Comparative Turkish Adaptation of The Kessler Psychological Distress Scale in Cancer Caregivers: A Validity And Reliability Study

Kessler Psikolojik Distress Ölçeğinin Kanser Hastalarının Bakımvericilerinde Karşılaştırmalı Türkçe Uyarlaması: Bir Geçerlik ve Güvenirlik Çalışması

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Abstract: The mental health and well-being of a population are determined by measuring the psychological distress levels of individuals in society. As psychological distress is quite common, especially in families caring for cancer patients, it is important to determine the level of stress. The effective strategy may need to target all members of the primary patient's family. In order to achieve this, there is a need for practical, reliable, useful and multifunctional scanning tools. This study was carried out to test the comparatively validity and reliability of the Turkish form of the Kessler Psychological Distress Scale (K10) and to reveal its explanatory power. The study used a methodological design. The study consist of total 150 people of which 75 relatives of cancer patients treated in a University Hospital Chemotherapy Unit and 75 healthy individuals from general population who did not have family members with cancer. The 10-item Kessler Psychological Distress Scale is a short measurement tool for anxiety and mood disorders. Cronbach's alpha values were calculated to determine the reliability of the scale, factor and fit analyses were done to reveal its validity, and correlation and upper-lower 27% values were calculated to reveal its discriminating power. Cronbach's alpha value of the scale was 0.91. The p-value for standardized factor loads, t values, and the explanatory values of the items were less than 0.001. The goodness of fit indices was within an acceptable range. Total scores showed significant differences according to the lower 27%-upper 27% groups. The Turkish version of the K10 scale is a valid, reliable and practical tool that can be used both in the healthy population and in groups with high stress risk to determine the level of distress.

Structured Abstract: Introduction: Generally, psychological distress is clinically defined as depression, anxiety and/or stress. The mental health and well-being of population are determined by measuring the

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psychological distress levels of individuals. Stress is linked to various health outcomes and illnesses for patient and caregiver. According to some researches; the prevalence of anxiety and depression in cancer patient caregivers is high. Determining the stress level of cancer patients is an extremely important initiative to support them. However, it is neglected in clinical practice. This study was carried out to test the comparatively (healty population and cancer care giver) validity and reliability of the Turkish form of the Kessler Psychological Distress Scale (K10) and to reveal its explanatory power. Turkish validity and reliability study of the K10 scale has been done before. however, only healthy population data were used in the study. In our study, we compared the data of cancer caregivers with high distress levels and healthy population data. In addition, we contributed to the literature by revealing the explanatory nature of the scale in our study.

Subjects and methods: The study used a methodological design. The study consist of total 150 people of which 75 relatives of cancer patients treated in a University Hospital Chemotherapy Unit and 75 healthy individuals from general population who did not have family members with cancer. Healthy individuals and relatives of patients with cancer were compared. In this study, the data was collected using the "Sociodemographic Information form" and "K10 scale". Sociodemographic Information form was created by researchers by examining the literature. It has provided information about participants sociodemographic characteristics. Psychological distress was measured using the 10-item K10 scale. The K10 was developed as a short screening scale for psychological distress by Kessler. The measure has five response categories ranging from 0 (none of the time) to 4 (all of the time). The items were summed to generate a total score ranging from 0 to 40, with higher scores indicating higher levels of psychological distress.

As a result of talks with Kessler, we received the Turkish translation of the Kessler Psychological Distress Scale (K10). This form is presented to the expert opinion for the language validity. Cronbach's alpha values were calculated to determine the reliability of the scale. Explanatory and confirmatory factor analyses were conducted to reveal the construct validity of the scale. Also, Kaiser-Mayer-Olkin (KMO) coefficient and Bartlett Sphericity tests were utilized to determine whether the scale was suitable for explanatory factor analysis. In this study $\chi2$ / sd, GFI, AGFI, CFI, RMSEA, and RMR, were used for determination of scale fit indicates. Regression analyses were performed for factor loadings and items on the scale. Correlation and upper-lower 27% values were calculated to reveal its discriminating power. ANOVA test was used to compare the distress level of cancer caregivers and healthy population. This study was carried out in accordance with ethical principles according to the decision of the non-interventional ethics committee of Aydın Adnan Menderes University, Faculty of Health Sciences, dated 26.09.2018 and numbered 92340882-050.04.04.

