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#### Research Article

### Psychometric Testing of the Turkish Version of the Patient Education Materials Assessment Tool

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#### Abstract

**AIM:** The aim of this study was to test the psychometric properties of the Turkish version of the Patient Education Materials Assessment Tool **METHODS:** The study was carried out with intern nurses receiving education at a Nursing Faculty in Turkey between July 2019 and June 2020. 248 intern nurses participated in PEMAT-P and 223 in PEMAT-A/V in this study. Five audio-visual and five printed materials were used. The Patient Education Materials Assessment Tool and the Patient Education Materials Assessment Tool User's Guide were translated into Turkish and culturally adapted using standard guidelines. Content and construct validity analyses were performed for the validity of the Turkish version of the Patient Education Materials Assessment Tool, and internal consistency, invariability, and external consistency analyses were performed for its reliability.

**RESULTS:** The content validity index was 1.00 for all the scale items. At the conclusion of the factor analyses, the scale has composed a twodimension construct of understandability and actionability. The Cronbach's alpha coefficients were observed to be 0.901 of the Turkish version of the Patient Education Materials Assessment Tool for Printable Materials and 0.897 of the Turkish version of the Patient Education Materials. Assessment Tool for Audiovisual Materials. The Pearson Product-Moment Correlation Coefficient ( $r_{xy}$ ) was high (Turkish version of the Patient Education Materials Assessment Tool for Printable Materials  $r_{y} = 0.815$ , Turkish version of the Patient Education Materials Assessment Tool for Printable Materials  $r_{yy} = 0.815$ , Turkish version of the Patient Education Materials Assessment Tool for Audiovisual Materials  $r_{xy} = 0.804$ ). Cohen's kappa coefficients were obtained as 0.736 of the Turkish version of the Patient Education Materials Assessment Tool for Printable Materials and 0.781 of the Turkish version of the Patient Education Materials Assessment Tool for Audiovisual Materials.

**CONCLUSION:** The Turkish version of the Patient Education Materials Assessment Tool is a valid and reliable measurement tool in the evaluation of both printed and audiovisual patient education materials.

Keywords: Audiovisual materials, educational materials, instrument development, measurement, patient education

#### Introduction

The effectiveness of patient education on the health outcomes of patients with different diseases has been proven based on the data of many studies (Simonsmeier et al., 2021). What is important in patient education is that the information provided reaches the patient and is understandable by the patient (Bastable, 2017, 2021). Patient education is one of the areas where the nurse applies the role of educator, and it is important that it is carried out with an evidence-based, systematic, scientific approach in line with the educational process. In the planning phase of the education process, the nurse selects materials, evaluates their suitability for the patient, and uses them (Bastable, 2021; Cutilli, 2020). Regardless of health literacy, patient-friendly materials are essential to improve patients' health outcomes (Furukawa et al., 2022). To improve a patient's physical and psychosocial well-being, personalized patient education materials, in addition to verbal education, enhance patient care improvement by improving patient satisfaction and health literacy (Bhattad & Pacifico, 2022). Furthermore, materials without appropriate plain language free of medical terminology may not be understood by the patient, so it is important that the materials are understandable (Ortega et al., 2023). Another important issue is the increasing interest in and use of online health information, including audiovisual materials, with the increase in technology today (Kang & Lee, 2019; Rubel et al., 2020). While the rate of obtaining information from platforms such as Tiktok, YouTube, etc. has increased, the importance of their quality has also increased (Chen et al., 2022; Ming et al., 2023; Yeung et al., 2022). Patient Education Materials Assessment Tool (PEMAT), a tool designed to assess all of these, was developed by Shoemaker et al. (2014a) to assess "understandability" and "actionability" in both print and audiovisual materials. Understandability relates to the extent to which consumers from different backgrounds can process and explain key messages. Actionability refers to the extent to which consumers from different backgrounds and with different levels of health literacy can determine what actions they should take based on the information presented (Shoemaker et al., 2014a). Health information that lacks understandability, reliability, and actionability can lead to serious consequences by affecting patients'

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It is known that PEMAT, which was developed in 2014, is used in many studies and many types of patient education materials are evaluated. In addition, its validity and reliability continue to be supported by studies on its use (Lee et al., 2022; Vishnevetsky et al., 2018). Furthermore, PEMAT has been adapted to Malay (Wong et al., 2019), Korean (Lee, 2016), and Japanese languages (Furukawa et al., 2022). It is seen that there is a need in this field in Turkish language. A few studies have been conducted in Turkey on the evaluation of patient education materials; most of these studies were done with valid and unreliable instruments. It is proposed in the related publications that it is necessary to examine for the validity and reliability to Turkish of the evaluation tools for suitable patient education materials (Kaya & Kaya, 2008; Orgun & Paylan Akkoç, 2020). In this study, it was aimed to examine the validity and reliability of the Turkish form of the PEMAT (PEMAT<sub>TR</sub>), which provides contributions to the definition of patient educational materials for spreading and developing understandable and actionable health information in the presentation of health services.

