Turkish Validity and Reliability Study of the Scale of Psychosocial Assessment of Candidates for Transplantation (PACT)

Dilek Güneş[a*], Behice Erci[b], Fatoş Uncu[c], and Serdar Saritaş[d]

[a]Department of Surgical Nursing, Fırat University, Faculty of Health Sciences, Elazığ, Turkey; [b]Department of Public Health Nursing, Inonu University, Faculty of Nursing, Malatya, Turkey; [c]Department of Public Health Nursing, Fırat University, Faculty of Health Sciences, Elazığ, Turkey; and [d]Department of Surgical Nursing, Inonu University, Faculty of Nursing, Malatya, Turkey

ABSTRACT

Background.   The Psychosocial Assessment of Candidates for Transplantation (PACT) scale shows a statistically acceptable level of reliability and validity and can guide clinicians in managing transplant candidates. This study aims to adapt PACT scale to Turkish and evaluate its validity and reliability for Turkish transplant candidates.

Methods.   This was a psychometric study of a sample of 162 patients in the organ transplant services of 2 hospitals in Turkey. The number of patients enrolled in the study was 20 times the number of items on the scale. The research data were collected using PACT. Descriptive statistics, Cronbach's alpha reliability coefficient, Pearson correlation, and factor analysis were used to evaluate the data.

Results.   The data were analyzed using varimax rotation in principal component analysis. The factor loadings of the items ranged from 0.56 to 0.79. The internal reliability coefficient of the scale is 0.87. It was also found that the scale accounted for the 52.82% of the total variance.

Conclusion.   According to the results of this study, evidence of the validity and reliability of the PACT was obtained.

TRANSPLANTATION of human cells, tissues, and organs saves many lives and at the same time restores basic functions in cases where there is no alternative [1,2]. According to the Global Observatory on Donation and Transplantation (GODT), 2018 organ transplantations totaled 146,930 worldwide and 5,763 in Turkey [3].

In addition to functional restrictions and somatic alterations, chronic diseases are also accompanied by cognitive, emotional, and social changes that necessitate intensive treatment plans and critical coping mechanisms. Because they are signs of a disease, as are somatic symptoms, psychosocial alterations should not be seen as secondary [4−6]. Living with a chronic disease after diagnosis is a hard experience. Emotional crises are also a part of the process of realizing one is chronically ill [4]. These patients experience a variety of psychosocial changes that affect the gradual process of adaptation, including depression, anxiety, hopelessness, aggression, and changes in confidence. Additional changes include enhanced physical functioning that leads to professional decisions, changes in relationship roles, changes in life goals, and the process of self-perception [4,7].

Psychosocial assessment of patients before transplantation is a significant psychological task, particularly considering the ongoing organ shortage crisis. Similar to a medical assessment, psychosocial assessments ought to be based on proof and free of moral judgment [8,9].

Psychosocial evaluation should be part of the program before every transplantation. The factors that could disrupt coping with this process should be investigated, with the patient and his or her family preparing for transplantation in the best possible way. When psychosocial disorders are detected, positive results can be obtained through good social support, special treatment, and regular visits for follow-up [8,10]. Preoperative assessment and postoperative care must include psychosocial evaluation for transplantation to be successful in the long term [4].

The scale, originally titled Psychosocial Assessment of Candidates for Transplantation (PACT), was developed by Olbrisch

*Address correspondence to Dilek Güneş, Fırat University, Faculty of Health Sciences, Campus 23100, Elazığ, Turkey. E-mail: dgunes23@yahoo.com

et al in 1989 for the psychosocial evaluation of transplantation candidates [11−13]. The goal of this research is to assess the reliability and validity of PACT in Turkish.

MATERIALS AND METHODS
Research Design and Sampling

This psychometric research was conducted in the organ transplant services of 2 different university hospitals between December 2020 and May 2021. Permission was obtained from the university's Non-Interventional Research Ethics Committee (Approval no: 2020/16-21) to conduct the research. At all stages of the research, the articles of the Declaration of Helsinki were taken into consideration.