Results: The mean age was 50.76 + 6.82, and 98 (75.4%) participants were between the ages of 45-59. Cronbach's alpha was 0.91. The p-value for standardized factor loads, t values, and the explanatory values of the items were less than 0.001. For the confirmatory factor analysis of the K10 scale; the p-value for all items was determined as <0.000. Before the explanatory factor analysis, the KMO (Kaiser-Meyer-Olkin) and Barlett tests, the presupposition tests, were implemented for the applicability of factor analysis. The KMO value was determined as 0.917> 0.60. The goodness of fit indices was within an acceptable range. In order to ensure reliability, the comparison of the lower 27% and the upper 27% groups has been made. According to the t-test results, it has been observed that there is a significant difference between the total scores of the scale and the upper 27% and lower 27% groups. Accordingly, it was determined that the scale made sensitive measurements to discriminate differences.

According to the results of the study, caregivers had more stress than the normal population. Except for the level of education and age, no difference about caregivers sociodemographic characteristics were found in our study.

Conclusions: According to the alpha value found related to the reliability, goodness of fit indices of confirmatory factor analysis, the variance value of the explanatory factor analysis, factor loadings, and discriminating power results, the K10 scale was found to be a valid and reliable tool using the data collected from a new sample. The score obtained from the scale ranged from 9 to 45. Increased scores show the symptoms encountered increase, too, and that they are highly noticeable. The Turkish form of the K10 scale is a valid and reliable tool that can be used to determine the level of distress. Health professionals can use to determine the stress levels of patients and caregivers.

Öz: Bir nüfusun zihinsel sağlık ve refah seviyesi, toplumdaki bireylerin psikolojik sıkıntı düzeylerinin ölçülmesiyle ortaya çıkar. Psikolojik sıkıntı, özellikle kanser hastasına bakım veren ailelerde oldukça yaygın olduğu için, stress düzeyinin belirlenmesi önemlidir. Etkili stratejin birincil hastanın ailesinin tüm üyelerini hedeflemesi gerekebilir. Bunun sağlanabilmesi için pratik, güvenilir, kullanışlı ve çok fonksiyonlu tarama araçlarına gereksinim vardır. Bu çalışma Kessler Psikolojik Distres Ölçeği'nin (K10) Türkçe geçerlik güvenilirliğini iki grupta karşılaştırmalı olarak test etmek, açıklayıcılığını ortaya koymak amacıyla yapılmıştır. Çalışma metodolojik özellikte planlanmıştır. Araştırma Üniversite Hastanesi Kemoterapi Ünitesinde bulunan 75 kanser tanısı almış hastanın yakını ve toplumda bulunan kanserli yakını bulunmayan 75 sağlıklı bireyden oluşmuştur. 10 maddelik Kessler Psikolojik Sıkıntı Ölçeği anksiyete ve duygudurum bozuklukları için kısa bir ölçüm aracıdır. Ölçek güvenirliğini belirlemek amacıyla cronbach alfa değerleri; geçerliliğini ortaya koymak amacıyla faktör analizi, uyum analizleri, ayrıt ediciliğini ortaya koymak amacıyla korelasyon ve alt-üst %27 değerleri belirlenmiştir. Ölçeğin Cronbach alfa değeri 0.91'dir. Standardize edilmiş faktör yükleri, t değerleri ve maddelerin oluşturduğu açıklayıcılık değerleri için p değerinin 0.001'in altındadır. Uyum iyiliği indeks değerleri kabul edilebilir değerler arasındadır. Alt%27-üst%27 gruplarına göre toplam puan puanları anlamlı farklılık göstermektedir. K10 ölçeği Türkçe formu distress düzeyini belirlemek için hem sağlıklı popülasyonda hem de stres riski yüksek olan yüksek olan gruplarda kullanılabilecek geçerli, güvenilir ve pratik bir araçtır.

