



## THE TURKISH VERSION OF THE SELF-EFFICACY FOR HOME EXERCISE PROGRAMS SCALE AMONG MUSCULOSKELETAL PATIENTS

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**Abstract:** To test the Turkish version of The Self-Efficacy for Home Exercise Programs Scale (SEHEPS-T) in patients with musculoskeletal diseases for validity and reliability. The performance of the scale was evaluated with 122 patients with varying musculoskeletal diseases, and repeated to assess its test-retest reliability. The questionnaire applied included a Demographic and Socioeconomic Characteristics Form, SEHEPS-T, the Turkish version of the Exercise Self-Efficacy Scale (EXSE), and the Turkish version of the Tampa Scale for Kinesiophobia (TSK). Exploratory Factor Analysis and Confirmatory Factor Analysis were used to evaluate their validity and reliability. High internal consistency (Cronbach's alpha = .974) and good test-retest reliability (ICC = .998) were demonstrated. SEHEPS-T was revealed to be strongly correlated with both the EXSE and the TSK ( $\rho = .933$ ,  $\rho = .949$ ,  $P = .000$ , respectively), indicating strong convergent validity. SEHEPS-T was found to reliably measure the self-efficacy of musculoskeletal patients.


**Keywords:** SEHEPS-T, Self-efficacy, Exercise


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### 1. Introduction

Being physically active is one of the most important actions that individuals of all ages can engage in to improve and maintain their health (Lee et al., 2012; Carlson et al., 2018). With increasing healthcare costs, the prescription of home exercise programs (HEPs) may help to decrease the financial burden associated with injuries by reducing the number of clinical visits required (Picha and Howell, 2018). However, the potential benefits of the overall treatment plan will be diminished if patients do not follow their prescribed home program (Picha and Howell, 2018). Self-efficacy refers to the beliefs that individuals hold regarding their capability to successfully perform specific tasks. Low self-efficacy is considered an obstacle to rehabilitation exercise adherence and is an important indicator of patient behavior. With higher levels of self-efficacy regarding exercise, patients have been found to be 50% more likely to engage in their prescribed exercise (Locke, 1997; Lewis et al., 2002; Oliver and Cronan, 2002). The Self-Efficacy for Home Exercise Programs Scale

(SEHEPS) was developed by Picha to assess the self-efficacy of individuals with musculoskeletal diseases related to home exercise programs. Picha et al. reported that SEHEPS has good psychometric properties, with both high internal consistency and test-retest reliability. The scale is intended to be used as a guide for clinicians to individualize patient care when HEPs are to be prescribed. The 12-item questionnaire takes approximately 2 minutes to complete. A patient's self-efficacy score is then calculated as the raw sum score of the 12 items (range: 0 min to 72 max) (Picha et al., 2019). To the best of our knowledge, the SEHEPS has yet to be translated into other languages, and no studies have investigated the validation and reliability of the scale. There are very few questionnaires or scales in the Turkish language which investigate the self-efficacy of home exercise programs. Therefore, the aim of the current study is to develop a Turkish version of SEHEPS (SEHEPS-T) for patients with musculoskeletal diseases, and to evaluate the scale's validity, reliability, and psychometric characteristics.



## 2. Materials and Methods

### 2.1. Participants

A total of 122 patients with musculoskeletal disease volunteered to take part in the study. Inclusion criteria for the study group were that participants were aged 18-65 years old, that they volunteered to be included in the study, were in receipt of musculoskeletal treatment, and were participating in an exercise program for a period of at least 2 weeks. Prospective participants not in an exercise program with a follow-up were excluded from the study. All of the selected participants were asked to sign an informed consent form and were apprised about the study prior to its start.

Demographic data of the participants, including their age, gender, and medical history were recorded as a baseline assessment. All assessment were conducted during face-to-face interviews including the SEHEPS, Exercise Self Efficacy Scale (EXSE), and Tampa Scale for Kinesiophobia (TSK). In order to test the reliability of SEHEPS, a retest was applied within 24-48 hours following the initial assessment.

### 2.2. Methods

#### 2.2.1. Sociodemographic characteristics

The characteristics of the participants were captured using a form that consisted of 12 questions regarding their demographic and socioeconomic status.