The research was conducted in 3 stages: 1. translation of the English form into Turkish and translation back into English, 2. content analysis by experts, and 3. psychometric tests (reliability coefficient, factor analysis, and correlations between items).

All adult patients who had been admitted for organ transplantation in organ transplant facilities made up the study's target population. As a consequence of the power analysis, the sample of the study was ascertained as 162 patients. The patients were selected by random sampling method. The number of patients involved in the study is 20 times the scale items, a size sufficient to investigate the reliability and validity of this study [14].

The data were collected by the researcher through face-to-face interviews with patients hospitalized in organ transplantation services. The researcher elucidated the questionnaire to the patients. It took approximately 20 minutes to fill out the questionnaire. Thus, 162 organ transplant patients fulfilled the survey. Criteria for inclusion in the research were determined as not having communication problems, being an adult, being in good mental health, and being a volunteer to participate in the research.

Data Collection Tools

A personal information form and the PACT were used to obtain data. The personal information form was developed to collect introductory information about patients who agreed to participate in this research and would undergo organ transplantation. It collects information about their age, marital status, sex, profession, level of education, reason for transplantation, place of residence, and type of donor selected for surgery. The PACT scale was developed by Olbrisch et al for psychosocial assessment of transplant candidates [11−13]. PACT evaluates candidates in 4 domains, including social support, psychological health, understanding of transplant and follow-up, and lifestyle factors. A final overall score of transplant candidacy is expressed on the scale from 0 (contraindication for transplantation) to 4 (excellent candidate). Scores of ≤2 and ≥3 indicate low and high PACT scores, respectively [15,16]. Cronbach's alpha coefficient was found to be 0.87 in the present study.

Translation

PACT was initially translated into Turkish. Two English language and literature scholars who teach translation translated the Turkish version into English independently. The authors compared 2 the translated versions and analyzed them until a consensus was reached. The Turkish translation was then translated back into English. The goal of the translation process was to make sure the meaning and content of the translated and original versions were consistent. The authors reviewed each draft before agreeing on the final version. To test the comprehensibility of the items and the validity of the content, the translated draft was presented to a panel of 5 experts. They received information on the pertinent concepts and measures. Five specialists from the fields of surgery, internal medicine, and public health made up this multidisciplinary team studying scale validity and transplantation. Each panelist was requested to assess the final version of the translated PACT's content in comparison to the original scale. They were also requested to rate each item on the scale as "not appropriate," "a little appropriate," "quite appropriate," or "very appropriate."

Psychometric Tests

Internal homogeneity and consistency: Cronbach's alpha coefficient was computed to ascertain internal consistency. According to Westen and Rosenthal, internal consistency is a necessary condition for a scale's unidimensionality or homogeneity and must be 0.70 or higher. In addition, the analysis included item-total correlations and interitem correlations. The use of interitem correlation is recommended by Esten and Rosenthal as a standard for internal consistency. This should be equal to or greater than 0.15. Researchers emphasized that these constraints should apply to all interitem correlations [17]. Only if all interitem correlations are tightly grouped around the correlation between the average components, can unidimensionality be obtained. The corrected item-total correlation is determined by the total score of all other items [18]. Therefore, we used the corrected item-total correlation.

Construct Validity

Principal component analysis was preferred, and the data were analyzed using Varimax rotation. To find out the first-factor solution, principal component analysis was used. As an orthogonal rotation technique that reduces the number of variables with a high load on each factor, the varimax rotation approach was chosen. This approach makes it easier to interpret the factors [19]. The subsequent criteria were employed to find out the factors' correct number and the most appropriate structure: factor loadings greater than 0.40, eigenvalues greater than 1.0, and the "elbow criterion" for eigenvalues [14]. Prior to executing the PACT's fundamental component analysis, the Bartlett test and the Kaiser-Meyer-Olkin (KMO) sampling adequacy measurement were performed to determine whether the sample size was sufficient to run a principal component analysis. To continue with a decent principal component analysis with varimax rotation, the KMO, which assesses sampling adequacy, must be higher than 0.50.