Anahtar Kelimeler: Ruh sağlığı, stres, kanser bakımverici, stres değerlendirmesi, geçerlik, güvenirlik

Introduction

Mental health is essential to the well-being of individuals, their families, and the population as a whole. The mental health and well-being of a population are determined by measuring the psychological distress levels of individuals in society. Stress is a state of mood that disrupts and threatens the internal and external balance of the individual. Stress needs adequate coping efforts; otherwise, physical and mental illnesses may occur. Claude Bernard defines stress as "the stimuli that disturb the balance of the organism", and Hans Selye describes it as "the response of the organism to all kinds of stimuli". Generally, psychological distress is clinically defined as depression, anxiety and/or stress (Metthews, 2016). Stress, anxiety, and depression are among the mood changes that can occur at any stage of human life. Anxiety is a kind of feeling of disturbance, unease, and fear that is explained with words, such as inner distress, concern, or boredom and which is life-threatening or perceived as a threat. Depression, on the other hand, is a concept that can indicate mood, a symptom, a syndrome, or a disorder. Depression is a common illness worldwide, with more than 264 million people affected (GBD, 2018). Anxiety and depression may occur due to genetic, individual, and environmental factors, and their prevalence is constantly increasing all over the world. Social surveys conducted in many countries show that mental illnesses are much more common than thought (Metheews 2016; Liu et al., 2020). Especially cancer and its treatment can result in psychological distress in both adults with cancer and in their family caregivers. This psychological distress acts as a significant adverse factor in patient-caregiver (Li et al., 2018). According a research the prevalence of anxiety and depression in cancer patient caregivers is approximately 47% and 42%, respectively (Geng et al., 2018). Stress is linked to various health outcomes and illnesses, including cancer, diabetes, cardiovascular disease, etc. for patient and caregiver. Therefore, it becomes important for nurses to monitor individuals' stress levels. To provide preventive mental health services, practical, reliable, useful, and multifunctional surveying tools are required. There are scales for surveying to see if anxiety and depression exist. There are many scales, such as the Beck Anxiety Scale, the Beck Depression Scale, Depression Anxiety Stress Scales, the Zung Depression Scale (ZDS), the Geriatric Depression Scale, or the Edinburgh Postpartum Depression Scale (Kılınç & Torun, 2011). The hospital anxiety and depression scales are specific to the population with a medical illness. At the same time, it does not

question guilt and despair. The geriatric depression scale and the Edinburgh postpartum depression scale are also appropriate for special populations (APA, 2020; Yeung et al., 2020). The Perceived Stress Scale is a short and easy to use questionnaire established with acceptable psychometric properties (Lee, 2012). The SAVE-9 (Stress and Anxiety to Viral Epidemics- 9 items) scale has been developed as a tool for assessing work anxiety and stress in response to the viral epidemic of health professionals working to prevent the spread of the virus and to treat infected (Tavormina et al., 2020). There are a lot of scales for evaluation stress, anxiety, depression but there is a need for a practical scale that can be used in many areas and will determine the level of distress. We think about The Kessler Psychological Distress Scale (K10) is easy to apply and a safe new surveying tool in clinical practice that question mood disorders, such as anxiety and depression. In this study, K10 scale, which is short and practical and which evaluates psychological distress in the normal population and individuals with chronic diseases, was developed. The Turkish adaptation, validity, and reliability study of the scale had already been carried out so that it could be used as a surveying test in primary healthcare units in our country (Altun et al., 2019). We were carried to do the validity and reliability study of the Turkish form of the scale, whose reliability and discrimination validity study was done in the general population, in healthy individuals and risky group comparatively in this study.

Materials and Methods

This study consisted of 150 people totally. 75 of the total participants were individuals who were the relatives of the patients treated for cancer in an University Hospital chemotherapy unit between June 25, 2018 and June 30, 2018. Also, the study included 75 individuals from the general population who were not diagnosed with cancer or had no relatives diagnosed with cancer and who agreed to participate in the study. The subjects were selected from the general population by using the non-probability sampling method.

It is stated that a sample size of between 100 and 200, or 1x10 for each item will be sufficient for factor analysis to be used in scale applications (Beins, 2017; De Vallis, 2017; Field, 2018). A total of 150 people, at least 75 for each group, made up the sample within the scope of the inclusion criteria. The data were collected by the researcher using the face-to-face interview method.

