Reliability and Validity of Turkish Version of Pediatric Quality of Life Inventory TM 3.0 Eosinophilic Esophagitis Module for Teens and Their Parents

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Abstract

Background While the Pediatric Quality of Life Inventory (PedsQL) 3.0 eosinophilic esophagitis (EoE) Module is widely used for EoE assessment, no comprehensive transcultural adaptation has been completed, except for one linguistic validation study in Spanish. To assess the transcultural adaptation of the Turkish version of PedsQL (Tr-PedsQL) 3.0 EoE Module for teens and parent reports through validity and reliability tests, marking a first in the field. **Methods** Teens with EoE and their parents were included in the study. Linguistic validation, content validity (CnV) and field test for construct validity (CsV) and reliability were completed in the adaptation of the Tr-PedsQL 3.0 EoE Module. Convergent and divergent validity (CgV and DgV) were examined for CsV by correlation analysis between Turkish version of Pediatric EoE Symptom Scores® (Tr-PEESS) v2.0 and Tr-PedsQL ™ 3.0 EoE Module scores. Reliability was determined through internal consistency (Cronbach-α) and test-retest reliability (intraclass correlation coefficients: ICC). **Results** Thirty-three teens and their parents completed the study. CnV indexes were > 0.8 for all items. Good correlations between Tr-PEESS v2.0 and Tr-PedsQL ™ 3.0 EoE Module Total, Symptoms I, II and Total scores substantiated CgV, while low or absent correlations in certain dimensions evidenced DgV. Tr-PedsQL ™ 3.0 EoE Module showed good internal consistency (Cronbach-α: 0.61-0.90) and good to excellent test-retest reliability (ICC: 0.713-0.935). **Conclusions** This study is the first to adapt the PedsQL 3.0 EoE Module for another language with its validity and reliability in assessing the health-related quality of life among Turkish-speaking teens with EoE and their parents.

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Running title: Reliability and Validity of Tr-PedsQL 3.0 EoE Module

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Methods

Teens with EoE and their parents were included in the study. Linguistic validation, content validity (CnV) and field test for construct validity (CsV) and reliability were completed in the adaptation of the Tr-PedsQL 3.0 EoE Module. Convergent and divergent validity (CgV and DgV) were examined for CsV by correlation analysis between Turkish version of Pediatric EoE Symptom Scores® (Tr-PEESS) v2.0 and Tr-PedsQL™ 3.0 EoE Module scores. Reliability was determined through internal consistency (Cronbach-α) and test-retest reliability (intraclass correlation coefficients: ICC).

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Thirty-three teens and their parents completed the study. CnV indexes were > 0.8 for all items. Good correlations between Tr-PEESS v2.0 and Tr-PedsQL™ 3.0 EoE Module Total, Symptoms I, II and Total scores substantiated CgV, while low or absent correlations in certain dimensions evidenced DgV. Tr-PedsQL™ 3.0 EoE Module showed good internal consistency (Cronbach-α: 0.61-0.90) and good to excellent test-retest reliability (ICC: 0.713-0.935).

Conclusions

This study is the first to adapt the PedsQL 3.0 EoE Module for another language with its validity and reliability in assessing the health-related quality of life among Turkish-speaking teens with EoE and their parents.

Keywords: eosinophilic esophagitis, quality of life, reliability, teens, validity

1. INTRODUCTION

Eosinophilic esophagitis (EoE) is a chronic immune disorder characterized by eosinophilic inflammation of the esophagus that causes esophageal dysfunction.[1, 2] The most bothersome symptoms of EoE are food impaction and dysphagia which are more prominent in adolescents and adults.[3] EoE diagnosis involves clinical presentation, endoscopic findings, and biopsy results showing eosinophilic infiltration. Treatment for pediatric patients includes dietary modifications (elimination diets) and medications (topical corticosteroids, proton pump inhibitors, biologic agents).[4] Symptoms and adaptive eating behaviours may affect quality of life (QoL) negatively in adolescents and other age groups and may constitute the main components of patient reported outcomes (PRO).[5, 6] It can cause pain and feeding problems, especially by making eating difficult. In addition, recurrent and severe episodes of esophagitis can cause physical and psychological fatigue, stress and lack of self-confidence. It can also make participation in school and social activities difficult. If left untreated, eosinophilic esophagitis can lead to long-term health problems for adolescents.