RESULTS

The mean age was 44.74 ± 11.97 years. Of the patients, 51.2% were women and the majority were married; 31.5% were primary school graduates, and the majority were nonworking and living in a county. The most common reason for transplantation was hepatitis B infection, and living donors ranked first (Table 1).

Validity Analyses

Content validity. The expert panel assessed the translated scale, which is made up of 8 items, for the wording and appropriateness of the items. The experts made feasible ameliorations in the wording of each item. The panelists then amended the scale's Turkish translation and talked about it once more until the content was decided on. The content validity ratio (CVR) of the scale is 0.99. A final overall transplant candidacy score is

Table 1. Distribution of Demographic Characteristics (n =162)

Sociodemographic Characteristics	N	(%)
Average age (y) 44.74 ± 11.97 (20-68)		
Sex		
Female	83	(51.2)
Male	79	(48.8)
Marital status		
Married	120	(74.1)
Single	42	(25.9)
Educational status		
Illiterate	37	(22.8)
Primary school graduate	51	(31.5)
Secondary school graduate	10	(6.2)
High school graduate	39	(24.1)
University graduate	25	(15.4)
Employment		
Nonworking	120	(74.1)
Working	42	(25.9)
Residency		
Province	55	(34.0)
County	76	(46.9)
Village	31	(19.1)
Reason for transplantation		
HBV	96	(59.3)
HCV	17	(10.5)
Wilson	11	(6.8)
Budd-Chiari	3	(1.9)
Toxic hepatitis	6	(3.7)
Alcohol	3	(1.9)
Cryptogenic cirrhosis	18	(11.1)
Autoimmune diseases	8	(5.0)
Donor type		
Living donor	159	(98.1)
Cadaver	3	(1.9)

HBV, hepatitis B virus; HCV, hepatitis C virus.

assigned on a scale from 0 (contraindication for transplantation) to 4 (excellent candidate). Scores of ≤ 2 and ≥3 were used to indicate the low and high PACT scores, respectively.

Structure validity. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy test result (adequacy of samples), as indicated in Table 2, was 0.841, and the Bartlett's test of sphericity analysis test result (size of the test of sampling) was 545.105. As a result of both tests, it was found to be significant at the level $P < .000$. If the KMO values are below 0.50, it is not accepted, and if they are above 0.90, it is accepted to be at a very good level. Based on this result, it is understood that the sample is adequate and suitable for factor analysis.

The principal component analysis method was employed to determine the factor structure of PACT, and analyses were

Table 2. Results of The Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test and Bartlett's Test of Sphericity (n: 162)

Test	Results	
Kaiser-Meyer-Olkin measure of sampling adequacy	.841	$P < .000$
Bartlett's Test of Sphericity Approx. χ^2	545.105	
df	28	
Sig.	.000	

performed according to the varimax rotation. The principal component method and the varimax rotation method were preferred because there were no significant changes in factor loadings, and also to examine whether the variance to be explained corresponds to 1 and whether the variables were added together. As a result of the analysis, the outcomes associated with the explanation rates of the total variance of the items and factors and the factor loadings are given in Table 3. Factor loadings change from 0.56 to 0.79 for all items. The factor loadings of 0.30 and above are considered sufficient. When Table 3 was examined, only 1 factor with an initial eigenvalue above 1 was found, which accounted for 52.82% of the total variance.

Reliability. We looked at Cronbach's alpha reliability coefficient as a measure of the scale's internal consistency and homogeneity. The reliability coefficient of Cronbach's alpha of the scale was found as 0.87 (Table 3). In addition, to find out the internal consistency of the scale, item-total correlation coefficients were then examined. In the first application, the item total score (item-remainder) correlation was applied to evaluate the relationship between each item score and the total score and whether each item constituting the scale was equally weighted. The scale's item-total correlation varied from 0.47 to 0.70.

