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# Psychometric properties of the Turkish version of the Tuberculosis-Related Stigma scale

Propriedades psicométricas da versão turca da escala *Tuberculosis-Related Stigma*

Propiedades psicométricas versión turca de la escala *Tuberculosis-Related Stigma*

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## Descritores

Tuberculose; Estigmatização; Estigma da escala de tuberculose; Confiabilidade e validade

## Keywords

Tuberculosis; Stigmatization; Stigma of tuberculosis scale; Reliability and validity

## Descriptores

Tuberculosis; Estigmatización; Estigma de la escala de tuberculosis; Reproducibilidad de los resultados

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July 30, 2018

## Abstract

**Objective:** The aim of this study was to investigate the validity and reliability of the Turkish "Tuberculosis-Related Stigma Scale".

**Methods:** This study used methodological design. This methodological study was conducted with 263 individuals who not being diagnosed as pulmonary tuberculosis. We also used Pearson correlation analysis, Cronbach alpha coefficient, item total correlation and factor analysis for the study data.

**Results:** In this study, Cronbach's alpha coefficient was .83 for the subscale community perspectives and .89 for the subscale patient perspectives. RMSEA was 0.077, NFI was 0.91, CFI was 0.94, RMR was 0.056, SRM was 0.079, GFI was 0.95, AGFI was 0.94, x<sup>2</sup> was 582.84, SD was 228 and x<sup>2</sup>/SD was 2.55 (p = 0.000). Clearly, all model fit indices were acceptable.

**Conclusion:** In the light of the findings, Turkish version of Tuberculosis-Related Stigma Scale has acceptable validity and reliability for use in Turkish population.

## Resumo

**Objetivo:** O objetivo deste estudo foi investigar a validade e confiabilidade da escala *Tuberculosis-Related Stigma*.

**Métodos:** Estudo metodológico com 263 indivíduos não diagnosticados com tuberculose pulmonar. Também foi utilizada a análise de correlação de Pearson, o coeficiente alfa de Cronbach, correlação item total e análise fatorial dos dados do estudo.

**Resultados:** Neste estudo, o coeficiente alfa de Cronbach foi 0,83 para a subescala perspectivas da comunidade e 0,89 para a subescala perspectivas dos pacientes. O RMSEA foi 0,077, NFI: 0,91, CFI: 0,94, RMR: 0,056, SRM: 0,079, GFI: 0,95, AGFI: 0,94, x<sup>2</sup>: 582,84, DP: 228 e x<sup>2</sup>/SD: 2,55 (p = 0,000). Claramente, todos os índices de ajuste do modelo foram aceitáveis.

**Conclusão:** À luz dos resultados, a versão turca da escala *Tuberculosis-Related Stigma* tem validade e confiabilidade aceitáveis para uso na população turca.

## Resumen

**Objetivo:** El objetivo de este estudio fue investigar la validez y confiabilidad de la escala *Tuberculosis-Related Stigma*.

**Métodos:** Estudio metodológico con 263 sujetos no diagnosticados con tuberculosis pulmonar. También se utilizó el análisis de correlación de Pearson, el coeficiente alfa de Cronbach, correlación ítem total y análisis factorial de los datos del estudio.

**Resultados:** En este estudio, el coeficiente alfa de Cronbach fue del 0,83 para las perspectivas de la subescala de la comunidad y del 0,89 para las perspectivas de la subescala de pacientes. El RMSEA fue del 0,077, NFI: 0,91, CFI: 0,94, RMR: 0,056, SRM: 0,079, GFI: 0,95, AGFI: 0,94, x<sup>2</sup>: 582,84, DP: 228 y x<sup>2</sup>/SD: 2,55 (p = 0,000). Claramente, todos los índices de ajuste del modelo fueron aceptables.

**Conclusión:** Conforme los resultados, la versión turca de la escala *Tuberculosis-Related Stigma* es confiable y posee validez aceptable para su uso en la población turca.

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**Conflicts of interest:** the manuscript has been read and approved by authors. The authors report no conflict interest or relevant financial relationships. Each of authors permits the copyright to the manuscript to Acta Paulista de Enfermagem. Abstract of this study was presented in 2nd World Congress on Nursing as oral presentation at 28-30 November 2016 in Abu Dhabi/UAE.