#### 2.2.2. Self-Efficacy for Home Exercise Programs Scale (SEHEPS)

SEHEPS was developed by Picha et al. (2019) the scale includes 12 questions to evaluate self-efficacy for home exercise programs in patients with musculoskeletal diseases. A six-point, Likert-type scoring (ranging from 0 = not confident to 6 = very confident) was used for each question in the scale. Higher scores indicate a greater level of confidence. The original study was applied with 81 participants who had various musculoskeletal disorders, and the SEHEPS was reported as having good test-retest reliability (ICC = .88) and high internal consistency ( $\alpha = .96$ ).

#### 2.2.3. Exercise Self Efficacy Scale (EXSE)

The EXSE was developed by Bandura. It consists 18 items that measure self-efficacy in exercise, with a score graded from 0% to 100% of total maximum power. According to the strength of their efficacy beliefs, participants are recorded on the 100-point scale at 10-unit intervals from 0 (not possible) to 50 (medium level definitely able) and 100 (definitely able). Higher scores indicate higher levels of efficacy (Bandura, Freeman, and Lightsey, 1999). The Turkish version of EXSE developed by Bozkurt was employed in the current study (Bozkurt, 2009). Bozkurt reported that the reliability of the Turkish version of EXSE was calculated as .968.

#### 2.2.4. Tampa Scale for Kinesiophobia (TSK)

The Tampa Scale for Kinesiophobia was published by Vlaeyen et al. It is a 17-question scale developed to measure the fear of motion/re-injury in patients. The scale uses a four-point, Likert-type scoring (from 1 =

strongly disagree to 4 = totally agree), with a total score of between a minimum of 17 and a maximum of 68. Higher scores indicate higher levels of kinesiophobia (Vlaeyen, Kole-Snijders, Boeren, and Van Eek, 1995; Vlaeyen and Linton, 2000). The Turkish version of the TSK developed by Yilmaz et al. was employed in the current study. Yilmaz et al. reported the reliability of the Turkish version of TSK as being .806 (Yilmaz et al., 2011).

#### *Translation and adaptation of the scale*

The translation process of the SEHEPS first began with gaining permission from its developer. The cross-cultural adaptation process of the SEHEPS was performed by following the guidelines provided by Brisling's translation model (Wild et al., 2005).

#### *Translation and back-translation*

The original SEHEPS was translated into the Turkish language and context by two Turkish native speakers fluent in English. The consistency of the two translations was then reviewed and discussed in order to reach consensus. Then the Turkish draft was back translated into English by two orthopedic specialists with experience working in English-speaking countries. The two versions of the scale were then compared and validated by a qualified bilingual expert who specializes in the design and cross-cultural validity of study questionnaires.

#### *Assessment of the tool*

In order to assess the scope and validity of the tool, a panel of experts was formed, selected based on their experience and professional knowledge. The expert panel consisted of two orthopedic specialists and four physiotherapists. The experts evaluated each item for its relevance and repetition, using a content validity index in their evaluation. According to the experts' assessment, the content index of SEHEPS-T was calculated as .92, which indicated that it contained an excellent level of content.

#### *Pilot application*

To assess whether or not the SEHEPS-T was easy to understand, 30 Turkish-speaking patients with musculoskeletal conditions who were prescribed a home exercise program were evaluated. After each of these steps had been completed, the psychometric properties of the scale were then tested. In total, 30 patients evaluated the SEHEPS-T in terms of whether or not each question of the scale was easy to understand and to answer.

### 2.3. Data Collection

After the participants had each signed a written consent form to participate in the current study, the questionnaires were applied by the research team. The demographic data of the participants, including their age, gender, and their musculoskeletal disease and medical history, were first recorded as a baseline assessment. All of the assessments were conducted during face-to-face interviews including the SEHEPS, the Exercise Self Efficacy Scale (EXSE), and the Tampa Scale for Kinesiophobia (TSK). The SEHEPS-T was performed a

second time as a follow-up within 24-48 hours of the initial assessment.

#### **2.4. Statistical Analysis**

The Statistical Package for Social Sciences version 25.0 software for Windows (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp., USA) and IBM SPSS AMOS 21.0 (Build 1178) were used for the statistical calculations performed in the study. Descriptive statistics of the variables are presented as mean  $\pm$  standard deviation and n (%). All of the variables were tested according to Kolmogorov-Smirnov and Shapiro Wilk test for normality assumptions. In addition, Kurtosis and Skewness coefficients were also examined.

