

The relationship between the psychological resilience of patients with chronic kidney failure and post-traumatic growth and psychological symptoms

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SUMMARY

Objective: This study aims to investigate the factors that may contribute to post-traumatic growth and resilience in chronic kidney failure (CKF) patients, the role of depression and anxiety symptoms as well as resilience in the emergence of post-traumatic growth.

Method: 64 patients diagnosed with CKF and received dialysis were included in the study. The Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Post-Traumatic Growth Inventory (PTGI) and Resilience Scale for Adults (RSA) were administered to all patients, respectively.

Results: Self-perception of PTGI ($r = -0.70$, $r = -0.65$), change in relationships with others ($r = -0.57$, $r = -0.65$), change in philosophy of life ($r = -0.60$, $r = -0.57$) subscales, and PTGI total score ($r = -0.70$, $r = -0.66$) were shown to have a negative moderate and statistically significant relationship with BDI and BAI scores ($p < 0.001$). A negative moderate and statistically significant relationship was found between BDI and BAI scores and perception of the future subscale ($r = -0.51$, $r = -0.57$), self-perception ($r = -0.54$, $r = -0.59$), social resources ($r = -0.66$, $r = -0.60$) subscales of RSA and total RSA score ($r = -0.68$, $r = -0.71$) ($p < 0.001$). A statistically significant and moderately positive ($r = 0.69$) relationship between PTGI and RSA total scores was also determined ($p < 0.001$).

Discussion: Anxiety and depression symptoms observed in CKF patients impact the psychological resilience levels of patients and the development of post-traumatic growth. Post-traumatic growth develops as psychological resilience increases. Thus, psychological interventions should be planned to support the psychological resilience levels and post traumatic growth development of CKF patients.

Key Words: Chronic kidney failure, post-traumatic growth, resilience, depression, anxiety.

INTRODUCTION

As life expectancy increases, chronic diseases have become a principal problem in the field of human health (1). The presence of a chronic disease may constitute a traumatic risk factor. Chronic kidney failure (CKF) is a public health problem that seriously harms human health worldwide and is an irreversible progressive disease that significantly increases morbidity and mortality (2, 3). While its prevalence is 13.4% worldwide (3, 4), it is observed in 15.7% of the general adult population in Turkey (2). CKF is a chronic disease that not only endan-

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gers patients' physical health but also their mental health and leads to an increase in the incidence of psychological disorders such as anxiety and depression (6). In addition to the presence of CKF and its complications, hemodialysis severely affects an individual's personal, family, work, and social life (7). Studies have shown that the prevalence of depression in patients undergoing hemodialysis is approximately three times higher than that in other patients (1, 2, 8). Among these patients, one-fourth of patients are affected by depression and anxiety is observed in 12% to 52% of patients, and these rates are much higher than in the general population (9). The presence of depression and anxiety

symptoms in this patient group is associated with increased mortality, increased hospitalization rate, and non-compliance with hemodialysis treatment (9,10).

Previous research has shown that there can be positive psychological changes in chronic diseases (11); such as chronic kidney failure. Posttraumatic growth (PTG) is defined as a positive psychological change that occurs in response to an extremely challenging life situation (12) and includes positive changes in various aspects of life, such as improvement in social relationships, seeking new ways of living, understanding the value of life, change in belief system and awareness of personal power (13, 14). Previous studies have shown that PTG is associated with numerous positive outcomes, including decreased symptoms of depression and increased feelings of relaxation and interpersonal relationships (14). Moreover, PTG development facilitates adaptation to the challenging disease process with these positive outcomes.

The principal mechanism leading to PTG is resilience (15). Psychological resilience is defined as “one’s ability to cope with difficult life stressors and return to their former state” (16). Resilience is generally thought to influence the likelihood of PTG in individuals (12). In fact, although psychological resilience has been shown to contribute to the development of posttraumatic growth in previous studies (17), depression and anxiety have been reported to have negative effects on PTG (18).

CKF is a life-threatening long-term disease. Psychological factors that may affect PTG in CKF have not been adequately studied in previous studies. Our hypothesis is that anxiety and depression symptoms in CKF have a negative effect on posttraumatic growth and that resilience favours posttraumatic growth. The aim of this study was to investigate the contributing factors of posttraumatic growth and resilience in patients receiving hemodialysis treatment for CKF, and the role of depression and anxiety symptoms as well as resilience in the emergence of posttraumatic growth.