#### **Research Questions**

- 1. Is the Turkish version of the Patient Education Material Assessment Tool valid?
- 2. Is the Turkish version of the Patient Education Material Assessment Tool reliable?

#### Method

#### Study Design

# The study was designed as a methodological study with the purpose of testing the psychometric properties of the Turkish version of the PEMAT.

#### Participants

The study was carried out with intern nurses receiving education at a Nursing Faculty in Turkey between July 2019 and June 2020. It was conducted with intern nurses who had reached the graduation stage because they were actively engaged in patient education and developing materials in the clinics. In situations where the factor analysis of the scale would be implemented, it was necessary for the size of the sampling to be a minimum of 5- to 10-fold the number of items (Güngör, 2016). In this study, 248 intern nurses participated in PEMAT<sub>TR</sub>-P and 223 in PEMAT<sub>TR</sub>-A/V. At least 10-fold the number of scale items were reached. The final version of the scale was tested for external consistency by five academic members.

#### **Data Collection Tools**

#### The Patient Education Materials Assessment Tool

The PEMAT was developed in 2014 for evaluating the understandability and actionability of printable and audiovisual patient education materials. This tool was designed in a manner that could be used by nurses, midwives, patients or persons receiving health services, and other persons who undertake the function of providing high-quality materials. Every item in the scale is evaluated by giving scores of 0 (disagree) and 1 (agree), and there is a third choice as "Not Applicable" that is valid for some items. The scale is composed of 19 items, which evaluate understandability, and 7 items, which evaluate actionability, for a total of 26 items. Even if a majority of the elements are related to printable and audiovisual materials, some elements are valid only for one type of material. Consequently, there are two versions of the PEMAT, the "Patient Education Materials Assessment Tool for Printable Materials (PEMAT-P)" composed of 24 items, and the "Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V)" composed of 17 items (Shoemaker et al., 2014a). The PEMAT provides points for materials between 0 and 100 points for understandability and actionability.

# **The Patient Education Materials Assessment Tool** User's Guide

There is a PEMAT User's Guide, which gives information about these tools and the concepts mentioned in the tool. It presents examples about how every scale item should be evaluated (Shoemaker et al., 2014b). In the Turkish adaptation study, after the translation of the guide was made, photographs were taken from the websites that did not have a copyright. Expert opinions were obtained, and it was made ready for use.

#### **Data Collection**

Five printed materials and five audiovisual materials were prepared by the researchers in accordance with the literature to be used in the data collection process. The booklet titled "Ten golden rules for a healthy diet" was evaluated with  $PEMAT_{TR}$ -P and the audiovisual multimedia material titled "Use of insulin pen" was evaluated with  $PEMAT_{TR}$ -A/V by intern nurses. All five printed and five audiovisual materials were used in the external consistency test of the scale.

Data were collected with the face-to-face interview technique in 30–40 person groups from the 248 (PEMAT\_{TR}-P) and 223 (PEMAT $_{TR}$ -A/V) intern nurses included in the sampling by using the  $PEMAT_{TR}$ . Participants provided informed consent. Since Cronbach's alpha coefficient ( $\alpha$ ) was used in the determination of the internal consistencies of the measurement tools made in the scoring based on non-dichotomic responses and different weights for every selection (Yurdabakan, 2008), it was implemented in the form of a four-part rating key with just as it was in the first development stage of the tool. In the data collection process,  $PEMAT_{TR}$  and  $PEMAT_{TR}$  User's Guide were first distributed to the intern nurses in printed form and also introduced verbally. Then, the printed booklet was distributed and they were asked to read and evaluate with  $PEMAT_{TR}$ -P. Then, the audiovisual patient education material was shown and they were asked to evaluate with  $PEMAT_{TR}$ -A/V. The data collection procedure lasted for approximately 30 minutes. The data collection tools accompanied by the same materials were applied once again 3 weeks after the first application to 35 students who accepted to fill the form again. The final condition given to the scale in the form of dual ranking (disagree=1, agree=2) was tested for external consistency. The five printed and five audiovisual patient education materials were evaluated by five faculty members for



#### Figure 1.

Data Collection Procedure.

external consistency testing of  $PEMAT_{TR}$ -P and  $PEMAT_{TR}$ -A/V (Figure 1). Throughout the data collection process, the  $PEMAT_{TR}$ -User's Guide, which was distributed to participants in printed form, provided guidance for their evaluation of the materials.