Validation of the Turkish version of Self-Efficacy for Home Exercise Programs Scale (SEHEPS-T) was examined from several perspectives. The following criteria were selected in order to distinguish the items to be omitted: a) correlation between item and total scale score (Item-Total Correlation) of less than .30, and b) no decrease in the Cronbach  $\alpha$  value where the item was below .20. Construct validity was first evaluated using Exploratory Factor Analysis (EFA) and then proved through Confirmatory Factor Analysis (CFA). Items with a factor loading of .40 or greater were considered to adequately measure a factor. CFA was then conducted so as to confirm each factor. Reporting multiple fit indices to estimate the goodness of fit were considered necessary in order to evaluate consistency among the different indices and criteria: Chi-square/degree of freedom ratio ( $\chi^2/df$ ), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), parsimony adjustment to the CFI (PCFI), Relative Fit Index (RFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) (Tabachnick and Fidell, 2013; Dong et al., 2016;). Convergent validity was calculated using the Spearman Rho coefficients of the three scales (SEHEPS-T, TSK, and EXSE). Cronbach's alpha was then used to evaluate the internal consistency of the scales' responses. A Cronbach's alpha value between .7 and .8 is considered minimally acceptable, from .8 to .9 as respectable, and greater than .9 as perfect (Hinkle, Wiersma, and Jurs, 2003). The other approach used to assess reliability in the study was to determine stability over time, which was accomplished by calculating the Spearman Rho coefficient and the Intraclass Correlation Coefficient (ICC) between the baseline test and the retest which was applied after a period of 24-48 hours.

### **3. Results**

A total of 122 patients voluntarily participated in the current study. The demographic characteristics of the participants are summarized in Table 1. Of the participants, 50.8% are male and 49.2% female; their mean age was  $48.58 \pm 7.85$  years old; their mean Body Mass Index (BMI) was  $27.73 \pm 4.28$ ; 82.5% of the participants were married; and the highest education level of the participants (35.9%) was primary school. In

medical terms, 48.7% of the patients have a drug history, most reported complaints of back (23.1%) and shoulder pain (23.1%), and all had some form of musculoskeletal disease, which was systemic in 59% for the participant patients. The patients' alcohol usage rate was 2.6%, and 12.8% of the patients were cigarette smokers. A home exercise program had previously been prescribed to all of the patients, and that they had participated in the program regularly for between 3 and 12 weeks, with an average of 5 weeks. At the end of the study, the SEHEPS-T mean score was calculated as  $44.84 \pm 18.98$ , the Tampa Kinesiophobia Scale mean score as  $36.17 \pm 12.25$ , and the Exercise Self-Efficacy Scale mean score was  $1125.12 \pm 468.23$ .

#### **3.1. Item Analysis**

The average item score ranged from 3.32 to 4.05, as shown in Table 2. Item-total correlations ranged from .772 to .944, indicating strong correlation. Cronbach's alpha reliability coefficient for the 12 items was calculated as being .974, which indicates a good level of reliability. Deletion of any items from the scale would not have improved the scale's Cronbach's value.

#### **3.2. Exploratory Factor Analysis (EFA)**

Prior to conducting the Exploratory Factor Analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were conducted to check if the data was able to be subjected to EFA. The KMO value was calculated as .911, and the Bartlett's test of sphericity was shown to be significant ( $X^2=578.94$ ,  $P < .001$ ), which demonstrated that the sampling was considered adequate. Principal factor analysis with varimax rotation was conducted in order to assess the underlying structure for the 12 items of the SEHEPS-T. The varimax rotation indicated that all items loaded to a single factor which explained 78.06% of the rotation variance (and therefore the total cumulative variance). Table 3 displays the items and factor loadings, communality coefficients, and the percentage of variance and Eigen values. All factor loadings, ranging from .806 to .954, were found to be statistically significant in the single-factor model, and with values greater than .4 (Table 3). The scree plot (Figure 1) indicated that the single-factor construct was optimal.

#### **3.3. Confirmatory Factor Analysis (CFA)**

CFA was conducted for the model fit of the single-factor structure obtained as a result of EFA. The goodness of fit indices were revealed to be acceptable. According to the final model for the SEHEPS-T construction (Figure 2), there was a correlation between the first and eighth items (between e1 and e8). The final model, shown in Figure 2, was arrived at after having reviewed the model modification indices for sources of model misfit. The fit of the final CFA was revealed to be acceptable, ( $\chi^2/df = 1.460$ ,  $P = .017$ ); AGFI = 0.757, PCFI = 0.756, NFI = 0.885, CFI = 0.960, TLI = 0.949, RMSEA = 0.102.