DISCUSSION

The findings of this investigation demonstrated that the single-factor psychometric features of the Turkish version of PACT are highly employable.

Content Validity

The wording of the Turkish form of the scale needed to be restated, according to the panel's evaluation. When the Turkish scale's items were matched to those on the original scale, it was discovered that they were linguistically equivalent.

The authors put forward only an adaptation study of a standardized tool based on the outcomes obtained from Turkish transplantation candidates and attempted to associate the results with its widely expressed psychosocial appropriateness to enhance the scale's content validity.

Structure Validity

Varimax rotational principal component analysis was used to evaluate the transplant candidates' psychosocial compatibility. The original scale reported 4 domains, including psychological health, social support, understanding of transplant and follow-up, and lifestyle factors. However, although no item was removed in this study, a single dimension was obtained as a factor structure. It is believed that cultural characteristics are effective in obtaining a single dimension. In the study of Olbrisch et al, all factor loadings of the principal component analysis were >0.40, and the factor loads of the scale items varied between 0.56 and 0.81 [11]. The minimum admissible score for factor loading on the adapted scale was ascertained as 0.40 [14]. In this research, all the items met these standards and the factor loads were high. This scale accounted for 52.82% of the

Table 3. Varimax Rotation Factor Loadings and Item-Total Correlations of the Items Following the Basic Components Analysis (n =162)

Items	Factor Loading	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	.748	12.652	.642	.848
Q2	.798	12.357	.702	.841
Q3	.767	12.300	.674	.844
Q4	.743	12.777	.640	.848
Q5	.722	12.924	.612	.851
Q6	.569	12.904	.473	.868
Q7	.730	13.016	.631	.850
Q8	.716	11.883	.620	.852
Total		52.82		.871

total variance, which can be considered sufficient. In order for the described variance to be acceptable, it must be 30% or higher [20,21]. Thus, the scale's structural validity was found. The results of the statistical analysis demonstrated that the PACT scale is valid in this sample.

Internal Consistency

The correlations between the scale items ranged between 0.47 and 0.70, and the scale's homogeneity seems to be adequate. On the original scale, item-total correlations are reported between 0.39 and 0.72 [11]. The outcomes of this research resemble the outcomes of the original research. The minimum acceptable score for item-total correlations is 0.15 in the literature [14,22]. The outcomes of the analysis reveal that the PACT is reliable.

Reliability

In the research, the Cronbach alpha coefficient of the scale is 0.87 (0.84-0.87). Olbrisch et al ascertained the Cronbach alpha coefficient to be 0.84 for the original scale [11]. A reliability level of 0.80 is suggested as the lowest acceptable coefficient for a well-developed measuring tool. A reliability level of 0.70 is accepted for a newly developed tool [14,22]. In our research, the scale's Cronbach alpha coefficient was 0.87, and it was found that the scale had a good level of internal consistency, and the items were consistent with one another. In this research, the Cronbach alpha coefficient is at an acceptable level. Considering these results, the tool was found to be reliable in this sample.

Limitations

Although the sample size is sufficient, the outcomes of this research should be handled carefully because the random sampling method was used. Obtaining data from only 2 health centers is a limitation of this research.

CONCLUSIONS

The PACT is a valid scale for Turkish transplant candidates. The scale shows a statistically acceptable level of reliability and validity.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

[1] Ruiz P. Transplantation pathology. 2nd ed. Cambridge, UK: Cambridge University Press; 2018. p. 1–24.

[2] Cornelius MC. Psychiatric challenges and management in kidney transplantation editors. In: Cukor D, Cohen SD, Kimmel PL, editors. Psychosocial aspects of chronic kidney disease. Cambridge, MA: Academic Press; 2021. p. 375–408.

