park in Korea in 2022 (Oh and Park 2022), to Turkish society.

Population and sample of the study

Study design and sampling method

The study was completed between July and October 2023. The population of the study consisted of adult individuals between the ages of 45 and 59 who were registered in a family health centre in Samsun province. Statistical analysis of the scale used in the study was based on factor analysis. In the factor analysis technique, while a scale is adapted to another culture, it is recommended to reach a sample size of at least 5–10 times the number of scale items (Esin 2014). For this reason, the sample size was calculated as at least 130–260 individuals to conduct the validity and reliability study of the Aging Anxiety Scale for Middle-Aged Adults, which consists of 26 items. Considering some attrition, the sample consisted of 293 middle-aged adults who were between the ages of 45 and 59. The inclusion criteria for the study were: being aged between 45 and 59, having no communication problems and participating in the study voluntarily. Individuals with a psychiatric diagnosis were not included in the study.

Data collection

Data collection tools were a 'Personal Information Form' and the 'Aging Anxiety Scale for Middle-Aged Adults'. Study data were collected by the researcher face-to-face. The purpose of the research was explained to the middle-aged adults who came to the family health centre and met the inclusion criteria, and they were given detailed information about the research. The questionnaires were administered to individuals who volunteered to participate in the research in a quiet room at the family health centre after they approved consent forms for voluntary participation in the study. Data collection took approximately 10–15 minutes per person.

Personal Information Form: This form, which was created by the researchers, had a total of nine questions about age, gender, marital status, number of children, educational status, economic status, profession, and employment status.

The Aging Anxiety Scale for Korean Middle-Aged Adults (AAS-KM): This scale was developed by Oh and Park in 2022 to measure the ageing anxiety of middle-aged individuals (Oh and Park 2022). It has 26 items and 5 sub-factors, namely 'loss of economic power' (seven items), 'loss of meaning in life' (six items), 'loss of physical attractiveness' (five items), 'loss of physical health' (four items) and 'prejudice against older people and falling behind' (four items). The scale has a five-point Likert-type evaluation system with the following options: (1) strongly disagree, (2) disagree, (3) undecided, (4) agree and (5) strongly agree. The score range is 26–130. High total scores from the scale indicate high levels of ageing anxiety.

In the study of Oh and Park (2022), Cronbach's alpha coefficient, which was examined for both the internal consistency and the test-retest reliability of the scale, was found to be 0.95, and, as a result of factor analysis, five factors – namely, loss of economic power, loss of meaning in life, loss of physical attractiveness, loss of physical health and prejudice against older people and falling behind – were determined. In this study, Cronbach's alpha coefficient of the total scale was found to be 0.936.

Language validity

The translation and back-translation method was used to ensure the language validity of the scale (Çokluk et al. 2012). First, the original English version of the scale was

Table 1. Statistical methods used in data analysis

Features analyzed	Statistical methods
Normality of the data	<ul style="list-style-type: none"> • Skewness coefficient • Kurtosis coefficient
Determining and comparing participants' descriptive characteristics	<ul style="list-style-type: none"> • Percentage distribution • Frequency distribution
Content validity	<ul style="list-style-type: none"> • Content validity index (CVI) (Davis Technique) • Content validity ratio (CVR)
Construct validity	<ul style="list-style-type: none"> • Confirmatory factor analysis (CFA) (maximum likelihood) <ul style="list-style-type: none"> ✓ χ^2/df ratio (χ^2/df) ✓ Comparative fit index (CFI) ✓ Goodness of fit index (GFI) ✓ Incremental fit index (IFI) ✓ Tucker–Lewis index (TLI) ✓ Root mean square error of approximation (RMSEA) ✓ Root mean square residual (RMR) ✓ Standardized root mean square (SRMR)
Item analysis	<ul style="list-style-type: none"> • Average variance extracted (AVE) 27% lower and upper quartile comparison (Independent groups t-test) • Item-total correlation values
Time-dependent invariance	<ul style="list-style-type: none"> • Test-retest <ul style="list-style-type: none"> ✓ Intraclass correlation coefficient test (ICC) ✓ Dependent groups test
Reliability	<ul style="list-style-type: none"> • Cronbach's alpha reliability coefficient • Composit reliability (CR)

translated into Turkish by six experts. The six translations obtained were evaluated by the researchers, the most appropriate items were determined and a draft Turkish form was created. In line with content validity analysis, necessary corrections were made on the scale and the Turkish form was sent to two English language experts for back translation. Then, the form that was translated back into English and the items in the original version of the scale were compared in terms of clarity, inconsistencies, semantic errors, term differences and unity of meaning. The rate of similarity between the translated/re-translated scale and the original scale was determined and the final version of the scale was obtained.