#### **3.4. Convergent Validity**

Spearman's rho correlation coefficient of the SEHEPS-T, Tampa Scale for Kinesiophobia, and Exercise Self Efficacy Scale revealed a statistical significance ( $\rho = .933$ ,  $\rho = .949$ ,

P = .000, respectively), indicating that the SEHEPS-T had sound convergent validity and statistical significance when evaluated with the Tampa Scale for Kinesiophobia and the Exercise Self Efficacy Scale.

### 3.5. Reliability

Test-retest reliability of the SEHEPS-T was optimal when

the test was administered after a period of 24-48 hours. The Spearman's rho correlation coefficient between the baseline and the 24-48 hour follow-up test was  $\rho = .994$  (P = .000). The SEHEPS-T was found to be reliable between the two applications (Intraclass Correlation Coefficient, ICC = .998, 95% C.I: 0.996-0.999).

**Table 1.** Participants' social, demographic, and health information (n = 122)

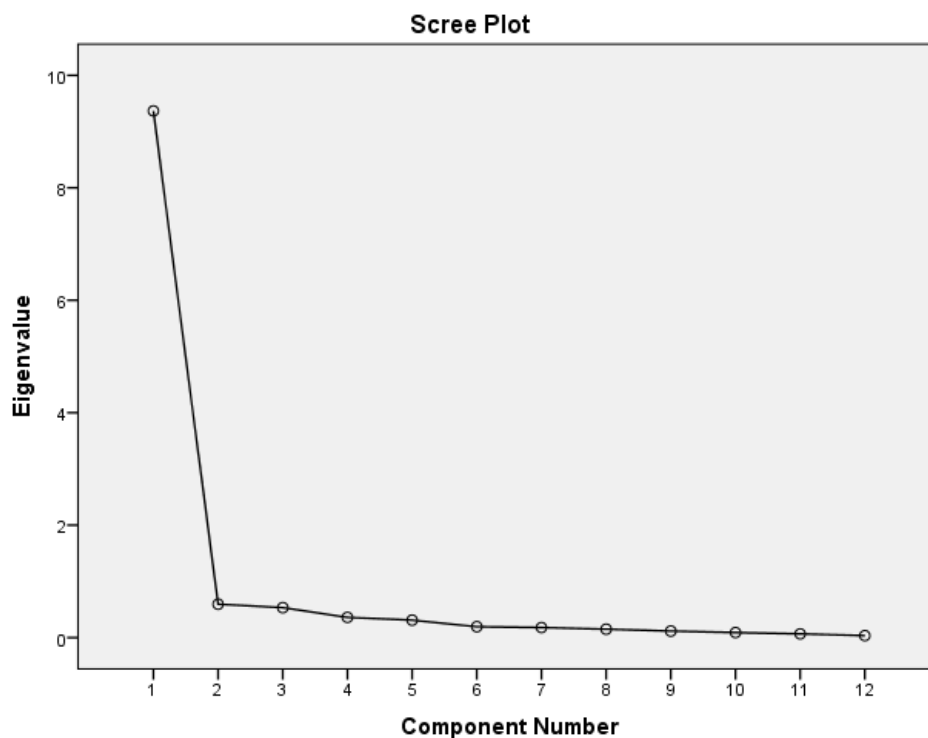
Gender, n (%)	
Male	62 (50.8)
Female	60 (49.2)
Marital status, n (%)	
Married	101 (82.5)
Single	21 (17.5)
Education, n (%)	
Primary school	44 (35.9)
Middle school	22 (17.9)
High school	34 (28.2)
University	22 (17.9)
Drug history, n (%)	
Yes	59 (48.7)
No	63 (51.3)
Complaints, n (%)	
Ankle	13 (10.3)
Waist	28 (23.1)
Neck	16 (12.8)
Knee	19 (15.4)
Hip	13 (10.3)
Arm	6 (5.1)
Shoulder	28 (23.1)
Musculoskeletal disease, n (%)	
Yes	0 (0.0)
No	122 (100.0)
Systemic illness, n (%)	
No	50 (41.0)
Yes	72 (59.0)
Alcohol use, n (%)	
No	119 (97.4)
Yes	3 (2.6)
Smoker, n (%)	
No	106 (87.2)
Yes	16 (12.8)
Has a home exercise program been prescribed? n (%)	
Yes	122 (100.0)
No	0 (0.0)
BMI, mean $\pm$ SD	27.73 $\bar{F}$ 4.28
How many weeks have you regularly participated in the home exercise program? Median (Min-Max)	5 (3-12)
Self-Efficacy for Home Exercise Programs Scale Score, mean $\pm$ SD	44.84 $\pm$ 18.98
Tampa Scale for Kinesiophobia Score, mean $\pm$ SD	36.17 $\pm$ 12.25
Exercise Self Efficacy Scale Score, mean $\pm$ SD	1125.12 $\pm$ 468.23
Retest Self-Efficacy for Home Exercise Programs Scale Score, mean $\pm$ SD	44.94 $\pm$ 18.89