[3] Global Observatory on Donation and Transplantation. Summary global report 2018, <http://www.transplant-observatory.org/global-report-2018>; 2018

[4] Schulz KH, Kroencke S. Psychosocial challenges before and after organ transplantation. Transplant Research and Risk Management 2015;7:45–58.

[5] Kim W, Kreps GL, Shin CN. The role of social support and social networks in health information-seeking behavior among Korean Americans: a qualitative study. Int J Equity Health 2015;14:40.

[6] De Pasquale C, Veroux M, Indelicato L, Sinagra N, Giaquinta A, Fornaro M, et al. Psychopathological aspects of kidney transplantation: efficacy of a multidisciplinary team. World J Transplant 2014;4:267–75.

[7] Kahl KG, Eckermann G, Frieling H, Hillemacher T. Psychopharmacology in transplantation medicine. Prog Neuro-Psychopharmacol Biol Psychiatry 2019;88:74–85.

[8] Heinrich TW, Marcangelo M. Psychiatric issues in solid organ transplantation. Harv Rev Psychiatry 2009;17:398–406.

[9] Maldonado JR, Sher Y, Lolak S, Swendsen H, Skibola D, Neri E, et al. The Stanford Integrated Psychosocial Assessment for Transplantation: a prospective study of medical and psychosocial outcomes. Psychosom Med 2015;77:1018–30.

[10] Rosenberger EM, Çiğ MA, Crone C, DiMartini AF. Psychiatric disorders as risk factors for adverse medical outcomes after solid organ transplantation. Curr Opin Organ Transplant 2012;17:188–92.

[11] Olbrisch ME, Levenson JL, Hamer R. The PACT: a rating scale for the study of clinical decision making in psychosocial screening of organ transplant candidates. Clin Transplant 1989;3:164–9.

[12] Presberg BA, Levenson JL, Olbrisch ME, Best AM. Rating scales for the psychosocial evaluation of organ transplant candidates. Comparison of the PACT and TERS with bone marrow transplant patients. Psychosomatics 1995;36:458–61.

[13] Freischlag KW, Chen V, Nagaraj SK, Chua AN, Chen D, Wigfall DR, et al. Psychosocial Assessment of Candidates for Transplantation (PACT) score identifies high risk patients in pediatric renal transplantation. Front Pediatr 2019;7:102.

[14] DeVellis RF. Scale development: theory and applications. Thousand Oaks, CA: Sage Publications; 2012. p. 13–29.

[15] Maltby MC, Flattery MP, Burns B, Salyer J, Weinland S, Shah KB. Psychosocial assessment of candidates and risk classification of

patients considered for durable mechanical circulatory support. J Heart Lung Transplant 2014;33:836–41.

[16] Netemeyer RG, Bearden WO, Sharma S. Scaling procedures: issues and applications. Thousand Oaks, CA: Sage Publications; 2003. p. 1–224.

[17] Westen D, Rosenthal R. Improving construct validity: Cronbach, Meehl, and Neurath's ship. Psychol Assess 2005;17:409–12.

[18] Giliem JA, Giliem RR. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales, <https://scholarworks.iupui.edu/handle/1805/85>

[19] Brown JD. Statistics corner. Questions and answers about language testing statistics: choosing the right type of rotation in PCA and EFA. JALT Testing & Evaluation SIG Newsletter 2009;13:20–5.

[20] Erefe I. Features of data tools editor. In: Erefe I, editor. Research in nursing. Istanbul, Turkey: Odak Ofset; 2011. p. 169–88.

[21] Kimberlin CL, Winterstein AG. Validity and reliability of measurement instruments used in research. Am J Health Syst Pharm 2008;65:2276–84.

[22] Yang Y, Green SB. Coefficient alpha: a reliability coefficient for the 21st century? J Psychoeduc Assess 2011;29:377–92.