#### **Statistical Analysis**

The Statistical Package for the Social Sciences 21 (IBM SPSS Corp., Armonk, NY, USA) and the Mplus Version 7.4 package programs were used for the statistical analyses in the examination of the validity and reliability of the scale. The procedures made for examining the validity and reliability of the scale were given in Table 1.

#### **Ethical Considerations**

Ethical committee approval was received from the Scientific Research and Ethics Committee of University of Ege (Approval no: 323, Date: 25.07.2019). Sarah J. Shoemaker, the author of

the original PEMAT, was contacted by e-mail for the adaptation of PEMAT and the user's guide to Turkish and to conduct the validity and reliability study, and written permission was obtained from the U.S. Agency for Healthcare Research and Quality. Written institutional approval was obtained from the faculties where the study was conducted. Informed consent was obtained from the participants.

This study was presented as a verbal notification during the first International Congress on Program Development in Nursing Education.

#### Results

#### Participants' Sociodemographic Characteristics

Of the 248 intern students who participated in the PEMAT\_{TR}-P, 82.3% were between the ages of 21 and 23 and 17.7% were

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Methods	Processes/Analyses			
Language validity	Translate and back-translate method			
Content validity				
<ul><li>Expert opinion</li><li>Pilot application</li></ul>	Calculation of the content validity index (CVI) Making pilot application on 35 students not included in sampling			
Construct validity	Exploratory factor analysis (EFA)			
• Internal construct validity	Confirmatory factor analysis (CFA)			
Invariability				
<ul> <li>Test–retest method</li> </ul>	Calculation of the Pearson product moment Correlation coefficient			
Internal consistency	Calculation of the Cronbach's alpha coefficient			
External consistency				
Interrater reliability	Calculation of Cohen's kappa coefficient			

between the ages of 24 and 26. Also, 79% were female and 21% were male.

Of the 223 intern students who participated in the  $PEMAT_{TR}^{-}$  A/V, 84.3% were between the ages of 21 and 23 and 15.7% were between the ages of 24 and 26. Also, 80.7% were female and 19.3% were male.

#### Validity

#### **Content Validity**

After making the language adaptation to Turkish with the translate-back translate method of the  $PEMAT_{TR}$  and User's Guide, 10 experts who were experts in different fields of nursing were referred to for the scope validity of the Turkish form. The "content validity index (CVI)" was calculated in the evaluation of the expert opinions by using the "David Technique." The CVI of the items was found to be 1.00. In addition, opinions were received from the experts on the  $PEMAT_{TR}$  User's Guide for the suitability of all the visuals, tables, and diagrams used in the guide. The minimum required changes were made according to the suggestions. A pilot application was made on the scale and the User's Guide, on 35 intern nurses who were receiving education at a different university. No change was made in the form since the students expressed that they found the scale items and the User's Guide were sufficiently readable and understandable.

#### **Construct Validity**

First, the Principal Components Analysis (PCA) was made with the objective of determining the suitability of the correlation matrix between items of the PEMAT<sub>TR</sub> to factor analysis. According to the analysis made with the Varimax perpendicular rotation method, it was found that the Kaiser–Meyer–Olkin (KMO) value was 0.888 and the Bartlett's test of sphericity value was 2769.739 for the PEMAT<sub>TR</sub>-P, whereas the KMO value was 0.895 and the Bartlett's test of Sphericity value was 1909.903 for the PEMAT<sub>TR</sub>-A/V and it was observed that these statistics were significant at the level of p < .001. At the conclusion of the PCA, it was observed that the scale reflected a dual-factor construct and the exploratory factor analysis (EFA) was made. When the factor loads of the items collected under two dimensions were examined, it was observed that the factor loads of the items in the "Understandability" dimension in the PEMAT<sub>TR</sub>-P varied between 0.526 and 0.744, whereas the items in the "Actionability" dimension in the PEMAT<sub>TR</sub>-P varied between 0.467 and 0.766. The factor loads of the items in the "Understandability" dimension in the PEMAT<sub>TR</sub>-A/V varied between 0.343 and 0.704, whereas the items in the "Actionability" dimension in the PEMAT<sub>TR</sub>-A/V varied between 0.431 and 0.906.