## Introduction

Tuberculosis is the second most frequent infectious disease causing death in adults in the world following HIV/AIDS and it continues to be an important public health problem.<sup>(1,2)</sup> According to Global Tuberculosis Report from the World Health Organization in 2017, there are 10.4 million tuberculosis patients in the world.

Forty-five percent of the tuberculosis cases are in the South-East Asia Region, the African Region (25%) and the Western Pacific Region (17%); smaller proportions of cases occurred in the Eastern Mediterranean Region (7%), the European Region (3%) and the Region of the Americas (3%).<sup>(3)</sup> According to a report about eradication of tuberculosis in Turkey issued in 2017, 12.772 tuberculosis patients were recorded in tuberculosis eradication centers. The incidence of the disease was 22 in 100,000 in Turkey in 2010, but it decreased to 15,4 in 100,000 in 2015.<sup>(4)</sup>

Tuberculosis, like all other chronic diseases, is a health problem which affects individuals in terms of both physical, psychological and social aspects.<sup>(5)</sup> Individuals with tuberculosis and their families may face judgemental and incriminatory attitudes and prejudices.<sup>(6,7)</sup> These negative attitudes and prejudices result in their isolation and stigmatization by the society.<sup>(5)</sup> The word stigma means deformity, mark, sign, a state causing indignity and categorization.<sup>(8,9)</sup> Stigmatization can be related to physical and social issues causing negative feelings. It causes isolation of individuals from social relationships and marginalizing them. Actually, underlying stigmatization is prejudices, which may cause the society to develop a negative attitude towards some groups of patients and isolate them.<sup>(1,6,10-13)</sup>

Due to stigmatization, people may have fears about losing their jobs, getting divorced, having marital conflicts, being the subject of gossips and being prevented from sharing their bedroom with their spouses and from using some articles at home like plates, forks, spoons and knives etc. Two most important features of tuberculosis causing stigmatization are that the disease is considered as a condition contaminating people and that tuberculosis

patients are isolated from the society due to their disease. Stigmatization caused by discrimination against tuberculosis patients by people or organizations lead to feelings of guilt and embarrassment in the patients, which has a negative effect on their behavior of seeking medical help for the disease and non-adherence to or even discontinuation of treatment.<sup>(1,6,10-13)</sup>

Before designing interventions to decrease stigmatization against tuberculosis patients, it is important to determine the extent of this problem, groups of the patients at higher risk and effects of the problem on diagnosis, treatment and adherence to treatment.<sup>(12,14)</sup> At this step, to what extent both tuberculosis patients and healthy people in a population have stigmatizing attitudes should be revealed. To this aim, it is necessary to use a valid and reliable measurement tool for both groups.

Stigmatization associated with tuberculosis in Turkey has been investigated by several researchers<sup>(1,5)</sup> by using a scale developed by Sert (2010).<sup>(15)</sup> Ozpinar et al. (2015) tested validity and reliability of a scale in a Turkish population developed by Coreil et al (2010) to reveal stigmatization against tuberculosis patients in Haiti and the USA.<sup>(16,17)</sup>

These scales, used in Turkey, are directed towards revealing opinions and feelings of only tuberculosis patients about stigmatization associated with their disease. However, it is of great importance to show what a society thinks about stigmatization. Therefore, in this study, Tuberculosis-Related Stigma Scale, developed by Rie et al. (2008) to measure to what extent both tuberculosis patients and healthy people in Thailand have stigmatizing attitudes, was adapted into Turkish and its validity and reliability were tested for Turkish population.<sup>(18)</sup> This feature of the scale will have new contributions to the literature. The scale had been adapted into Mexican before.<sup>(19)</sup>

This methodological study, directed towards adapting Tuberculosis-Related Stigma Scale into Turkish, will allow determining the extent of stigmatization regarding tuberculosis and effects of this problem on diagnosis, treatment and adherence to treatment of the disease in Turkish population by using a valid and reliable scale.

## Methods

### Study design

This study had a methodological design.

### Sampling and Setting

It is recommended that sample size should be 5 or 10 times the number of items in a scale to perform factor analysis in validity and reliability studies.<sup>(20)</sup> Tuberculosis-Related Stigma Scale was composed of a total of 23 items, of which 11 were about community perspectives and 12 were about patient perspectives. Therefore, 263 individuals were included into the study.