**Table 2.** Internal consistency of SEHEPS-T

Items	Mean $\pm$ SD	Item-Total Correlation	Cronbach's $\alpha$ if item deleted
How confident are you that you could perform the prescribed exercises correctly...			
...as often as prescribed by your clinician?	4.05 $\pm$ 1.29	.863	.972
...when you are bored by the program?	3.67 $\pm$ 1.27	.819	.973
...when you feel pain when exercising?	3.70 $\pm$ 1.06	.772	.974
...when you have to exercise alone?	4.02 $\pm$ 1.46	.829	.973
...when you do not enjoy it?	3.87 $\pm$ 1.10	.906	.971
...when you are given written exercise instruction?	4.05 $\pm$ 1.63	.791	.973
...when you are too busy with other activities?	3.52 $\pm$ 0.83	.914	.970
...when you are given video exercise instruction?	3.97 $\pm$ 1.57	.864	.972
...when you feel tired?	3.60 $\pm$ 1.09	.863	.972
...when you feel stressed?	3.32 $\pm$ 0.91	.884	.971
...when you feel depressed?	3.55 $\pm$ 1.22	.862	.972
...when you do not have supervision or clinician feedback?	3.90 $\pm$ 1.16	.944	.970

**Table 3.** Rotated factor analysis of Turkish version of self-efficacy for home exercise programs scale (SEHEPS-T)

Items	Factor Loading	Communality coefficients	% of variance	Eigen Value
...as often as prescribed by your clinician	.886	.785	78.06	9.367
...when you are bored by the program	.849	.720		
...when you feel pain when exercising	.806	.650		
...when you have to exercise alone	.856	.733		
...when you do not enjoy it	.923	.851		
...when you are given written exercise instruction	.822	.676		
...when you are too busy with other activities	.930	.864		
...when you are given video exercise instruction	.886	.785		
...when you feel tired	.886	.786		
...when you feel stressed	.905	.819		
...when you feel depressed	.887	.786		
...when you do not have supervision or clinician feedback	.954	.911		



**Figure 1.** Scree Plot for SEHEPS-T. The scree plot shows that the one-factor structure is optimal

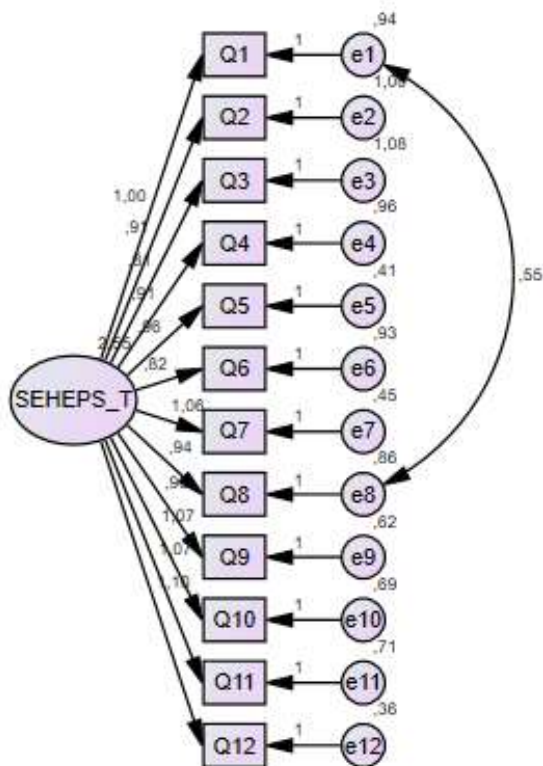


Figure 2. Final single-factor model of SEHEPS-T. According to the final model for the SEHEPS-T construction, there is a correlation between items 1 and 8 (between e1 and e8).