Confirmatory factor analysis (CFA) was performed to obtain more evidence regarding factorial construct validity. For this purpose, a theoretical model was formed and tested based on EFA. Goodness of fit statistics values obtained as a result of the analysis were The comparative fit index (CFI)= 0.938, the Tucker-Lewis index (TLI)=0.9381, the root mean square error of approximation (RMSEA)=0.062, and 1.96 for the chi-square/degree of freedom in the PEMAT<sub>TR</sub>-P and CFI=0.958, TLI=0.952, RMSEA=0.074, and 2.22 for the chi-square/degree of freedom in the PEMAT<sub>TR</sub>-A/V.

At the conclusion of the CFA, the factor loads of the items on the PEMAT<sub>TR</sub>-P varied between 0.589 and 0.864 in the "Understandability" dimension, whereas in the second dimension, they varied between 0.580 and 0.961. The  $R^2$  values for the items in the "Understandability" dimension varied between .38 and .877, whereas, for the "Actionability" dimension, they varied between .336 and .923. The factor loads of the items in the PEMAT<sub>TR</sub>-A/V varied between 0.317 and 0.839 in the "Understandability" dimension and between 0.884 and 0.985 in the second dimension. The  $R^2$  values for the items varied between .272 and .703 in the "Understandability" dimension, whereas, between .781 and .971 in the second dimension (Table 2). All the parameters calculated for both scales were found to be significant at the level of p < .00.

 $\mathsf{PEMAT}_{\mathsf{TR}}\text{-}\mathsf{P}$ : the Turkish version the Patient Education Materials Assessment Tool for Printable Materials

 $\mathsf{PEMAT}_{\mathsf{TR}}\text{-}\mathsf{A/V}:$  the Turkish version the Patient Education Materials Assessment Tool for Audiovisual Materials

The path diagram for the CFA results was given in Figure 2. The standardized factor loads (with the calculated error coefficients in parentheses) and the correlation coefficient between the dimensions are observed in the diagram.

#### Reliability

#### Internal Consistency

The Cronbach's alpha coefficient was calculated for the scale total and the dimensions with the objective of examining the internal consistency of the scale.

## Table 2. Results of the PEMAT-TP Confirmatory Factor Analysis

		Factor Loads		Residual Variance		R <sup>2</sup>	
Dimension	Item	PEMAT <sub>TR</sub> -P	PEMAT <sub>TR</sub> -A/V	PEMAT <sub>TR</sub> -P	PEMAT <sub>TR</sub> A/V	PEMAT <sub>TR</sub> -P	PEMAT <sub>TR</sub> -A/V
Understandability	1	0.864	0.750	0.254	0.438	0.746	0.562
	2	0.830	_	0.311	-	0.689	_
	3	0.823	0.605	0.322	0.634	0.678	0.366
	4	0.895	0.530	0.200	0.719	0.800	0.281
	5	0.883	0.582	0.219	0.661	0.781	0.339
	6	0.854	-	0.271	-	0.729	-
	7	0.620	-	0.616	-	0.384	-
	8	0.881	0.839	0.224	0.297	0.776	0.703
	9	0.962	0.719	0.074	0.482	0.926	0.518
	10	0.770	0.729	0.407	0.469	0.593	0.531
	11	0.589	0.317	0.653	0.899	0.347	0.101
	12	0.937	0.729	0.123	0.469	0.877	0.531
	13	_	0.553		0.694		0.306
	14	_	0.521		0.728		0.272
	15	0.875	-	0.235	-	0.765	-
	16	0.901	-	0.188	-	0.812	-
	17	0.796	-	0.367	-	0.633	-
	18	0.909	0.790	0.174	0.376	0.826	0.624
	19	0.639	0.697	0.592	0.514	0.408	0.486
Actionability	20	0.897	0.910	0.196	0.172	0.804	0.828
	21	0.825	0.943	0.319	0.110	0.681	0.890
	22	0.802	0.985	0.356	0.029	0.644	0.971
	23	0.786	-	0.382	-	0.618	-
	24	0.580	-	0.664	-	0.336	-
	25	0.868	0.884	0.246	0.219	0.754	0.781
	26	0.961	-	0.077	_	0.923	-

The "Understandability" dimension was obtained at  $\alpha = 0.887$ and the Actionability dimension was obtained at  $\alpha = 0.774$  in the PEMAT<sub>TR</sub>-P. Whereas, the Cronbach's alpha internal consistency reliability coefficient was found to be  $\alpha = 0.901$  for the total PEMAT<sub>TR</sub>-P. The "Understandability" dimension was obtained at  $\alpha = 0.851$  and the Actionability dimension was obtained at  $\alpha = 0.932$  in the PEMAT<sub>TR</sub>-A/V. Whereas, the Cronbach's alpha internal consistency reliability coefficient was found to be  $\alpha = 0.897$  for the total PEMAT<sub>TR</sub>-A/V.