Inclusion criteria were accepting to participate in the study, not being diagnosed as pulmonary tuberculosis, ages 18 years or older, being able to speak and read in Turkish and not having hearing or speech problems. No sampling method was used; the individuals meeting the above mentioned criteria formed the sample.

For test-retest purposes, an instrument should be administered for the second time. For test-retest analysis, a group of at least 30 participants is recommended.<sup>(21)</sup> In this study, the scale was given to 50 people who were willing to take part in the retest two weeks after the first administration.

## Instrument

### Demographic characteristics

Data about age, education and marital status were collected with a demographic characteristics form.

### Tuberculosis-Related Stigma Scale

Tuberculosis-Related Stigma Scale was created by Van Rie et al. in 2008.<sup>(18)</sup> The scale was composed of two subscales. One was about community perspectives about tuberculosis (11 questions) and the other was about patient perspectives about tuberculosis (12 questions). Cronbach's alpha coefficient was .88 for the first subscale and .82 for the second subscale.

### Calculating standardized stigma scores

1. Responses to the question in the scale were assessed on a four-point Likert scale: (0) strongly

disagree, (1) disagree, (2) agree, and (3) strongly agree. Higher scores indicate higher levels of stigmatization.

2. No items were reverse coded.
3. For each subscale, scores for all the items were summed to create the summary score (SSraw).
4. Before comparing scores across subscales, a standardized score needs to be created because each subscale has a different number of items. Any forms of standardizing will work (item-adjusted, 10-point scale, etc). We chose to standardize all scores to a 50-point scale using the following equation:

$$SS_{50} = \frac{SS_{raw} \times 50}{n \times 3}$$

5. where  $n$  equals the number of items on the subscale being calculated and 3 equals the maximum value for any one item on the scale. Standardized scores range from 1 to 50.

Test-retest reliability was  $r=0.64$  for community perspectives towards tuberculosis ( $p=0.01$ ) and  $r=0.46$  for patient perspectives towards tuberculosis ( $p=0.10$ ).

### Translation of the scale

In order to constitute the Turkish form of Tuberculosis-Related Stigma Scale group translates, back translations and judges' expertise are performed. In the translation, linguistic equivalence was tried to be provided along with conceptual equivalence. To achieve linguistic validity of the scale, it was translated from English into Turkish by all the researchers and five linguists. For the expert opinion, both in terms of translation and clarity of items were obtained recommendations from five experts; one internal medicine specialist, two public health specialists, two nursing and one researcher. Then the scales translated by the linguists were compared with those translated by the researchers. Thus, the final Turkish version of the scale was obtained.

### Data collection

Data were collected at face to face interviews from people living in the territories of Atakum municipi-

pality of Samsun, Turkey, and accepting to participate in the study. The data was collected from Jan to Apr 2016 by researchers. Atakum was elected in this study because of the high number of tuberculosis patients registered to tuberculosis eradication center in northern Turkey. It took about ten minutes to complete the data collection tools.

### Data analysis

Descriptive statistics and reliability and validity analyses were conducted by using SPSS 15.0 (SPSS Inc.Chicago, IL,USA). Confirmatory factor analysis (CFA) was made by using LISREL 8.80 (Scientific Software International, Inc, Lincolnwood, IL,USA). Exploratory factor analysis (EFA) was made with principal component analysis and obtained results were evaluated with varimax rotation. CFA was made with Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR), Standardized RMR (SRMR), Normed Fit Index (NFI),  $\chi^2$  and  $\chi^2/SD$ .

### Validity analysis

To determine appropriateness of EFA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used. By using Bartlett's sphericity test, meaningfulness of intervariable correlation coefficients was determined.<sup>(20)</sup> Validity of the scale was tested with EFA and CFA.

### Reliability analysis

Cronbach's Alpha was used to test internal consistency for the instrument and for each of the factors resulting from the factor analysis. The item-total item correlations and mean inter-item correlations were included in the analysis. Pearson correlation analysis was used for analysis of test-retest and item total scores.