METHOD

Design and Sampling

A descriptive, observational design was used in this study. Patients diagnosed with CKF and treated by hemodialysis in Karadeniz Technical University Medical Faculty Nephrology Unit. Between September 2016 and September 2017, a total of 86 patients were followed up with hemodialysis treatment in the nephrology unit. Among these patients, 64 patients who met the study criteria and who gave voluntary consent for the study were included in the study. A total of 64 patients diagnosed with CKF, followed by the Nephrology Unit, and receiving hemodialysis treatment 2-3 times a week for at least 6 months, each session lasting an average of 4-5 hours, were included in the study. The inclusion criteria were; age \geq 18 years, adequate the physical, mental and linguistic capacity to answer the scale questions, no diagnosis or treatment history of any psychiatric disease and agree to participate in the study. Patients insufficiently educated to read the scales with clinical conditions too severe to be able to comply with the evaluation, diagnosed with dementia, with histories of either physical disease affecting the central nervous system, head trauma resulting in loss of consciousness, mental disability, or who did not provide informed consent were excluded from the study.

The patients were informed about the research, and their sociodemographic characteristics were recorded once their written consent to take part was received. Other medical diseases of the patients were obtained from their medical records. All patients were administered the Beck Depression Inventory (BDI) for depressive symptoms, followed by the Beck Anxiety Inventory (BAI) to determine anxiety symptoms, the Posttraumatic Growth Inventory (PTGI) and finally the Resilience Scale for Adults (RSA) to determine psychological resilience. Clinical interviews and BDI, BAI, PTGI, and RSA applications were conducted by the physician responsible for the research.

The study commenced after receiving the approval from the Karadeniz Technical University Clinical

Research Ethical Committee (no. 24237859-599).

Assessment Tools

Sociodemographic Data Form: Prepared by the authors, this form was designed to investigate sociodemographic characteristics, such as age, sex, marital status, and employment, and clinical characteristics such as onset age of disease, total disease duration, total number of hospitalizations.

Beck Depression Inventory (BDI): This scale was developed to measure the risk of depression, levels of depressive symptoms and changes in severity in adults (19). The reliability and validity of the Turkish version were confirmed by Hisli (1989) (20). The scale had a cut-off point of 17.

Beck Anxiety Inventory (BAI): Developed by Beck et al. (1988), this self-report scale was used to determine the frequency of anxiety symptoms (21). This Likert-type scale consists of 21 items scored between 0 and 3. Its validity and reliability in Turkey were investigated by Ulusoy et al. (1998) (22).

Post-traumatic Growth Inventory (PTGI): Developed by Tedeschi and Calhoun (1996) (23), this scale measures post-traumatic growth, and it was adapted to Turkish by Dürü (2006) (24). This six-point (0-5) self-report Likert-type scale consists of 21 items. The lowest possible score is 0 and the highest 105. Higher scores indicate a higher level of growth in the face of traumatic experience. The Cronbach's alpha internal consistency value of the original version (23) is 0.90. The internal consistency of the sub-domains ranges between 0.66 and 0.85. Test-retest reliability of $r=0.71$ was calculated. The original scale has also been reported to exhibit significant positive correlation with variables such as optimism, religious participation, extraversion, openness to experiences, compliance, and conscientiousness. Factor analysis for the reliability study of the original scale revealed five domains—changes in relationships with others, new possibilities, personal strength, spiritual change, and appreciation of life.

Resilience Scale for Adults (RSA): Developed by Friborg et al. (2003), the RSA consists of the dimensions of “personal strength”, “structured style”, “social competence”, “family cohesion”, and “social resources” (25). The reliability and validity of the scale in Turkey were investigated by Basım and Çetin (26). The dimensions of “structural style” (3,9,15,21) and “perception of the future” (2,8,14,20) consist of four items each, “family cohesion” (5,11,17,23,26,32), “perception of self” (1,7,13,19,28,31), and “social competence” (4,10,16,22,25,29) of six items each, and “social resources” (6,12,18,24,27,30,33) of seven items. The scale consists of a total of 33 questions. Items 1, 3, 4, 8, 11, 12, 13, 14, 15, 16, 23, 24, 25, 27, 31, and 33 are reverse scored. If the researcher desires psychological resilience to increase in line with scores, then the response boxes must be evaluated as 1, 2, 3, 4, and 5 from left to right. The minimum possible score is 33, and the maximum possible score is 165 (26). The internal consistency coefficients of the subdimensions range between 0.66 and 0.81. The total Cronbach's alpha coefficient for this scale is 0.86.