The Kessler Psychological Distress Scale (K10)

The 10-item Kessler Psychological Distress Scale is a short measurement tool for anxiety and mood disorders. This scale is a questionnaire designed to determine the distress levels based on questions about anxiety and depressive symptoms experienced by a person in the last 4 weeks. High K10 scores correlate well with a diagnosis of depression and anxiety. The scale has been used to evaluate psychological distress levels of the normal population and relatives of patients with cancer in some studies conducted so far (Kessler, 2003).

Language validity

The scale was developed by Kessler. As a result of talks with Kessler, we received the Turkish translation of the Kessler Psychological Distress Scale (K10). This form is presented to the expert opinion for the language validity.

Examination of psychometric properties (validity- reliability)

Item-total correlations and Cronbach's alpha reliability coefficient were used for the internal consistency test of the scale. A reliability coefficient of 0.7 or greater shows the scale has good reliability, and an alpha value of greater than .90 indicates that the reliability of the scale is excellent (De-Vellis, 2017; Kılıç, 2016). Explanatory and confirmatory factor analyses were conducted to reveal the construct validity of the scale. Also, Kaiser-Mayer-Olkin (KMO) coefficient and Bartlett Sphericity tests were utilized to determine whether the scale was suitable

for explanatory factor analysis. Principal component analysis and orthogonal varimax rotation technique were used so that the factor analysis could be conducted. To determine the construct validity of the K10 scale, the explanatory (exploratory) factor analysis method was applied. Before the explanatory (exploratory) factor analysis, KMO (Kaiser-Meyer-Olkin) and Bartlett tests, the presupposition tests, were applied for the applicability of factor analysis. The KMO value should be greater than 0.5 to conduct a factor analysis (DeVellis, 2017; Kyriazos, 2018).

Factor analysis

While EFA tries to provide a determination function and to collect data for establishing hypotheses, CFA is used to test whether there is enough relationship between these factors determined, how the variables classified into factors, whether the factors are independent of each other, and whether the factors are adequate to explain the model (DeVellis, 2017; Kyriazos, 2018; Özkorkmaz et al., 2013). In our study, normality analyzes were performed with the Shapiro Wilks test. The capacity to reproduce the data was calculated using fit indices different from the indices of the confirmatory factor analysis. There are many different fit indices in the literature. Since a single statistic reflects a certain aspect of the fit, it is recommended to use different fit indices (Kyriazos, 2018). In our study, fit indices, such as $\chi2$ / sd, GFI, AGFI, CFI, RMSEA, and RMR, were used.

Regression analyses were performed for factor loadings and items on the scale. Total correlation coefficients were calculated to ensure internal consistency. The t-test was performed for the discriminating power of the items, and findings regarding the values and significance levels were determined (Beins, 2017).

The discriminating power

To evaluate the discriminating power of the scale, the lower 27%-upper 27% value was calculated.

Ethics

This research was conducted in accordance with the Helsinki Declaration.Approval was received from Aydin Adnan Menderes University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (approval no: 92340882-050.04.04). The data of the patients who volunteered to participate in the study were collected after the purpose of the study was explained to them and they agreed to participate in the study. Written informed consent was obtained from all the participants.

Findings

According to the groups, 75 (49.7%) of the participants were caregivers, and 76 (50.3%) were from the general population. The mean age was 50.76 + 6.82, and 98 (75.4%) participants were between the ages of 45-59. Also, 111 (73.5%) of the participants were female, 73 (48.3%) had primary school or lower education levels, and 115 (76.2%) were unemployed. According to our research results, 118 (78.1%) of the participants had equal income and expenses, 132 (87.4%) lived in a nuclear family, and 77 (51.0%) of them did not have a chronic disease (Table 1).

Table 1. General Characteristics Of The Sample (N=151) Tablolar Times News Roman olmalı

General characteristics		n	%
Grup	Care giver	75	49.7
	Normal Population	76	50.3
Age	> 50	72	47.7
	51-55	47	31.1
	< 56	32	21.1
Gender	Female	111	73.5
	Male	40	26.5
Education Status	Primary School	73	48.3
	Middle School	46	30.4
	High School	32	21.1
Employment status	Yes	36	23.8
	No	115	76.1
Income level	Less than expense	33	21.8
	Income equal to expense	118	78.1
Family type	Nuclear family	132	87.4
	Others	19	12.5
Chronic disease	Yes	74	49.0
	No	77	51.0

The reliability analysis was applied for the K10 scale, and the alpha coefficient was found as 0.917. The item analysis for the effect of items on internal consistency is given below (Table 2).