### Ethical consideration

Written permission was requested from Annelies Van Rie, who developed this scale, through e-mail to examine reliability and validity of the Turkish version of the scale. Ethical approval was obtained

from 19 Mayıs University Ethical Committee (Approval number: 2015/397). Also, the objective of the research was explained to the participants and oral informed consent was taken from them.

## Results

### Sample characteristics

The mean age of the participants was  $35.41 \pm 14.6$  years. Of all the participants ( $n=263$ ), 65.4% were female, 54.8% were married, and 41.8% were university graduates. Besides, 50.6% were unemployed, 49.8% had an income equal to their expenditures and 67.3% were living in the city (Table 1).

**Table 1.** Sociodemographic characteristics of the study participants

Characteristics	n(%)
Age (mean)	35.41±14.6
Gender	
Female	172(65.4)
Male	91 (34.6)
Marital status	
Married	144(54.8)
Single	119 (45.2)
Education	
Illiterate	9(3.4)
Primary school	27(10.3)
Secondary school	30(11.4)
High school	87(33.1)
Two-year university education	110 (41.8)
Employment status	
Employed	130(49.4)
Unemployed	133(50.6)
Income	
Lower than expenditures	82(31.2)
Equal to expenditures	131(49.8)
Higher than expenditures	50 (19.0)
Place of living	
City	177(67.3)
Town	55 (20.9)
Village	31 (11.8)
Total	263(100.0)

### Descriptive statistics of the Tuberculosis-Related Stigma Scale: community and patient perspectives towards tuberculosis

The mean score was  $16.65 \pm 6.47$  for the community perspectives towards tuberculosis subscale and  $19.51 \pm 5.87$  for the patient perspectives towards tuberculosis subscale (Table 2).

### Validity analysis

Scores assigned by six experts were evaluated by using Kendall W analysis, and no statistically significant

**Table 2.** Scores for community perspectives towards tuberculosis and patient perspectives towards tuberculosis

Stigma subscale	X $\pm$ SD
Community perspectives towards TB	16.65 $\pm$ 6.47
Patient perspectives towards TB	19.51 $\pm$ 5.87

TB – tuberculosis

difference was found between their scores (Kendall  $W = 0.47$ ,  $p = 0.16$ ). EFA revealed a KMO coefficient of 0.878 and Bartlett's test result was  $\chi^2 = 2644.691$  ( $p = 0.000$ ). The factor loadings of the scale ranged from 0.78 to 0.041. The explained total variance was 43.62% (Table 3).

Item - total score correlation coefficients of the scale ranged from 0.28 to 0.63. The correlation coefficients were greater than 0.20 for all the items of the scale (Table 3).

After EFA was conducted, CFA was used to create a model about the factor structure of the scale. RMSEA was 0.077, NFI was 0.91, CFI was 0.94, RMR was 0.056, SRM was 0.079, GFI was 0.95,

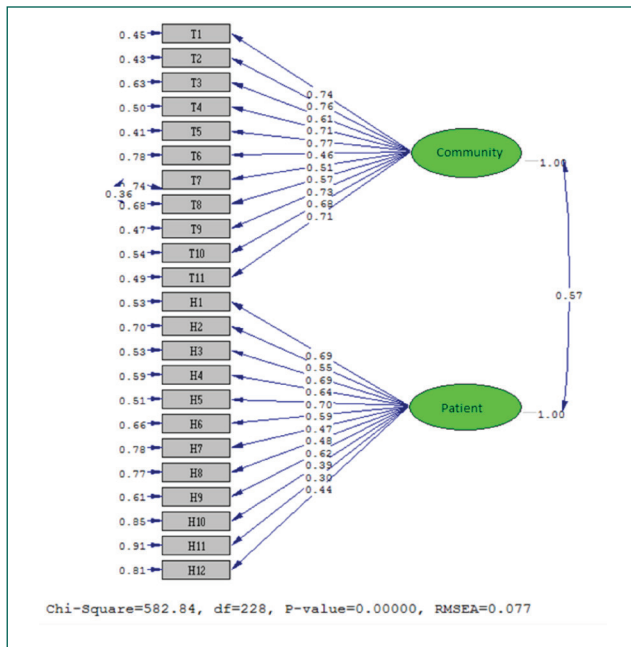
AGFI was 0.94,  $\chi^2$  was 582.84, SD was 228 and  $\chi^2/SD$  was 2.55 ( $p = 0.000$ ). Clearly, all model fit indices were acceptable. According to PATH diagram obtained from the model,  $t$  values for all the items were higher than 1.96 and factor loadings of all the items were 0.30 or higher than 0.30. The model suggested that items 7 and 8 loaded on the factor community perspectives about tuberculosis should be associated. They were modified in accordance with the suggestion. As a result of CFA, none of the items were removed and the scale with its two-factor structure and 23 items was accepted. The PATH diagram obtained from the model is presented in figure 1.