Statistical Analysis

Data were recorded and analyzed using SPSS (Statistical Package for the Social Sciences) version 23.0. Descriptive statistics were expressed as numbers and percentages for categorical variables and as mean, standard deviation, minimum, and maximum values for continuous variables. Normality of the distribution of continuous variables was evaluated using the One-Sample Kolmogorov-Smirnov test. Independent Samples T Test was applied for continuous variables with normal distribution, and Mann Whitney U Test was applied for continuous variables with non-normal distribution. Relationships between continuous variables were assessed using Pearson's test when normal distribution conditions were met, and with Spearman's test when those conditions were not met. p values <0.05 were considered statistically significant.

The power of the study was calculated using the OpenEpi. The power was calculated %73.85 based on %5 type 1 error, %95 confidence interval.

Table 1. Sociodemographic and clinical characteristics of the patients (n=64)

n= 64	n	%
Gender		
Male	34	53.1
Female	30	46.9
Marital status		
Married	45	70.3
Single	19	29.7
Educational Level		
Illiterate	2	3.1
Literate	8	12.5
Elementary	20	31.3
Middle School	10	15.6
High School	16	25
University	8	12.5
Work Status		
Working	36	56.3
Not working	28	43.8
Another Comorbid Diseases*		
Present	39	60.9
Cardiovascular diseases	25	64.1
Endocrine system diseases	18	46.2
Immune system diseases	6	15.4
Gastrointestinal system diseases	5	12.8
Pulmonary system diseases	4	10.3
Musculoskeletal diseases	1	2.6
Absent	25	39.1
Diagnosis of psychiatric diseases		
None	64	100.0
Suicide History		
None	64	100.0
	Mean – SD	Range (min-max)
Age (year)	49.86 – 11.75	23-75
Disease duration (year)	8.80 – 8.48	1-35

* More than one disease can occur at the same time.

RESULTS

Sixty-four individuals were included in this study. The participants' mean age was 49.9 ± 11.8 years (min. 23 max. 75), 53.1% were men, 70.3% were married, 31.3% were primary school graduates, 25.0% were high school graduates, 56.3% were in income-generating employment, and 60.9% had an additional medical disease. Mean time elapsed since onset was 8.8 ± 8.5 years (1-35). Participants' sociodemographic characteristics are shown in Table 1.

The participants' mean BDI score was 7.52 ± 6.74 , mean BAI was 7.88 ± 6.80 , mean PTGI was 50.56 ± 23.13 , and mean RSA was 129.92 ± 20.55 . The scale scores are presented in Table 2.

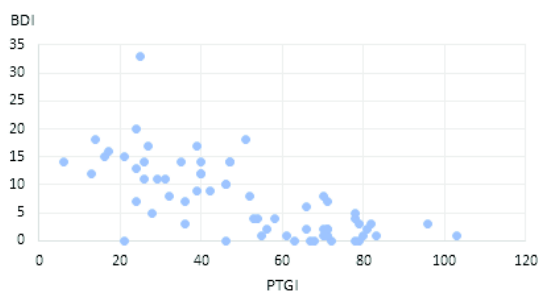


Table 2. Scale scores of the patients

	Mean – SD	Range (min-max)
BDI	7.52 – 6.74	0-33
BAI	7.88 – 6.80	0-27
PTGI		
Perceived change in self	26.75 – 11.79	1-50
A changed philosophy of life	12.59 – 7.63	0-28
A changed sense of relationships with others	11.22 – 6.20	1-25
Total PTGI score	50.56 – 23.13	6-103
RSA		
Personal structure	15.20 – 3.06	10-20
The perception of future	14.94 – 4.09	4-20
Family coherence	25.19 – 4.36	11-30
The perception of self	22.75 – 5.93	11-30
Social competence	23.42 – 4.64	12-30
Social support	28.42 – 5.44	15-35
Total RSA score	129.92 – 20.55	81-165

The relationship between sociodemographic characteristics and PTGI is shown in Table 3. The mean RSA family cohesion subscale scores were significantly higher among individuals educated to middle school level or lower than those educated to high school or university level ($p=0.041$). The mean RSA perception of self-subscale scores were significantly higher in men than in women ($p=0.012$). The relationship between sociodemographic characteristics and RSA is shown in Table 4.