Standardized and validated instruments that measure PRO are neccessary not only for clinical use but also for research purposes. There are four instruments in children with EoE that measures PRO that are Pediatric Eosinophilic Esophagitis Symptom Scores® (PEESS v2.0), Gazi University Eosinophilic Esophagitis Symptoms and Adaptive Behavior Scale (GaziESAS), GaziESAS v2.0 and Pediatric Quality of Life Inventory (PedsQL) 3.0 EoE Module.[6-11]

In addition, there are no study that completed all steps of transcultural adaptation by validation and reliability studies of PedsQL 3.0 EoE Module in another language. There is only one study that reported linguistic validation step in Spanish.[4]Therefore for the first time, we aimed to evaluate transcultural adaptation of Turkish version of PedsQL (Tr- PedsQL) 3.0 EoE Module for teens and parent reports by validity and reliability tests.

2. MATERIALS AND METHODS

2.1 Study Population

Teens between 13-18 years old who have been followed up at our center with a diagnosis of EoE since 2009 and their parents were included in the study. Diagnosis of EoE was made according to the guideline.[1] All the forms used in the study were filled in by face to face interview with the patients and their parents at our center. The patients were seen twice one week apart. At the first visit, demographics were filled in and Turkish version of PEESS (Tr-PEESS) v2.0 and Tr-PedsQL^{TM} 3.0 EoE Module forms were applied to patients and to their parents. In the second visit only Tr-PedsQL^{TM} 3.0 EoE Module was applied for test-retest reliability.

2.2 Ethics and Permission

A written informed consent form was obtained from all parents and teens. This study was approved by Gazi University Ethics Committee (IRB No: 2019-313). The rights of use and distribution of PedsQL^{TM} 3.0 EoE Module and Tr-PEESS v2.0 were given to and provided by MAPI Research Trust (MAPI), Lyon, France (https://eprovide.mapi-trust.org).

2.3 Scales

2.3.1 Tr-PEESS v2.0

The validity and reliability of Tr-PEESS v2.0 were tested by Karagol et al[6]. Tr-PEESS v2.0 contains children and teens reports for 8-18 years and a parent-proxy report for children and teens between 2-18 years. It assesses the frequency (11 items) and severity (9 items) of EoE-related symptoms on a 5-point likert scale. Scores are transformed on a scale from 0 to 100. Higher scores indicate more frequent and severe symptoms.[8]

2.3.2 PedsQL^{TM} 3.0 EoE Module for teens and parent reports

The PedsQL 3.0 EoE Module consists of 3 versions for parents and children from 5–7 (young child), 8–12 (child), and 13–18 years (teens), and one for parents of children from 2 to 4 years (toddler).[7] The PedsQL EoE Module for teens and parent reports encompasses 8 dimensions: Symptoms I (6 items); Symptoms II (4 items); Treatment (5 items); Worry (6 items); Communication (5 items); Food and Eating (4 items); Food Feelings (3 items) and Feeding Tube (2 items, this dimension not scored). The PedsQL 3.0 EoE module is a 5-point Likert scale from 0 (Never a problem) to 4 (Almost always a problem). Scores are linearly transformed to a 0 to 100 scale (0=100, 1=75, 2=50, 3=25, 4=0). Scale scores are based on sum of the responses to each item divided by the number of items. Higher scores indicate fewer problems. Feeding Tube Scale is included only for clinical purposes and is not included in the quantitative analyses.