Data analysis

Data were analyzed using the SPSS 22.0 software package. For statistical tests, the significance level (p) was taken as 0.05. The tests used to evaluate the data are given in Table 1.

Ethical aspects

The research was conducted in accordance with the Declaration of Helsinki Ethical Principles for Medical Research on Human Subjects. To conduct the Turkish validity

and reliability study of the Aging Anxiety Scale for Middle-Aged Adults, Dr Eun A. Oh, who developed the original form of the scale, was contacted via email; Dr Oh gave written permission for use of the original form of the scale for the validity and reliability study. Approval of the clinical research ethics committee of a state university was obtained to conduct the study (date: 29 March 2023, number: 2023-215). Following the permission of the ethics committee, the necessary legal permissions were obtained from the Public Health Directorate.

Results

Participants' descriptive characteristics

Of the individuals participating in the research, 50.9 per cent were female, 91.1 per cent were married, 30.7 per cent were high school graduates, 55.3 per cent had equal income and expenses, 67.2 per cent were employed, 38.9 per cent had two children and 53.9 per cent were in good health. The mean age was 51.11 ± 3.95 [min-max = 45-59] (Table 2).

Content validity

The Davis technique was used to ensure the content validity of the scale (Çokluk et al. 2012). The translated scale was presented to nine experts (seven nurse academicians with doctoral degrees and two nurse clinicians with doctoral degrees). Items were evaluated between 1 and 4 points (1 = not appropriate, 2 = somewhat appropriate, 3 = quite appropriate and 4 = very appropriate) in terms of consistency with the items of the original scale (Davis 1992). The content validity ratios (CVR) of the scale items were in the range of 0.88-1.00. The CVI value of the total scale was determined as 0.97. Since all statements were above the limit value (> 0.80) (Davis 1992; Polit and Beck 2006), it was decided to keep all the items on the scale. Thus, the content validity of the AAS-TM was ensured.

Pilot application

A pilot application was conducted with 30 individuals, who were not included in the study and showed similar characteristics to the sample group, to evaluate the intelligibility of the AAS-TM. The internal consistency coefficient in the pilot application was 0.936 for the total scale and in the range of 0.756-0.878 for the sub-factors. Since all statements were found to be intelligible by the participants in this step, the pilot application phase of the Aging Anxiety Scale for Turkish Middle-Aged Adults (AAS-TM) was completed successfully. Accordingly, no changes were made to the scale items, and face validity was ensured.

Item analyses

The capacity of each item on the scale to distinguish high and low scores was analyzed. To do this, the upper 27 per cent group with the highest scores and the lower 27 per cent group with the lowest scores were compared. A significant difference was found between the scores in the lower and upper groups as a result of the comparison

Table 2. Distribution of participants' descriptive characteristics (N = 293)

Characteristics	Mean	Sd
Age[Min–Max = 45–59]	51.11	3.95
	n	%
Gender		
Female	149	50.9
Male	144	49.1
Marital status		
Married	267	91.1
Single	26	8.9
Education		
Non-literate	5	1.7
Literate	9	3.1
Elementary school	55	18.8
Middle school	59	20.1
High school	90	30.7
Undergraduate/graduate	75	25.6
Income		
Income > expenses	70	23.9
Income = expenses	162	55.3
Income < expenses	61	20.8
Employment		
Retired	33	11.3
Unemployed	63	21.5
Employed	197	67.2
Number of children		
None	38	13.0
1	24	8.2
2	114	38.9
3	80	27.3
≥ 4	37	12.6
Perceived health		
Poor	22	7.5
Moderate	113	38.6
Good	158	53.9

Notes: Sd = standard deviation, Min = minimum, Max = maximum.