Significant and moderate negative correlation was determined between BDI and BAI scores and the total PTGI scores ($r= -0.70$, $r= -0.66$). Significant and moderate negative correlation was determined between BDI and BAI scores and the PTGI changes in perception of self ($r= -0.70$, $r= -0.65$) (Table 5, Figure 1). Significant and moderate negative correlation was also observed between BDI and BAI scores and the total RSA scores ($r= -0.68$, $r= -0.71$). Significant and moderate negative correlation was also observed between BDI and BAI scores and the RSA perception of the future ($r= -0.51$, $r= -0.57$), perception of self ($r= -0.54$, $r= -0.59$) and social support ($r= -0.65$, $r= -0.60$) subscales (Table 5, Figure 2).

Significant and moderate positive correlation was determined between total PTGI and total RSA

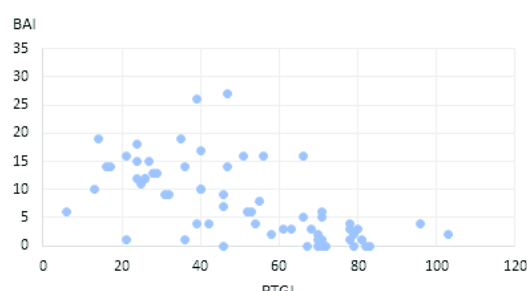


Figure 1. Correlation of BAI and BDI with PTGI

Table 3. Sociodemographic features and PTGI

	PTGI			
	Perceived change in self	A changed philosophy of life	A changed sense of relationships with others	Total PTGI score
	Mean – SD	Mean – SD	Mean – SD	Mean – SD
Gender				
Female	24.57 – 13.52	11.80 – 7.57	10.90 – 5.67	47.27 – 24.25
Male	28.68 – 9.83	13.29 – 7.72	11.50 – 6.72	53.47 – 22.04
Marital status				
Single	24.00 – 11.34	10.53 – 6.81	10.05 – 5.09	44.58 – 20.43
Married	27.91 – 11.91	13.47 – 7.86	11.71 – 6.61	53.09 – 23.94
Educational level				
Middle school and lower	26.00 – 12.03	12.33 – 7.55	11.48 – 6.69	49.80 – 24.01
High school and university	28.00 – 11.53	13.04 – 7.90	10.79 – 5.41	51.83 – 22.02
Work status				
Not working	24.5 – 12.37	12.21 – 7.11	11.36 – 6.42	48.07 – 23.78
Working	28.5 – 11.19	12.89 – 8.10	11.11 – 6.12	52.5 – 22.75
Presence of another comorbid diseases				
Absent	27.48 – 12.00	12.68 – 7.68	10.96 – 6.58	51.12 – 23.30
Present	26.28 – 11.79	12.54 – 7.70	11.38 – 6.03	50.21 – 23.31
Duration of disease (year)*				
≤5 years	25.30 – 12.17	12.27 – 8.00	11.85 – 6.34	49.42 – 24.76
>5 years	28.29 – 11.37	12.94 – 7.33	10.55 – 6.09	51.77 – 21.60

Independent Samples T Test was applied for continuous variables with normal distribution, and Mann Whitney U test was applied for continuous variables with non-normal distribution. In this table, the p values of all tests are above 0.05

*: Categorized from median value

scores ($r = -0.69$). Significant and moderate positive correlation was determined between total RSA scores and PTGI perceived change in self, changes in philosophy of life, changes sense of relationships ($r = 0.67, r = 0.57, r = 0.56$) (Table 6, Figure 3).

The correlation analysis age, duration of disease and BDI, BAI, PTGI and RSA is shown in Table 7. No significant correlation is found.