#### **Test-Retest Reliability**

Pearson Product Moment Correlation Coefficient  $(r_{xy})$  of PEMAT<sub>TR</sub>-P was found that  $r_{xy} = 0,803$  in the understandability dimension,  $r_{xy} = 0,824$  in the actionability dimension and  $r_{xy} = 0,815$  in the total scale.  $r_{xy}$  of PEMAT<sub>TR</sub>-A/V was found that  $r_{xy} = 0.871$  in the understandability dimension,  $r_{xy} = 0,885$  in the actionability dimension and  $r_{xy} = 0,804$  in the total scale

#### **External Consistency**

Finally, Cohen's kappa coefficients were calculated for determining the reliability among raters. When a calculation was made in doubles among the five raters ( $5 \times 4/2 = 10$ ), 10 each kappa coefficients were obtained. The mean of the 10 each kappa coefficients for the PEMAT<sub>TR</sub>-P was obtained at 0.736, whereas for the PEMAT<sub>TR</sub>-A/V, it was obtained at 0.781.

#### Discussion

#### Validity of the Turkish Version of the Patient Education Materials Assessment Tool

When a scale would be adapted to a different language, the translation should be suitable to the original and to the characteristics of the culture to which it is desired to adapt (Coster & Mancini, 2015). The translate-back translate method was used to provide for language validity of the PEMAT<sub>TR</sub> and User's Guide, whose original language is English. The final condition



#### Figure 2.

Diagram for the Confirmatory Factor Analysis of the PEMAT<sub>TR</sub>.

was made by remaining committed to the original figures and by using words and concepts that would not change the integrity of meaning and it was presented for expert opinions (Yeşilyurt & Çapraz, 2018). In this study, the views of 10 experts were obtained and by using the Davis Technique, the CVI was calculated. It should be a minimum of 0.80 for the acceptability of the CVI (Yeşilyurt & Çapraz, 2018). Since the CVI value of every item at the conclusion of the study was 1.00, it was accepted that all the scale items were valid for scope. Prior to the application, a pilot study should be conducted on persons who have similar characteristics to those who respond to the test form (Güngör, 2016). The PEMAT<sub>TR</sub> and User's Guide were tested with 35 intern nurses who were receiving education at another university and the readability and understandability of the scale items were found to be sufficient.

Factor analysis is one of the methods used with the objective of determining the scale construct (Sürücü & Maslakçı, 2020). First, the PCA was made for the version of both scales with the objective of determining the factorable construct validity of the  $PEMAT_{TR}$ . The PCA is a method that is applied frequently for decreasing the components and for reaching significant conceptual constructs (Goretzko et al., 2021; Shrestha, 2021). With this technique, by analyzing the principal components, a decision was made on the number of components (dimension, factor) at the end of the analysis. The KMO and Bartlett's test of sphericity values were examined with the objective of understanding whether or not the relationship matrix could be factored. Since the KMO value was above 0.60 and the Bartlett's test was significant, it showed that they were suitable for factor analysis (Harrington, 2009). In this study, the fact that the KMO value was above 0.60 and the Bartlett's test was significant showed that the items found in both scales had a factorable construct. At the conclusion of the PCA, it was determined that both scale versions had a dual-component construct and subsequently, the factor loads for the components of the 24 items on the PEMAT<sub>TR</sub>-P and the 17 items on the PEMAT<sub>TR</sub>-A/V were examined. It is expected in factor analysis that the factor load of an item should be above 0.30 (Harrington, 2009). According to the EFA results, since the factor load of both versions of the two scales was over 0.30, no items were removed from the scales.

The CFA was made with the objective of confirming the EFA results. Various fit indices are used for being able to interpret the model data fit in the CFA. When the model data fit indices and the error indices are treated together, it was observed that the model data fit was rather high for both scale types tested (Goretzko et al., 2021; Kline, 2005; Schumacker & Lomax, 2004). According to the CFA results, the  $R^2$  values of all the items were rather high, and all of the factor loads were above 0.30 and were significant at the level of p < .00.