2.4 Validity and Reliability Process for Tr-PedsQL 3.0 EoE Module

2.4.1 Linguistic Validation

Linguistic validation is based on the backtranslation method according to the guide sent by the Mapi Trust.[4, 12] This method is also similar to Beaton et al.[13] The linguistic validation of PedQL 3.0 EoE module consisted of these steps (Figure 1):

1. Forward translation: Creating a single reconciled Turkish version (Tr-V1): Two local professional translators independently produced a forward translation of the original items, instructions, and response choices. The expert committee consisting of two Pediatric Allergy Professors (HIEK and AB), 3 Pediatric Gastroen-

terology Professors (BD, SS, OEG) and 1 public health specialist (DY) got together and created the single reconciled Turkish version (Tr-V1).

2. Backward translation and comparison with the original scale (Tr-V2): A translator, native speaker of English, and bilingual (Turkish and English) translated the first reconciled version (Tr-V1) into English. The research team and the backward translator made a comparison of the backward version with the original source to detect any misunderstandings, mistranslations, or inaccuracies in the intermediary forward version. Here, minor changes were made in line with some suggestions and this second reconciled version was created (Tr-V2).

3. Evaluation of Tr-V2 with source instrument by Davis method in terms of language translation by 8 independent experts (for assessment of content validity): Expert opinion was requested from 8 academicians (independent reviewers: 2 pediatric allergists, 6 pediatric gastroenterologists) to evaluate of latest Turkish version (Tr-V2) and original tool in terms of language and cultural appropriateness. The latest Turkish version and original tool were e-mailed to the reviewers. The independent reviewers jointly analyzed the Turkish version and the original version, using the Davis technique[14-16] with the main purpose of evaluating the semantic, experimental, and conceptual equivalence between the original tool and Turkish version. According to this technique, items are evaluated on a four-point scale: (a) "The item is appropriate", (b) "The item should be slightly revised", (c) "The item should be revised extensively" and (d) "The item is inappropriate". The number of experts marking the options (a) and (b) is divided by the total number of experts to calculate the content validity (CnV) index (CVI) for an item. The cut-off value for this index is considered as 0.80 with a minimum consensus of 80% agreement between the reviewers.[15, 17] According to the feedback of the group's responses (expert opinions), the latest Turkish version (Tr-V2) was revised.

4. *Patient testing and Expert Committee evaluation, re-evaluating the scale and making necessary correction for Final Version:* We administered Tr-V2 to a sample of patients and parents to determine whether the translation (instructions, items, and response choices) is acceptable, whether it is understood in the way it is supposed to be, and whether the language used is simple and appropriate. In the patient testing, 8 teens and 8 parents responded to all the questions. After this phase, the expert committee came together again and put the scale into its final Turkish version by considering the opinions and suggestions before field testing. Turkish linguistic validation process has been completed.

2.4.2 Field Test

To test the validity and reliability of the final Tr-PedsQL 3.0 EoE module, we applied it to 33 teens with EoE and their parents.

2.4.2.1 Reliability: Internal consistency and Test-retest reliability

To measure the internal consistency, Cronbach-α values per dimensions were calculated and also a total Cronbach-α value was computed. Cronbach-α with values of 0.60 to 0.80 is regarded as evidence of good reliability and those above 0.80 indicating excellent reliability.[17, 18] The parent and teens reports Tr-PedsQL 3.0 EoE module were applied for twice at one week interval. Test-retest reliability was determined by using the intraclass correlation coefficient (ICC). ICCs with values of 0.60 to 0.80 regarded as evidence of good reliability and those above 0.80 indicating excellent reliability.[17]

2.4.2.2 Validity: Construct validiy

Convergent validity (CgV) is considered subcategories of construct validity (CsV). Convergent validity was determined by performing the Spearman correlation analysis between Tr-PEESS v2.0 scores and Tr-PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II score. The level of correlation coefficients were regarded as follows: r [?] 0.81–1.0 as excellent, 0.61–0.80 very good, 0.41–0.60 good, 0.21–0.40 fair, and 0–0.20 poor.[17] The negative correlation coefficients above 0.4 (19, 20) between Tr-PEESS v2.0 scores and Tr-PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of CgV. Divergent validity (DgV) confirms that a measurement tool or test has a low or no relationship with variables it is not intended to measure, thus establishing the test's ability to discriminate

between different and independent concepts.[19, 20] The lack or low correlation between the dimensions of communication and food feeling of Tr-PedsQL^{TM} 3.0 EoE Module with Tr-PEESS v2.0 has also been used to test DgV.