DISCUSSION

The purpose of this study was to identify factors capable of contributing to PTG and psychological resilience in patients with CKF and the role of depressive and anxiety symptoms in addition to resilience in the emergence of PTG. In this study, it was shown that anxiety and depression symptoms observed in CKF patients impact the psychological resilience levels of patients and the development of

post-traumatic growth. Post-traumatic growth develops as psychological resilience increases.

Among the demographic variables affecting the development of PTG, the results in the literature on age are inconsistent. Some studies on the subject have reported that the elderly exhibit greater growth than young people (27). In the present study, no significant correlation was found between PGI total score and subscale scores and age and disease duration. Consistent with this finding Maddi et al. (2006) found a positive correlation between age and psychological resilience (28). The literature supports that psychological endurance increases with age (29). Another study reported that experienced acquired over the years may affect the emergence of psychological resilience (30). However, a study investigating the effect of PTG and psychological resilience in CKF patients on quality of life concluded that PTG levels were higher among middle-aged patients compared to

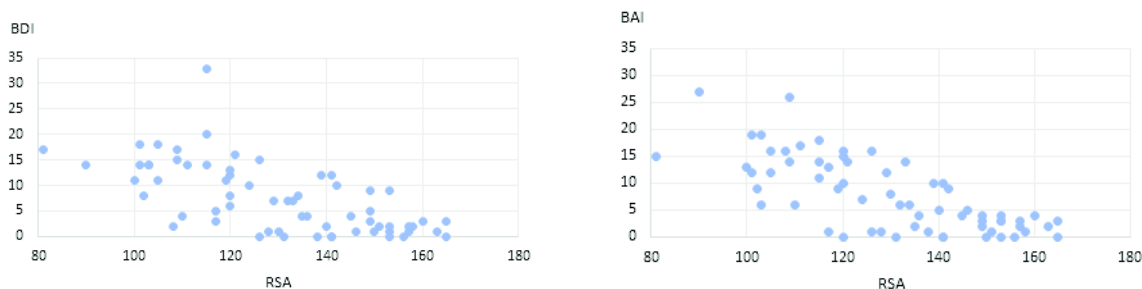


Figure 2. Correlation of BAI and BDI with RSA

The relationship between the psychological resilience of patients with chronic kidney failure and post-traumatic growth and psychological symptoms

Table 4. Sociodemographic features and RSA

	Personal structure	The perception of future	RSA				Total RSA score
			Family coherence	The perception of self	Social competence	Social support	
	Mean – SD	Mean – SD	Mean – SD	Mean – SD	Mean – SD	Mean – SD	Mean – SD
Gender							
Female	14.67 – 2.88	13.83 – 4.18	24.97 – 4.72	20.70 – 6.06*	21.90 – 4.54*	27.53 – 5.97	123.60 – 21.07*
Male	15.68 – 3.18	15.91 – 3.82	25.38 – 4.08	24.56 – 5.26*	24.76 – 4.36*	29.21 – 4.88	135.50 – 18.65*
Marital status							
Single	14.74 – 3.05	13.79 – 3.60	24.32 – 4.27	20.74 – 5.57	21.74 – 4.00	27.79 – 4.49	123.11 – 15.69
Married	15.40 – 3.08	15.42 – 4.23	25.56 – 4.39	23.6 – 5.93	24.13 – 4.75	28.69 – 5.82	132.80 – 21.81
Educational level							
Middle school and lower	15.18 – 3.00	14.98 – 4.25	25.85 – 4.45*	22.20 – 5.87	23.88 – 4.21	28.00 – 5.56	130.07 – 21.01
High school and university	15.25 – 3.25	14.88 – 3.92	24.08 – 4.05*	23.67 – 6.05	22.67 – 5.30	29.13 – 5.27	129.67 – 20.21
Work status							
Not working	14.89 – 3.17	14.32 – 3.99	25.21 – 5.09	21.11 – 6.37	23.07 – 4.25	28.29 – 5.11	126.89 – 20.51
Working	15.44 – 3.00	15.42 – 4.16	25.17 – 3.77	24.03 – 5.31	23.69 – 4.97	28.53 – 5.75	132.28 – 20.56
Presence of another comorbid diseases							
Absent	15.52 – 3.03	15.92 – 3.84	24.92 – 4.76	23.64 – 5.92	23.04 – 5.43	28.76 – 5.25	131.80 – 18.57
Present	15.00 – 3.10	14.31 – 4.17	25.36 – 4.13	22.18 – 5.95	23.67 – 4.12	28.21 – 5.62	128.72 – 21.88
Duration of disease (year)**							
≤5 years	15.52 – 3.02	15.33 – 3.96	25.06 – 4.66	23.27 – 5.94	23.42 – 4.95	29.00 – 5.62	131.61 – 20.04
>5 years	14.87 – 3.12	14.52 – 4.26	25.32 – 4.09	22.19 – 5.96	23.42 – 4.37	27.81 – 5.26	128.13 – 21.27