### Reliability analysis

Total Cronbach's Alpha internal consistency reliability coefficient was 0.90 for Tuberculosis-Related Stigma Scale, 0.89 for the subscale community perspectives towards tuberculosis and 0.83 for the

**Table 3.** Results of reliability and validity Analyses of Tuberculosis-Related Stigma Scale

	Scale Items	Factor loading	Mean (SD)	Item-total correlation	Cronbach alpha if item deleted	Explained variance (%)
Factor 1: Community perspectives towards tuberculosis ( $\alpha=.897$ )						
1	Some people do not prefer to live in the same environment as tuberculosis patients.	0.653	2.66	0.608	0.893	24.896
2	Some people keep away from tuberculosis patients.	0.682	2.66	0.625	0.893	
3	Some people think tuberculosis patients are disgusting.	0.611	2.51	0.517	0.895	
4	Some people feel uncomfortable when they are close to tuberculosis patients.	0.703	2.62	0.600	0.893	
5	Some people do not want their children to play with tuberculosis patients' children.	0.767	2.65	0.628	0.893	
6	Some people do not want to talk to tuberculosis patients.	0.523	2.10	0.443	0.897	
7	If a person has tuberculosis, some people may treat him/her differently throughout their life.	0.658	2.30	0.480	0.896	
8	Some people may not want to eat or drink with their friends having tuberculosis.	0.715	2.41	0.505	0.896	
9	Some people avoid touching tuberculosis patients.	0.782	2.55	0.598	0.893	
10	Some people may not want to eat or drink with their relatives having tuberculosis.	0.720	2.61	0.566	0.894	
11	Some people are afraid of tuberculosis patients.	0.691	2.59	0.617	0.893	
Factor 2: Patient Perspectives about Tuberculosis ( $\alpha=.836$ )						
1	People with tuberculosis feel guilty since they think their care causes burden on their families.	0.471	2.75	0.549	0.894	18.724
2	Some people with tuberculosis do not keep close with other people in order not to spread tuberculosis bacilli.	0.419	2.43	0.476	0.896	
3	Some people with tuberculosis feel lonely.	0.625	2.76	0.536	0.895	
4	Some people with tuberculosis feel disturbed when other people learn about their disease.	0.626	2.74	0.501	0.896	
5	Some people with tuberculosis lose their friends due to their disease.	0.650	2.86	0.543	0.895	
6	Some people with tuberculosis are worried that they may have AIDS.	0.647	2.55	0.476	0.896	
7	Some people with tuberculosis fear about telling their disease to other people except family members.	0.609	2.37	0.405	0.898	
8	Some people with tuberculosis carefully select who to tell about their disease.	0.603	2.58	0.408	0.898	
9	Some people with tuberculosis are afraid of going to tuberculosis eradication centers since they think other people may see them.	0.664	2.82	0.497	0.896	
10	Some people with tuberculosis are afraid of telling their disease to members of their families.	0.549	2.65	0.324	0.900	
11	Some people with tuberculosis are afraid of telling their disease to other people in case these people think they have AIDS.	0.454	2.38	0.278	0.901	
12	Some people with tuberculosis feel guilty due to their smoking habit, taking alcohol or other unhealthy behavior.	0.522	2.63	0.374	0.899	
Total Cronbach Alpha $\alpha=.90$						
Total Explained Variance (%)						43.620



**Figure 1.** Examination of factor structure of Tuberculosis-Related Stigma Scale with PATH diagram

subscale patient perspectives towards tuberculosis (Table 3). In split-half analysis, Cronbach's Alpha was 0.82 for the former subscale and 0.83 for the latter subscale. Both subscales had acceptable reliability. The correlation coefficient between the two subscales was 0.74.