2.5 Statistical analysis

The SPSS program, version 26.0 was used to analyze the data. Normal distribution for continuous variables were assessed with visual (histograms and probability graphics) and analytic methods (Kolmogorov-Smirnov and Shapiro-Wilk's test). Statistical significance was accepted as $p<0.05$. The power of the study was computed post hoc using the G*Power 3.0.10 software.

3. RESULTS

Participants

Thirty-three teens (7 girls, 26 boys) with EoE and their parents (mothers) were included in this study. Median age of children was 207 months (range, 13 to 18 years) (Table 1).

3.2 The linguistic validation of PedsQL 3.0 EoE module

The CVIs for all items was calculated above 0.8. The final Turkish version after the linguistic validation is presented in Table 2.

Scores of Tr-PedsQL^{TM} 3.0 EoE module

Table 3 contains the summary scores of the Tr-PedsQL EoE Module with higher scores indicating lower problems. Both the teens self-report and parent proxy report obtained the lowest score from the Food and Eating dimension.

3.4 Reliability of Tr-PedsQL^{TM} 3.0 EoE Module

The teens self-report and parent proxy-report scales on the EoE Module demonstrated good internal consistency (Cronbach-α: 0.61-0.90). All of the ICCs were within good to excellent test-retest reliability range (0.713-0.935) for both patients and parents. ICCs between teens and parent reports are in the moderate to good agreement (0.477-0.794) for the Tr-PedsQL EoE module scales (Table 4).

3.5 Construct validity of Tr-PedsQL^{TM} 3.0 EoE Module

The good correlations between Tr-PEESS v2.0 scores and Tr-PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, and Symptoms II scores supported convergent validity. The low ($r<0.4$) or lack of correlation between the dimensions of communication and food feeling of Tr-PedsQL^{TM} 3.0 EoE Module with Tr-PEESS v2.0 also demonstrated the divergent validity of the instrument (Table 5).

Finally, the power of the study was calculated with a two-tailed test, an effect size of $|r| = 0.67$, a significance level (α err prob) of 0.05, and a total sample size of 33, the calculated power (1-β err prob) was found to be 0.99.

4. DISCUSSION

This study demonstrated that Tr-PedsQL 3.0 EoE Module had good reliability and validity among teens and their parents with EoE. These findings are in line with previous research on the psychometric properties of the original version of the PedsQL EoE Module.[7] In our country, there is currently no valid and reliable QoL scale related to EoE developed or adapted for children in Turkish. Although the linguistic validation and cultural adaptation of the PedsQL 3.0 EoE module have been published in Spanish, there have been no validity and reliability studies in any other languages found outside of our study.[4]

Franciosi et al. have developed a specific EoE scale to determine the disease-related quality of life in children with EoE, consisting of a patient version for different age groups in the pediatric population and a parent proxy version.[7, 9, 21] They reported the reliability and validity of the PedsQL EoE Module in a USA pediatric

EoE population. Their results showed that the module demonstrated good internal consistency, test-retest reliability, and construct validity, similar to the findings of the Tr-PedsQL 3.0 EoE Module.

Scales, originally designed in their original language, can only be applied to the populations they were designed for. Therefore, their use in a different context requires linguistic validation and cross-cultural adaptation to the country in which they will be applied, while maintaining the original meaning and intent of the items.