Independent Samples T Test was applied for continuous variables with normal distribution, and Mann Whitney U test was applied for continuous variables with non-normal distribution.

*: p<0.05 **: Categorized from median value.

young or elderly patients (31). However, there are also studies reporting that the relationship of PTG development with factors such as age, marital status and socioeconomic status is inconsistent (32, 33).

Anxiety and depression are common psychological problems in patients with CKF (6). The presence of anxiety and depression can also affect the physical and mental health of individuals with chronic diseases. In the present study, BDI and BAI scores exhibited negative moderate significant correlations with all the PTGI subscales and total PTGI scores, and an increase in anxiety and depression symptoms adversely impacting on individuals' PTG

levels. Consistent with these findings, a previous study of breast cancer patients reported that anxiety and depression exhibited adverse effects on PTG; the greater the severity of their anxiety and depression symptoms, the more negative their PTG development. An extended duration study investigating psychological characteristics representing basic determinants of quality of life in cancer patients described anxiety and depressive symptoms as significant predictors of PTG development and reported that good mental health mediated rapid adaptation to traumatic events and an increase in PTG levels (18).

In previous studies, it has been reported that long-

Table 5. The correlation analysis between scales

	BDI r	BAI r
PTGI		
Perceived change in self	-0.70**	-0.65**
A changed philosophy of life	-0.57**	-0.52**
A changed sense of relationships with others	-0.59**	-0.57**
Total PTGI score	-0.70**	-0.66**
RSA		
Personal structure	-0.29*	-0.39**
The perception of future	-0.51**	-0.57**
Family coherence	-0.44**	-0.53**
The perception of self	-0.54**	-0.59**
Social competence	-0.54**	-0.49**
Social support	-0.65**	-0.60**
Total RSA score	-0.68**	-0.71**

Relationships between continuous variables were assessed using Pearson s test when normal distribution conditions were met, and with Spearman s test when those conditions were not met.

*: p<0.05 **: p<0.001

Table 6. The correlation analysis between PTGI and RSA

	PTGI			
	Perceived change in self	A changed philosophy of life	A changed sense of relationships with others	Total PTGI score
	r	r	r	r
RSA				
Personal structure	0.32*	0.35*	0.32*	0.37*
The perception of future	0.53**	0.41*	0.43**	0.51**
Family coherence	0.44**	0.39*	0.48**	0.49**
The perception of self	0.53**	0.43**	0.40*	0.51**
Social competence	0.50**	0.35*	0.40*	0.47**
Social support	0.66**	0.59**	0.63**	0.70**
Total RSA score	0.67**	0.57**	0.56**	0.69**

Relationships between continuous variables were assessed using Pearson s test when normal distribution conditions were met, and with Spearman s test when those conditions were not met.