Table 1. K10 Scale Item Analysis

	Scale score when item is deleted	Variance when item is deleted	Item total correlation	When item is deleted cronbach alpha	Factor load
M1	20.553	42.032	0.760	0.905	0.819
M2	20.676	42.205	0.694	0.908	0.764
M3	21.461	41.739	0.666	0.910	0.737
M4	21.284	41.678	0.708	0.907	0.772
M5	21.353	39.812	0.734	0.906	0.797
M6	21.669	42.549	0.649	0.910	0.718
M7	21.561	42.806	0.650	0.910	0.717
M8	21.846	41.403	0.680	0.909	0.743
M9	21.361	39.892	0.741	0.905	0.800
M10	21.530	41.693	0.641	0.911	0.709

Total Cronbach alpha=0.917   Total variance : 57.530

Confirmatory factor analysis for the K10 scale

The diagram for the confirmatory factor analysis of the K10 scale and the goodness of fit criteria for the confirmatory factor analysis are given below (Figure 1). $\chi2/sd$ 1.340; GFI 0.936; CFI 0.983; RMSEA 0.051; RMR was 0.035 Accordingly, the K10 scale yielded the AGFI criterion within acceptable limits and all other goodness of fit criteria within normal limits (Table 3).

Table 3. K10 Scale Confirmatory Factor Analysis Index Values

Index	Normal Value	Acceptable Value	K10 Scale
χ^2/sd	≤ 3	$\leq 4\text{-}5$	1.340
GFI	≥ 0.90	0.89-0.85	0.936
AGFI	≥ 0.90	0.89-0.85	0.896
CFI	≥ 0.97	≥ 0.95	0.983
RMSEA	≤ 0.05	0.06-0.08	0.051
RMR	≤ 0.03	≤ 0.05	0.035

Standardized factor loadings, t values, and explanatory (R^2) values yielded by the items are given below. While the standard error was 0.271 in question 10, it was determined as 0.040 in question 1. The p-value for all items was determined as <0.000 (Table 4).

Table 4. K10 Scale Factor Loads and Regression Coefficients of Items

Items		Factors	Std. β	B	S.error	t	P	R^2
M10	<---	K10	1.00	0.526	0.271	7.388	0.000	0.459
M9	<---	K10	1.23	0.430	0.063	6.846	0.000	0.609
M8	<---	K10	1.03	0.471	0.065	7.275	0.000	0.499
M7	<---	K10	0.88	0.392	0.053	7.367	0.000	0.467
M6	<---	K10	0.91	0.412	0.056	7.348	0.000	0.474
M5	<---	K10	1.24	0.451	0.066	6.877	0.000	0.603
M4	<---	K10	1.02	0.365	0.052	7.069	0.000	0.559
M3	<---	K10	0.99	0.469	0.064	7.038	0.000	0.481
M2	<---	K10	0.92	0.385	0.053	7.231	0.000	0.494
M1	<---	K10	0.96	0.272	0.040	6.864	0.000	0.599

Explanatory factor analysis

Before the explanatory factor analysis, the KMO (Kaiser-Meyer-Olkin) and Barlett tests, the presupposition tests, were implemented for the applicability of factor analysis. The KMO value was determined as 0.917> 0.60 (fig1).
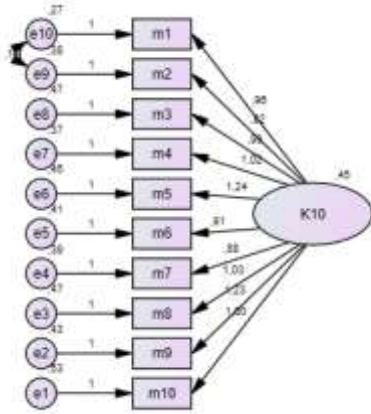
Figure 1. Diagram of K10 Scale Confirmatory Factor Analysis