In the symptom I domain, our patients and their parents don't understand "heartburn" (item 2) because it does not have a single-word equivalent in Turkish. In Turkish, patients describe the sensation as " Burning sensation behind the breastbone or bitter and sour secretion flowing back into their mouths," which reminds the doctor of reflux, another symptom. The researchers resolved this issue by consulting experts and using a description that accurately conveyed the intended meaning in Turkish. This is a crucial step in ensuring that the translated version is comprehensible and relevant to the target population. Secondly, during the linguistic validation process, it became apparent that some items in the parent report version lacked verbs. This omission affected the clarity and comprehensibility of these items for parents. To address this issue, we added verbs to all the items that lacked them and then parents were able to answer without any issues. After making these adjustments, we did not encounter any issues with parents and teens during the cognitive interviews stage, demonstrating the effectiveness of the revisions in enhancing the scale's usability.

Moderate agreements were found for Treatment, Worry, Communication, and Food feelings dimensions of Tr-PedsQL 3.0 EoE Module between teens and their parents. The study by Franciosi et al. (2013) also found moderate agreement only for symptom I and poor agreement for treatment and communication dimensions.[7] The Treatment, Worry, Communication, and Food feelings dimensions of PedsQL 3.0 EoE Module are generally related to subjective experiences and individual perceptions.[22]

The construct validity of the Tr-PedsQL 3.0 EoE Module, as shown by significant correlations between its Symptoms Total, Symptoms I, and Symptoms II scores with the Tr-PEESS v2.0 scores, provides evidence of convergent validity. Convergent validity pertains to the degree to which two measures that are supposed to assess the same construct are indeed related to each other.[23] Additionally, the absence or weak correlation between the Communication and Food Feeling dimensions, which are not present in the Tr-PEESS v2.0 but are included in the Tr-PedsQL 3.0 EoE Module, supports the divergent validity.

The lowest scores were obtained from the Food and Eating dimension, indicating that this dimension is the most problematic for both teens and their parents. These findings are consistent with previous studies[7, 24], which have highlighted the impact of EoE on food-related activities and quality of life. In Warners et al. study[24], the authors discussed the challenges faced by patients with EoE, particularly in terms of food avoidance and dietary restrictions, and how these factors contribute to decreased quality of life. Our results further emphasize the importance of addressing food-related issues in the management and treatment of EoE to improve patient outcomes and overall well-being.

There are some limitations in this study. It is performed in Turkish children at a single center which may limit the generalizability of the results. The number of participants in the study may seem limited, it should be noted that our center is a reference hospital for EoE in Turkey and has the highest number of cases. This study evaluates the validity and reliability of the Turkish version of the PedsQL 3.0 EoE Module. Therefore, we could not compare the our results with similar studies conducted in other languages. Due to the absence of a Turkish scale that assesses quality of life in EoE or a Turkish quality of life scale that is similar to dimensions in the PedsQL 3.0 EoE module, only the Tr-PEESS v2.0, which assesses symptoms, was used to test convergent validity.

5. CONCLUSIONS

In conclusion, this is the first validity and reliability study of transcultural adaptation of PedsQL 3.0 EoE Module for teens and their parents in another language and it can be used in clinical practice and research in the Turkish context.

Conflict of Interest Statement

The authors declare no conflict of interest related with this manuscript.

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Tables

Table 1 . Demographics of teens with EoE (n=33)

Male, n (%)	26 (
Median age (min-max), years	207
Median age (min-max) at diagnosis, years	133.
Median follow-up (min-max), months	61.9
Allergic Comorbidity, n (%)	16 (
Treatments, n (%) Noncompliant with treatment Undertreatment PPI Diet Topical swallowed budesonide Combined	14 (