($t = -25.921$; $p < 0.001$). It was determined that the scale items could accurately distinguish individuals' ageing anxiety. Then, the relationship of each item with the total scale score was evaluated. Item-total correlation values were found to be in the range of 0.456–0.694. The correlation value of each item was greater than the limit value of 0.30

(Streiner and Norman 2014). The item analysis results of the scale items were found to be adequate.

Confirmatory factor analysis

The structure of the scale, which included 5 sub-factors and 26 items, was analyzed. It was determined that the items were distributed statistically significantly across the sub-factors ($p < 0.001$). Model fit indices were determined as $\chi^2 = 473.583$, $df = 275$, $\chi^2/df = 1.722$, CFI = 0.95, GFI = 0.89, IFI = 0.95, TLI = 0.94, RMSEA = 0.05, RMR = 0.06 and SRMR = 0.05. As a result of the analysis, it was determined that the scale model values were within accepted limits (Karagöz 2019) and that the structure of the scale consisting of 5 sub-factors and 26 items was confirmed (Table 3; Figure 1).

Reliability

Cronbach's alpha value for the total AAS-TM was determined as 0.936. At the sub-factor level, the alpha coefficients were determined as 0.878 for loss of economic power, 0.872 for loss of meaning in life, 0.865 for loss of physical attractiveness, 0.804 for loss of physical health and 0.756 for prejudice against older people and falling behind (Table 4).

Composite reliability (CR)

The CR values of the AAS-TM were 0.96 for the total scale and in the range of 0.76–0.88 for the sub-factors. Since the CR values of the scale were above the limit value (> 0.70) (Hatcher and O'Rourke 2013), it was determined that composite reliability was achieved. This showed that measurements using this scale to determine ageing anxiety were reliable in parallel with the original scale (Table 4).

Convergent validity (average variance extracted [AVE])

The AVE value of the AAS-TM was 0.51 for the total scale and varied from 0.45 to 0.56 for the sub-factors. Accordingly, it was determined that the AVE values of the AAS-TM for the total scale and three of its sub-factors (F2, F3 and F4) were higher than the limit value of 0.50 (Yaşlıoğlu 2017). The AVE values of the F1 and F5 sub-factors of the scale were determined as 0.46 and 0.45, respectively. According to the literature, in cases where CR values are higher than 0.6, AVE values of lower than 0.5 can be accepted (Fornell and Larcker 1981). In this study, since the CR values of the AAS-TM were above the limit value of 0.60, the AVE values of the F1 and F5 sub-factors, which were very close to 0.5, were accepted, and therefore the convergent validity of the scale was achieved (Table 4).

Test-retest reliability

The test-retest method is based on the principle of repeating the test to the same individuals under the same conditions at different times to determine the consistency of the scale (Karagöz 2019). To determine the reliability of the scale for

Table 3. CFA values and item mean/standard deviation scores for the AAS-TM

Factor		SRW	URW	SMC	Mean (Sd)
F1-Loss of economic power					
1	I am worried that I will not be able to make money in my old age.	0.635*	1.000*	0.632	2.86(1.18)
2	I am worried that economic independence will be difficult in my old age.	0.600*	0.919*	0.650	2.99(1.15)
3	I am worried that I will not have money to spend for my family in my old age.	0.673*	1.003*	0.635	3.03(1.13)
4	I am worried that I will not be able to pay hospital bills in my old age.	0.516*	0.755*	0.423	2.94(1.11)
5	I am worried that I will not be able to take good care of my family in my old age.	0.811*	1.220*	0.572	2.94(1.13)
6	I am worried that I will be a burden to others such as my children in my old age	0.749*	1.164*	0.549	3.03(1.17)
7	I am worried that I will not be able to live on my own without relying on my family or other people in my old age.	0.730*	1.109*	0.561	3.08(1.14)
F2-Loss of meaning in life					
8	I am afraid that my life will have no meaning in my old age.	0.739*	1.275*	0.595	2.81(1.17)
9	I am worried that I will have nothing to do in my old age.	0.843*	1.404*	0.664	2.69(1.13)
10	I am worried that my old age will be boring and uninteresting.	0.761*	1.256*	0.583	2.84(1.12)
11	I am afraid I will be living without hope of life in my old age.	0.783*	1.272*	0.614	2.80(1.10)
12	I am worried that I will be useless in my old age.	0.745*	1.228*	0.532	2.80(1.12)
13	I am afraid that I will be abandoned by society or organization in my old age.	0.589*	1.000*	0.426	2.81(1.15)

(Continued)

Table 3. (Continued.)