As a result of Barlett test, Chi-square = 749.488, df = 36, and p=0.000<0.05 values were found. The varimax method was chosen in the factor analysis application, and the structure of the relationship between the factors was maintained the same. The factor loads of each item ranged between 0.70 and 0.81. As a result of the rotation, the variables were gathered under a single factor with a total explained variance of 57.530% (Table 2). The eigenvalue scree plot used in determining the number of scale factors is given below. In the scree plot of the factors, the scale showed a breakpoint after the first factor (fig 2).
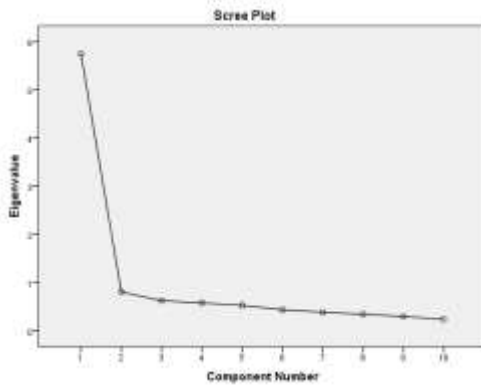

Figure 2. Diagram of K10 Scale Confirmatory Factor Analysis

Discriminating power

In the study, statistically significant difference was found between the caregivers (28.061 + 1.199) and the normal population (19.385 + 0.393) in the lower 27% and upper 27% groups of the K10 Scale scores (p<0.000).

As a result of the independent samples t-test between the two groups, a difference was found (P = 0.00 <0.05). Accordingly, it was observed that the K10 total scores of the caregiver group were higher on average compared to those of the normal population (Table 5).

Table 5. Differentiation Status of K10 Scores by Descriptive Characteristics

	General characteristics	n	$\underline{X} \pm SD$	statistic
Grup	Care giver	75	28.061±1.199	t=6.875
	Normal Population	76	19.384±0.392	p=0.000
Age	≥ 50	72	20.666±6.064	F=0.906
	51-55	47	23.923±0.956	p=0.463
	≤ 56	32	24.061±1.181	
Gender	Women	111	24.281±0.907	t=1.278
	Men	40	22.147±1.134	p=0.203
Educational status	Primary school	73	36.250±12.223	F=2.485
	Middle school	46	23.383±1.012	p=0.047
	High school	32	22.863±1.402	
Employment status	Yes	36	23.867±1.249	t=0.91
	No	115	23.707±0.891	p=0.928
Income level	Less than expense	33	22.500±1.568	F=0.406
	Equal to expense	118	23.970±0.855	p=0.667
Family type	Nuclear family	132	23.863±0.786	t=0.570
	Others	19	22.461±2.358	p=0.581
Chronic disease	Yes	74	23.952±0.958	t=0.345
	No	77	23.439±1.128	p=0.731

As a result of the ANOVA test conducted for the analysis of the question of whether there was a difference between the K10 scores of the age groups, no difference was found (P= 0.463> 0.05). Accordingly, K10 scores of the age groups were similar (Table 5).

As a result of the independent samples t-test conducted to analyze the question of whether there was a difference between K10 scores in terms of sex, no difference was found (P = 0.203> 0.050). Accordingly, K10 scores were found similar in terms of sex (Table 5).

The ANOVA test indicated that there was a difference between the K10 scores of the participants in terms of the level of education (P = 0.047 <0.05). According to the post hoc tests, while the K10 scores of the literate-primary school group were the lowest, the K10 scores of the other education groups were similar and higher than the literate-primary school group (Table 5).

The result of the independent samples t-test indicated that there was no difference between the K10 scores of the participants in terms of employment status, family type, and chronic diseases (P> 0.050). Accordingly, the K10 scores of the participants were similar in terms of employment status, family type, and chronic diseases (Table 5). The ANOVA test results showed that there was no difference between the K10 scores of the participants in terms of income (P = 0.667> 0.05). Accordingly, K10 scores of income groups were similar, as well (Table 5).