Table 2. The final Turkish version after the linguistic validation

Tr-PedsQL 3.0 Eosinophilic Esophagitis Module

Teens self-report item content
Şikâyetlerim Hakkında I 1. Göğsümde ağrı, sızı ya da acı olur 2. Göğsümde veya boğazımda yanma olur veya ağzıma acı su
Şikâyetlerim Hakkında II 1. Yutma güçlüğüm olur 2. Yiyecekler boğazımda veya göğsümde takılıyor gibi hissederim 3. Yiye
Tedavim Hakkında 1. İlaçlarımı içmeyi hatırlamakta zorlanırım 2. İlaçlarımı içmeyi istemem 3. Doktora gitmek istemem 4.
Endişelerim Hakkında 1.Eozinofilik özofajit olduğum için endişeliyim 2. Başkalarının yanında hastalanmaktan endişelenirim
İletişimim Hakkında 1. Eozinofilik özofajiti başkalarına anlatmakta sorun yaşarım 2. Nasıl hissettiğim hakkında annem ve b
Yiyeceklerim ve Yemek Yemem Hakkında 1. Bazı yiyeceklere izin verilmemesi bana zor geliyor 2. Alerjim olan yiyeceklerle
Duygularım Hakkında 1. Alerjim olan veya yememem gereken yiyecekleri yemek konusunda endişelenirim 2. Alerjim olan ve
Beslenme Tüpüm Hakkında 1. Beslenme tüpünü kullanmayı unuturum 2. Beslenme tüpü kullanmak bana zor geliyor

Table 3. Dimensions and Total Scores of Tr-PedsQL™ 3.0 EoE Module

TEENS REPORT	Median (min-max)
EoE Module Total Scale Score	84.8 (41.7-100)
Symptoms Total Scale Score	95 (35-100)
Symptoms I	100 (41.7-100)
Symptoms II	93.7 (18.8-100)
Treatment	85 (30-100)
Worry	87.5 (37.5-100)
Communication	100 (30-100)
Food and Eating	68.8 (0-100)
Food Feelings	83.3 (0-100)
PARENT REPORT	**Median (min-max)**
EoE Module Total Scale Score	84.1 (37.1-100)
Symptoms Total Scale Score	92.5 (55-100)
Symptoms I	100 (75-100)
Symptoms II	87.5 (0-100)
Treatment	80 (5-100)
Worry	83.3 (29.2-100)
Communication	100 (40-100)
Food and Eating	62.5 (0-100)
Food Feelings	66.7 (0-100)

Table 4. Reliability statistics of Tr-PedsQL^{TM} 3.0 EoE Module

	Teens report	Teens report	Teens report	Parent report	Parent report	Parent report	Parent–child Report Agreement	Parent–child Report Agreem
	Internal consistency	**Test-retest Reliability**	**Test-retest Reliability**	**Internal consistency**	**Test-retest Reliability**	**Test-retest Reliability**		
	Cronbach's α	**ICC* (95% CI)**	**p**	**Cronbach's α**	**ICC* (95% CI)**	**p**	**ICC* (95% CI)**	**p**
EoE Module Total Scale Score	0.897	0.946 (0.889-0.974)	**<0.001**	0.888	0.935 (0.868-0.968)	**<0.001**	0.788 (0.570-0.896)	**0.001**
Symptoms Total Scale Score	0.807	0.931 (0.927-0.983)	**<0.001**	0.672	0.830 (0.656-0.916)	**<0.001**	0.784 (0.567-0.893)	**<0.001**
Symptoms I	0.777	0.843 (0.827-0.958)	**<0.001**	0.628	0.739 (0.472-0.871)	**<0.001**	0.717 (0.432-0.859)	**<0.001**
Symptoms II	0.742	0.900 (0.894-0.974)	**<0.001**	0.740	0.862 (0.720-0.932)	**<0.001**	0.794 (0.587-0.898)	**<0.001**

	Teens report	Teens report	Teens report	Parent report	Parent report	Parent report	Parent–child Report Agreement	Parent–child Report Agreem
Treatment	0.607	0.873 (0.744-0.937)	**<0.001**	0.711	0.914 (0.826-0.957)	**<0.001**	0.598 (0.189-0.801)	**0.006**
Worry	0.742	0.874 (0.745-0.938)	**<0.001**	0.643	0.793 (0.581-0.898)	**<0.001**	0.477 (0.073-0.743)	**0.038**
Communication	0.810	0.891 (0.780-0.946)	**<0.001**	0.761	0.886 (0.768-0.944)	**<0.001**	0.556 (0.096-0.781)	**0.030**
Food and Eating	0.882	0.815 (0.626-0.909)	**<0.001**	0.863	0.850 (0.697-0.926)	**<0.001**	0.655 (0.296-0.830)	**0.002**
Food Feelings	0.787	0.713 (0.419-0.858)	**<0.001**	0.690	0.743 (0.479-0.873)	**<0.001**	0.528 (0.031-0.769)	**0.021**