Factor		SRW	URW	SMC	Mean (Sd)					
F3-Loss of physical attractiveness										
14	I am worried that I will look old.	0.724*	1.000*	0.583	2.92(1.13)					
15	I am worried that my skin is losing elasticity with aging.	0.719*	0.975*	0.566	2.96(1.12)					
16	I am worried about getting white hair in my old age.	0.735*	1.103*	0.559	2.97(1.23)					
17	I am anxious that my physical attractiveness is declining with age.	0.818*	1.129*	0.596	2.90(1.14)					
18	I hate seeing myself growing old when I look in the mirror.	0.723*	1.031*	0.558	2.98(1.17)					
F4-Loss of physical health										
19	I am worried that my body is not the same as I get older.	0.578*	1.000*	0.555	3.09(1.13)					
20	I am worried that my physical strength is weakening as I get older.	0.757*	1.220*	0.535	3.50(1.05)					
21	I am afraid that I will get sick often when I get older.	0.753*	1.226*	0.525	3.44(1.07)					
22	I am worried that physical limitations in daily activities will increase with aging.	0.787*	1.263*	0.573	3.43(1.05)					
F5-Prejudice against older people and falling behind										
23	I am worried that I will be told I am not acting my age.	0.627*	1.000*	0.413	3.05(1.09)					
24	I am worried that it will be difficult to communicate with young people due to the increased generation gap as I get older.	0.693*	1.137*	0.446	3.14(1.11)					
25	I am anxious that I will fall behind the young people as I get older.	0.733*	1.171*	0.497	3.10(1.09)					
26	I am worried that I will be called ‘stubborn’ and ‘inflexible’ in my old age.	0.606*	1.018*	0.399	3.19(1.15)					
Fit index values of the scale										
	<i>x</i> ²	<i>df</i>	<i>x</i> ² / <i>df</i>	CFI	GFI	IFI	TLI	RMSEA	RMR	SRMR
Total AAS-TM	473.583	275	1.722	0.95	0.89	0.95	0.94	0.05	0.06	0.05
Acceptable fit levels	–	–	≤ 3	≥ 0.95	≥ 0.85	≥ 0.90	≥ 0.90	≤ 0.05	≤ 0.08	≤ 0.08

Notes: *p < 0.001, AAS-TM = Aging Anxiety Scale for Turkish Middle-Aged Adults, SRW = standardized regression weight, URW = unstandardized regression weight, SMC = squared multiple correlations, mean = average, Sd = standard deviation.