*: p<0.05 **: p<0.001

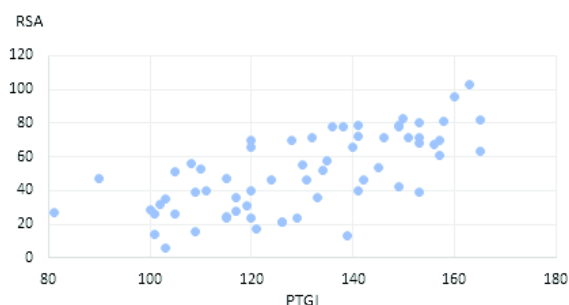


Figure 3. Correlation of PTGI with RSA

term stressors improve and strengthen the individual's self-perception and resilience capacity (34), however, high levels of perceived stress have negative effects on patient adaptation (35). In this study, psychological resilience, BDI and BAI scores exhibited significant moderate negative correlation with the RSA perception of self and social resources subscales and with total RSA scores. As psychological resilience levels decrease depressive and anxiety symptoms increase. Consistent with these findings, previous studies have reported that the presence of anxiety and depression has a direct and indirect effect PTG by causing a decrease in resilience (36). Indeed, in another recent study conducted in CKF patients receiving hemodialysis treatment, it was shown that increased anxiety levels decreased resilience (37). In the literature, it has been reported that resilience is negatively associated with indicators of mental illness such as depression, anxiety and negative emotions and positively associated with life satisfaction and subjective well-being (37, 38).

Psychological resilience allows PTG to develop by preserving psychological strength in the face of difficulties (17). Some authors who think that psychological resilience and PTG are mutually supportive and who have investigated the subject have determined a significant positive relationship between the two (39). Similarly, significant moderate positive correlation was observed between total PTGI and RSA scores in this study. PTG development increases in line with resilience levels. Previous research investigating the role of resilience and alexithymia in the development of PTG as a response to excessive stress in patients following kidney transplantation reported that resilience levels were positively correlated with PTG, and that resilience was a direct predictor of PTG (15). Another study investigating factors affecting the development of PTG in patients with colorectal

Table 7. The correlation analysis age, duration of disease and BDI, BAI, PTGI and RSA

	Age (years)	Duration of disease (years)
	r	r
BDI	-0.03	0.13
BAI	-0.06	0.11
PTGI		
Perceived change in self	0.01	0.12
A changed philosophy of life	0.02	0.05
A changed sense of relationships with others	0.22	-0.09
Total PTGI score	0.12	0.02
RSA		
Personal structure	-0.09	-0.21
The perception of future	-0.12	-0.19
Family coherence	0.07	-0.02
The perception of self	0.04	-0.10
Social competence	0.29*	0.04
Social support	0.05	-0.11
Total RSA score	0.12	-0.11

Relationships between continuous variables were assessed using Pearson's test when normal distribution conditions were met, and with Spearman's test when those conditions were not met.

*: $p < 0.05$

cancer also reported a positive correlation with PTG and suggested that clinicians might improve their patients' PTG levels and quality of life by increasing their resilience (40). Individuals who experience a chronic disease can benefit from this through the presence and help of psychological resilience, despite the difficulties caused by the situation in question and can even achieve PTG, which enhances their functionality, plays a role in the development of new and different perspectives and involves a more in-depth evaluation process (41).

There are a few limitations of this study. Firstly, it is a descriptive study without a control group and detailed psychiatric examinations. Secondly, prolonged follow-up at different stages of the disease could not be performed.

Psychological factors that may affect PTG in CKF have not been adequately studied in previous studies. It is thought that this study will contribute to the literature on the investigation of psychological factors that may affect the development of PTG and psychological resilience levels of CKF patients. Further more extensive, prolonged, and prospective studies planned at different stages of the diseases in this field are needed. Other potential psychological factors such as personality traits, stress management, and coping mechanisms capable of mediating the effects of anxiety and depression symptoms on resilience and the development of PTG may also need to be considered in future studies.

CKF is a chronic disease with a severe impact, both as a disease and in terms of hemodialysis, on individuals' personal family, work, and social lives. The presence of psychological resilience and the development of PTG during this process will reduce the psychological problems that frequently accompany the disease, enhance interpersonal relations and increase compliance with the therapeutic process in this difficult disease. In this context, a multidisciplinary approach may be recommended for health-care professionals to evaluate the mental and physical problems of CKF patients. Attention now needs to be drawn to the importance of planning psychological interventions capable of increasing the ability to cope with diseases and contributing to patients' psychological resilience levels and the development of PTG during the disease process.

Anxiety and depression symptoms seen in patients with CKF have an adverse impact on their PTG and resilience levels. The development of PTG rises in line with psychological resilience.

The presence of psychological resilience and the development of PTG in this process will improve

the psychological problems, increase the capacity to cope with the disease and adherence to the therapeutic process. In this context, the mental and physical problems of patients with CKF must be considered with a multidisciplinary approach, and psychological interventions that support psychological resilience levels and the development of PTG must be planned.

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