	Teens report	Teens report	Teens report	Parent report	Parent report	Parent report	Parent–child Report Agreement	Parent–child Report Agreem
*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.81 to 1.00 excellent agreement [25]. ICCs= intra-class correlation coefficients. CI= Confidence interval	*ICCs are designated as [?]0.40 poor to fair agreement, 0.41 to 0.60 moderate agreement, 0.61 to 0.80 good agreement, and 0.8 to 1.00 excellen agreement [25] ICCs= intra-class correlation coefficients. CI= Confidence interva

Table 5. Construct Validity of Tr-PedsQL™3.0 EoE Module

	Tr-PEESS v2.0	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**
	Correlations Coefficient Between Teens Scores	**Correlations Coefficient Between Teens Scores**	**Correlations Coefficient Between Teens Scores**	**Correlations Coefficient Between Parents Score**	**Correlations Coefficient Between Parents Score**	**Correlations Coefficient Between Parents Score**

	Tr-PEESS v2.0	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**
Tr-PedsQL™ 3.0 EoE Module	Frequency Domain r (p)	Severity Domain r (p)	Total r (p)	Frequency Domain r (p)	Severity Domain r (p)	Total r (p)
EoE Module Total Score*	**-0.672 (<0.001)**	**-0.556 (0.001)**	**-0.657 (<0.001)**	**-0.642 (<0.001)**	**-0.646 (<0.001)**	**-0.670 (<0.001)**
Symptoms Total Score*	**-0.925 (<0.001)**	**-0.859 (<0.001)**	**-0.902 (<0.001)**	**-0.856 (<0.001)**	**-0.830 (<0.001)**	**-0.884 (<0.001)**
Symptoms I*	**-0.653 (<0.001)**	**-0.675 (<0.001)**	**-0.675 (<0.001)**	**-0.437 (0.011)**	**-0.603 (<0.001)**	**-0.475 (0.005)**
Symptoms II*	**-0.862 (<0.001)**	**-0.755 (<0.001)**	**-0.816 (<0.001)**	**-0.827 (0.001)**	**-0.662 (<0.001)**	**-0.805 (<0.001)**
Treatment	-0.339 (0.054)	-0.340 (0.053)	**-0.377 (0.030)**	**-0.528 (0.002)**	**-0.530 (0.002)**	**-0.554 (0.001)**
Worry	**-0.398 (0.022)**	-0.257 (0.149)	**-0.359 (0.040)**	**-0.428 (0.013)**	**-0.406 (0.019)**	**-0.437 (0.011)**
Communication**	-0.337 (0.055)	-0.330 (0.061)	-0.341 (0.052)	-0.217 (0.226)	-0.230 (0.197)	-0.226 (0.206)
Food and Eating	**-0.406 (0.019)**	-0.302 (0.088)	**-0.390 (0.025)**	-0.270 (0.129)	**-0.408 (0.018)**	**-0.351 (0.045)**
Food Feelings**	**-0.381 (0.029)**	-0.210 (0.241)	-0.329 (0.062)	-0.258 (0.148)	-0.304 (0.086)	-0.282 (0.111)

	Tr-PEESS v2.0	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**	**Tr-PEESS v2.0**
r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**	r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**	r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**	r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**	r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**	r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**	r: Spearman's Correlations Coefficient * The negative correlation coefficients above 0.4 between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 EoE Module Total, Symptoms Total, Symptoms I, Symptoms II scores are supportive of **convergent validity**. ** The low (r<0.4) or lack of correlation between Tr-PEESS v2.0 scores and PedsQL^{TM} 3.0 Eosinophilic Esophagitis Module communication and food feeling scores are supportive of **divergent validity**

Figure Legends

Figure 1. Process of Turkish Linguistic Validation