**4. Discussion**

It is considered important to find a validated measurement to assess exercise self-efficacy in musculoskeletal disease patients, especially in Türkiye. In this study, the psychometric properties of the SEHEPS-T were evaluated with 122 Turkish patients with musculoskeletal disease. The study’s result revealed the SEHEPS-T to be a reliable and valid tool to evaluate self-efficacy in a population of patients with musculoskeletal disease and participating in HEPs.

An exploratory principal component factor analysis determined that the 12-item, two-factor SEHEPS-T, explained 78.06% of the total variance, with each item having a factor loading of .40 or greater, which was considered acceptable (Mulaik, 2009). However, for comparative purposes, it was a pity that factor analysis had not been examined in the original version of SEHEPS (Picha et al., 2019).

In the original scale, the SEHEPS was strongly correlated with a modified Self-Efficacy for Exercise (SEE) scale, indicating strong convergent validity (Picha et al., 2019). The Turkish version (SEHEPS-T) demonstrated acceptable convergent validity, which was based on the connection between three scales assessing an identical feature. The Spearman’s rho correlation coefficient of the SEHEPS-T, TSK, and EXSE instruments showed that a statistical significance was revealed in that the SEHEPS-T performed with excellent convergent validity when assessed against the TSK and EXSE. Therefore, it was

concluded that the SEHEPS-T was sufficiently sensitive to evaluate the same feature as the TSK, EXSE, and SEE instruments.

The results from the current study can be said to be consistent with the original research in which the Cronbach alpha value was .96 (Picha et al., 2019). The test-retest reliability of the SEHEPS was considered to be good. In the current study, item-total correlations ranged from .772 to .944, indicating a strong correlation. Cronbach’s alpha reliability coefficient for the 12 items of the SEHEPS-T was .974, which indicates a good level of reliability. The SEHEPS-T showed a good level of reliability with a 24-48 hours interval producing a correlation coefficient of .994. The result was considered consistent with that of the original version in which the test-retest reliability was proven. It is important that clinicians have reliable measures to assess patient self-efficacy for HEPs as this may aid in the individualization of care given.

**5. Conclusion**

Considering the results of the current study, it was shown that the 12-item SEHEPS-T may be used to measure self-efficacy in Turkish-speaking patients musculoskeletal diseases who are prescribed a home exercise program. It is an important to acknowledge that confirmatory and explanatory factor analyses were not performed on the original version of SEHEPS, as was completed in the current study. Additionally, the 12-item SEHEPS-T is comparatively simple and easy to understand/apply. Usage of SEHEPS-T may urge healthcare professionals addressing patients with known musculoskeletal diseases to apply self-efficacy and psychological methods so as to improve their patients’ physical activity.

**Limitations**

Certain limitations of the current study should be mentioned. First, self-efficacy was measured based on self-reporting, which could lead to inaccurate evaluations when compared with more objective forms of measurement. Second, patients were included in the study without being grouped according to their self-efficacy levels.

**Author Contributions**

Percentages of the author(s) contributions is present below. All authors reviewed and approved final version of the manuscript.

%	M.Y.	M.C.	Ö.A.G.	H.K.	Ö.G.
C	20	20	20	20	20
D	20	20	20	20	20
S	20	20	20	20	20
DCP	20	20	20	20	20
DAI	20	20	20	20	20
L	20	20	20	20	20
W	20	20	20	20	20
CR	20	20	20	20	20
SR	20	20	20	20	20
PM	20	20	20	20	20
FA	20	20	20	20	20

C= concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

**Conflict of Interest**

The authors declared that there is no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

**Ethical Approval/Informed Consent**

The study was approved by the Ethics Committee of the Kırşehir Ahi Evran University, Faculty of Medicine, (Decision: 2021-03/31). All the participants provided written and verbal informed consent on a voluntary basis. The study was carried out in accordance with the tenets of the World Medical Association Declaration of Helsinki.

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