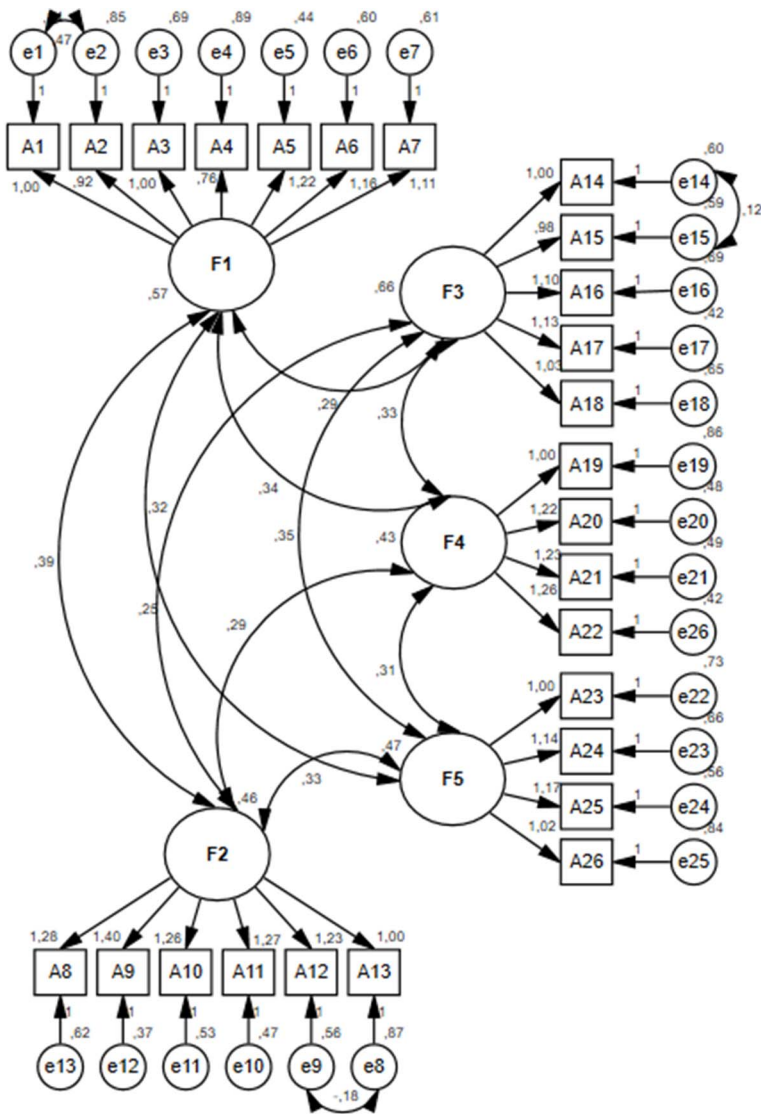


Figure 1. Structure of the AAS-TM following CFA.

time-dependent invariance, the test was re-administered at two-week intervals to 39 individuals selected from the 293 individuals using the simple random sampling method. Accordingly, the intra-class correlation coefficient (ICC) values of the scale were found to be $r = 0.872$ (95%CI = 0.754–0.933) for the total scale ($p < 0.001$) (Table 3). Additionally, it was determined that there was no significant difference between participants' test-retest scores ($t = 0.041$; $p = 0.967$). Thus, it was determined that the test-retest reliability of the scale was achieved.

Table 4. Validity and reliability analysis values for the AAS-TM

AAS-TM and the sub-factors		Cronbach's alpha	ICC [95%CI]	CR	AVE
F1	Loss of economic power	0.878	0.877*[95%CI = 0.855 – 0.898]	0.85	0.46
F2	Loss of meaning in life	0.872	0.872*[95%CI = 0.848 – 0.893]	0.88	0.56
F3	Loss of physical attractiveness	0.865	0.865*[95%CI = 0.839 – 0.888]	0.86	0.56
F4	Loss of physical health	0.804	0.795*[95%CI = 0.752 – 0.833]	0.81	0.52
F5	Prejudice against older people and falling behind	0.756	0.755*[95%CI = 0.706 – 0.798]	0.76	0.45
Total AAS-TM		0.936	0.872*[95%CI = 0.754 – 0.933]	0.96	0.51

Notes: $p < 0.001$, AAS-TM = Aging Anxiety Scale for Turkish Middle-Aged Adults

Discussion

This was a Turkish validity and reliability study of the Aging Anxiety Scale for Korean Middle-Aged Adults. It analyzed its psychometric properties.

Validity is defined as the capacity of a scale to measure only the variable intended to be measured without mixing it with another feature or variable (Özdemir 2018). In this study, content validity, face validity and construct validity methods were used to measure validity.

Reliability is defined as ensuring the consistency, stability, freedom from errors, invariance, adequacy and equivalence of a scale (Gözüm and Aksayan 2003). In this study, the item analysis, Cronbach's alpha and test-retest methods were used to measure internal consistency in reliability analysis. Item analysis is performed to determine the distinctiveness of the items on the scale and the degree to which they predict the total score. It is recommended to use the item total score correlation method to determine the degree to which items predict the total score. Positive and high item-total score correlations indicate that each item of the scale is similar and has high internal consistency (Kline 2000). In this study, lower-upper group analysis and item-total correlation methods were used to do the item analysis of the scale. The capacity of each item on the scale to distinguish high and low scores was analyzed. It was determined that there was a significant difference between the scores in the lower and upper groups ($t = -25.921$; $p < 0.001$). Then, the relationship of each item with the total scale score was evaluated. Item-total correlation values were found to be in the range of 0.456–0.694. It was concluded that the item analysis results of the scale items were adequate and that the scale could correctly distinguish individuals' ageing anxiety.