Discussion

In our study, the mean score of the K 10 scale was determined as 0.91. Altun et al (2019) reported the mean K10-PDS score of 200 people as 0.95 in their Turkish validity and reliability study. Our result is similar to the studies conducted so far (Altun et al, 2019; Bu et al., 2017; Bougie et al., 2016; Easton et al., 2017 Kessler et al., 2003; Pereira et al., 2019, Sampasa-Kanyinga et al., 2018). In our study, the validity, reliability, and discriminating power of the K10 scale were determined by comparing two groups with different psychological distress levels. The scale scores of healthy individuals participating in our study were found to be similar to the results of the study of Altun et al. (2019), in that caregivers of patients with cancer were determined to experience

more psychological distress than the normal population. Cancer is a health problem that affects individual families and society. As a result, various physical and mental problems are observed in individuals giving care to patients with cancer. A study has reported a high rate of depression among caregivers of a patient with cancer (Grobe, 2018). Variables such as age, sex, education, family type, economic status, and chronic illness increase levels of anxiety and depression in caregivers. However, no difference was found in our study. This may have been because the majority of the participants were under the age of 50, their economic status was not bad, and they did not have chronic diseases.

Factor analyses were conducted to reveal the construct validity of the scale. The KMO test showed that the sample size was enough for factor analysis (KMO = 0.917). The factor analysis performed in this study confirms the original (Altun et al., 2019). The Barlett test showed that there was a relationship between the variables included in the factor analysis (DeVallis, 2017). We found that there was enough relationship between variables to perform a factor analysis based on values $\chi2 = 749.488$ and $p <0.001$. Our finding confirms the original (Altun et al., 2019). According to this study, the Turkish version of the K10 scale has high discriminating power. when the literature is examined, similar to our study, it is seen that the scale is valid in studies conducted in our country and the other countries (Altun et al., 2019; Bougie et al., 2016; Bu et al., 2017; Easton et al., 2017; Pereira et al., 2019). When the standardized coefficients were examined, it was determined that factor loads were high, standard error values were low, t values were significant ($p <0.001$), and $R2$ values were high. These results confirmed the construct validity of the factor structure determined previously.

The factor structure of the K10 scale, which was previously determined, was tested with confirmatory factor analysis. Confirmatory factor analysis (CFA) is a type of structural equation model (SEM) that can measure the relationship between observed variables and latent variables (Kyriazos, 2018). In the present study, the most frequently used goodness of fit indices in the literature were utilized. The results of the analysis revealed that the fit statistics calculated with the confirmatory factor analysis showed an acceptable fit with the previously determined factor structure of the scale. Similar results were found in other validity and reliability studies (Bougie et al., 2016; Easton et al., 2017; Pereira et al., 2019; Sampasa-Kanyinga et al., 2018). Our finding is consistent with the literature. These results show that the scale is a valid and reliable tool according to the results of our study and the literature.

Total-score scores showed a significant difference according to the lower 27%-upper 27% group calculations which were conducted to evaluate the discriminating power of the scale. The total-score scores of the upper 27% were higher than the total-score scores of the lower 27% (Table 6). Accordingly, it was determined that the scale made sensitive measurements to discriminate differences.

According to the results of the study, caregivers had more burden, mood disorders and than the normal population. Cancer is a health problem that affects individual families and society. As a result, various physical and mental problems can be encountered in individuals giving care to patients with cancer. Studies have reported a high rate of depression among caregivers of patients with cancer (Borges et al 2017; Große et al., 2018; Park et al., 2013; Rha et al., 2015; Yıldız et al., 2016).

Variables, such as age, gender, education, family type, disturbance, financial concerns, and chronic diseases increase the levels of anxiety and depression in caregivers (Li et al., 2018; Park et al., 2013; Toptaş Kılıç and Öz, 2019). However, except for the level of education and age, no difference was found in our study. This may have been because the majority of the participants economic status were not bad, and they did not have chronic diseases. In a study conducted, it was found that there was a relationship between the age of caregivers of cancer patients and their depression-anxiety levels. There was a moderate relationship above the age of 60, while a low level

of association was found under the age of 45. Distress levels of individuals in the high school group were found to be higher than other groups (Li et al., 2018). People with a low level of education may have difficulties in getting support from healthcare personnel while receiving care compared to more educated people. It can be thought that inadequate support increases the stress levels of individuals.

Conclusion and Recommendations

According to the alpha value found related to the reliability, goodness of fit indices of confirmatory factor analysis, the variance value of the explanatory factor analysis, factor loadings, and discriminating power results, the K10 scale was found to be a valid and reliable tool using the data collected from a new sample. K 10 is a practical scale that health care professionals can use to determine the stress levels of patients and caregivers.

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