The research results support that, just as in the original work report of the PEMAT-P and PEMAT-A/V (Shoemaker et al., 2014a), this study made for the Turkish adaptation also has a two-dimension construct of understandability and actionability.

#### Reliability of the Turkish Version of the Patient Education Materials Assessment Tool

Reliability is a measurement tool that produces correct and sensitive results, and it has the meaning that the scores obtained from this tool have the characteristic of being consistent and repeatable. It is really a stipulation, which is required by a good scale (Cronbach & Shavelson, 2004; Schrepp, 2020; Sürücü & Maslakçı, 2020). The Cronbach's alpha ( $\alpha$ ) coefficient was calculated in the testing of the internal consistency for both scales and the dimensions. The scale is accepted as reliable with this coefficient being a minimum of 0.70. If the value is greater than 0.80, then the scale is interpreted as reliable to a high degree (Cronbach & Shavelson, 2004). In this study, since the items in the related dimensions contributed to high reliability, no item was removed from the scale. Since the Cronbach's alpha coefficients for both scale versions of the  $\mathsf{PEMAT}_{\mathsf{TR}}$  were above 0.80, the conclusion was reached that the internal consistency was rather high. It was found in the original study report that the total of the PEMAT-P was 0.76, whereas the total of the PEMAT-A/V was 0.82 (Shoemaker et al., 2014a). It was observed that the Turkish adaptation of the scale had a higher internal consistency compared to the original scale.

The test–retest reliability method was used with the objective of determining the invariability of the scale according to time. In this method, the test was applied twice to the same group and the correlation between them was considered. If the correlation coefficient is above 0.70, then the conclusion is reached that the scale gave measurements that are consistent over time (Güngör, 2016; Sürücü & Maslakçı, 2020). It was found that the PEMAT<sub>TR</sub> was reliable (PEMAT<sub>TR</sub>-P rtt=0.815, PEMAT<sub>TR</sub>-A/V rtt=0.804).

The original form of the PEMAT was in the shape of a dualranking key (Shoemaker et al., 2014a). In this study as well, after testing the internal consistency and the invariability according to time, it was retransformed into the original condition of the scale, which was in the shape of a dual ranking, and the external consistency was tested. There should be a minimum of two raters independent from each other with the same rating characteristics for being able to calculate the interrater reliability, and the raters should be trained previously. Cohen's kappa statistics are used frequently in the calculation of the results in this method. The value emerging is between -1 and +1. A positive kappa value indicates that the fit between raters is more likely to be related to luck (Bıkmaz Bilgen & Doğan, 2017). Kappa values between 0.41 and 0.60 show an average fit, between 0.61 and 0.80 show a good fit, and between 0.81 and 1.00 show a fit at a very good level among raters (Dettori & Norvell, 2020). The average of the 10 Cohen's kappa coefficients calculated for  $\mathsf{PEMAT}_{\scriptscriptstyle\mathsf{TR}}\text{-}\mathsf{P}$  was 0.736 and 0.781 for PEMATTR-A/V. A fit at a medium level was found in the original study report with a result of 0.50 for the  $PEMAT_{TR}$ -P and 0.57 for the PEMAT<sub>TR</sub>-A/V (Shoemaker et al., 2014a). However, in 2018, a fit at a high level was found among the raters in a broader-scoped study that examined 80 printed and 30 audiovisual materials for a total of 110 materials for the consistency among raters of the PEMAT (Vishnevetsky et al., 2018). In this study that was made for the Turkish adaptation of the scale, the conclusion was reached that there was a fit at a good level among raters.

#### **Conclusion and Recommendations**

The PEMAT- $_{TR}$  was analyzed by making its adaptation to Turkish. At the conclusion of the analyses made, Turkish had become a valid and reliable tool in the evaluation of both printed and audiovisual materials.

The PEMAT<sub>TR</sub> can be used as a tool to provide patients with understandable and actionable educational materials. The PEMAT<sub>TR</sub> User's Guide can also serve as a guide for material developers during material development with the examples it contain.

**Ethics Committee Approval:** Ethical committee approval was received from the Scientific Research and Ethics Committee of University of Ege (Approval no: 323, Date: 25.07.2019).

**Informed Consent:** Written and verbal informed consent was obtained from the participants who agreed to take part in the study.

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