Cronbach's alpha reliability coefficient shows whether the items on a scale represent a homogeneous whole (Özdamar 2017). Cronbach's alpha value of the total scale was determined to be 0.936. In the original form of the scale, the alpha value was found to be 0.95 (Oh and Park 2022). It is thought that the difference may be owing to differences in language and culture.

When the scale sub-factors were examined, it was seen that item five (I am worried that I will not be able to take good care of my family when I get old) in the loss of economic power sub-factor had the highest item load value. It is thought that this may be because Turkish society associates ageing with the end of working life and loss of strength. Our research finding is compatible with studies in the literature in which older people associate old age with loss of strength (Durak 2016; Karacan 2017; Tuna Uysal 2020). However, it was determined that the item load of the fourth item (I am worried that I will not be able to pay hospital expenses when I get old) was lower than that of other items on the same sub-factor and the same item on the original scale (0.765) (Oh and Park 2022). When the economic status of the participants in the research was examined, it was seen that the income of the majority was equal to or more than their expenses. It is thought that this situation may have caused the item load of item 4 to be low. This result is consistent with the literature suggesting that future anxiety decreases as socio-economic level increases (Canatan 2015; Santrock 2019).

In the second sub-factor, which is the loss of meaning in life, it was determined that the item load of item 9 (I am worried about having nothing to do when I get old) was higher than that of the others. It is known that the meaning, characteristics and forms of life change as we get older. The life satisfaction of the individual, who begins to be motivated by the past, depends on their life success in youth and adulthood. It is stated that the life dissatisfaction that occurs during this period cannot be compensated easily. The search for meaning is the main motivation in an individual's life (Frankl 2018). The term 'older people' usually refers to individuals who are preoccupied with health problems, unable to produce, in need of care, lonely and whose social life is weakened (Durak 2016). It is thought that this negative perception of ageing in society may have caused the participants to assign high scores to this item. On this sub-factor, the item load of the 13th item (I am afraid that I will be abandoned by society or organization when I get old) was lower than the load values of other items on the same sub-factor and the same item on the original scale (0.791) (Oh and Park 2022). It is thought that differences in the retirement age and systems between the country where the scale was developed and the country where the scale was adapted may have affected the low item loadings.

In the loss of physical attractiveness sub-factor, the item load of item 17 (I am worried about my physical attractiveness decreasing with age) was higher than the load value of the others. Loss of physical attractiveness is one of the concepts associated with old age (LaWare and Moutsatsos 2013). Conditions such as wrinkles, sagging and blemishes occur in aged skin owing to decreased cell renewal (Farage *et al.* 2013). It is thought that the knowledge and observations of adult individuals regarding the natural process of ageing may have affected the high item load value of this item on the loss of physical attractiveness sub-factor.

It was found that the mean score of almost every item on the scale (2.86–3.50) was lower than that of the original scale (2.71–3.90) (Oh and Park 2022). According to a 2019 United Nations report, South Korea ranks 41st in the older population ratios with 15.1 per cent (United Nations 2019). South Korea has a relatively younger population compared to that of Türkiye. It is thought that this situation may have affected the lower mean item scores in this adaptation study compared to the original scale.

Conclusion

It is necessary to determine whether middle-aged adults experience ageing anxiety so that necessary interventions can be carried out to reduce ageing anxiety and improve their psycho-social adaptation to old age. In conclusion, it can be said that the Turkish version of the Aging Anxiety Scale for Korean Middle-Aged Adults is a valid and reliable measurement tool to enable Turkish society to determine the ageing concerns of middle-aged individuals. In line with the findings, it is recommended that the Aging Anxiety Scale for Middle-Aged Adults should be used in Türkiye. The study may help health professionals, such as nurses, identify and intervene in adults' concerns about ageing earlier.

Limitations

This study has some limitations. It was conducted with middle-aged individuals registered in a family health centre in one province of Türkiye. Until future comparable studies are conducted on middle-aged adults in different regions and provinces of Türkiye, the findings of this study cannot be generalized to all Turkish middle-aged adults. In addition, the fact that most of the participants were married limits the generalizability of the current findings to single middle-aged adults.

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Competing interests. The authors declare no competing interests.

Ethical standards. This study was approved by an ethics committee. In addition, written consent forms were obtained from all the participants.

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