## Discussion

If a scale were to be used in a different language, its translated version is expected to display the same reliability and validity characteristics as its original form. Therefore, validity and reliability of Tuberculosis-Related Stigma Scale needed to be evaluated if it were to be used in a Turkish sample. The results of the present study showed that the scale was valid and reliable to reveal perspectives of Turkish population about tuberculosis related stigmatization.

Turkish version of Tuberculosis-Related Stigma Scale was sent to six experts for evaluation of its content validity and Kendall W analysis was made to determine consistency between the experts' evaluations. Expert opinions about understandability of the items of the scale were not different (Kendall W= .47, p=.16).

In the factor analysis, the KMO coefficient was found to be 0.878 and Bartlett's test result was significant ( $p<.001$ ). The values for the Turkish version of the scale overlapped with those of the original scale and showed that the sample size was suitable both to perform both the factor analysis and to analyze the distribution of homogeneity of values.<sup>(20)</sup>

In the exploratory factor analysis, the total variance of the scale was found to be 43.62.

In studies in the field of social sciences, variance rates between 40% and 60% are deemed to be adequate so the total variance explained by the factor structure of the scale in the present study was sufficient. In this study, the scale demonstrated acceptable internal consistency. One of the methods used to evaluate internal consistency in the adapted scales in terms of reliability is item analysis. In item-total analyses, the acceptable coefficient for item selection should be higher than 0.20 or 0.25. In the item analysis made in the current study, the item-total score correlation coefficients ranged from 0.28 to 0.63. Since all the items had acceptable item-total correlation coefficients, all of them were kept.<sup>(18,21,22)</sup>

One of the methods used for evaluation of internal consistency is Cronbach's Alpha reliability coefficient. If it is between .60 and .79, the measurement tool is considered relatively reliable. If it is between .80 and 1, the tool is considered highly reliable.<sup>(20)</sup> In the present study, Cronbach's alpha coefficient was found to be .89 for the subscale community perspectives towards tuberculosis. It was reported to be .88 in the original. Cronbach's alpha coefficient was .83 for the subscale patient perspectives towards tuberculosis in the current study. It was reported to be .82 in the original scale.<sup>(18)</sup> Cronbach's alpha coefficients for both subscales of the Turkish version were consistent with those reported for the original scale and indicated that the scale had high reliability.<sup>(20)</sup>

How tuberculosis patients view their disease and the stigmatization they feel is important in terms of their compliance with the treatment. Studies conducted have shown that patients experienced intense feelings of stigmatization and the disease caused negative effects especially on their relationships with friends.<sup>(1,23,24)</sup> The feeling of stigmatization can be effective on individuals' compliance to treatment in

addition to social isolation. For this reason, it is important to reveal this stigmatization felt especially in patients and to help them cope with it. The fact that both parts of this scale adapted to Turkish society have high reliability coefficient will make it possible to use it as a reliable instrument in studies conducted in many regions of Turkey, to show the dimension of stigmatization felt by patients and the views of the society and will contribute to interventions to prevent this. Especially in conducting tuberculosis control programs successfully throughout the country, it will be used as a facilitating measurement instrument in overcoming bias against the disease and in raising awareness in individuals. Besides, this adapted scale will contribute to determining tuberculosis control programs within the country.

This scale for finding out stigma against tuberculosis patients, the reliability and validity of which was confirmed, was adapted by reaching healthy individuals in society. The fact that it was not possible to take permission from the related institutions for tuberculosis patients is the limitation of this study.

## Conclusion

To conclude, Turkish version of Tuberculosis-Related Stigma Scale has acceptable validity and reliability for use in Turkish population. However, prospective studies can contribute to validation of the tool. It is suggested to repeat the validity and reliability by applying to patients and healthy individuals in larger populations.

## Collaborations

Bahar Z contributed to the project design, final approval of the version and relevant critical review of the intellectual content; Beser contributed to the project design, data analysis, a final approval of the version and relevant critical review of the intellectual content; Kissal A contributed to the project design, data collection, data analysis and interpretation, Cal A and Cavusoglu F, contributed to the project design, data collection, writing and interpretation;

Mert H contributed to the project design, a final approval of the version and relevant critical review of the intellectual content; Capik C contributed to the data analysis, interpretation and relevant critical review of the intellectual content.

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