ORIGINAL RESEARCH

The validity and reliability of the Turkish version of the Brief Fear of Negative Evaluation Scale – straight forwardly in patients with systemic sclerosis

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Abstract

Objective

This study aimed to examine the validity and reliability of Turkish version of Brief Fear of Negative Evaluation Scale–Straightforwardly (BFNE-S (TR)) in patients with Systemic Sclerosis (SSc).

Materials and Methods

35 individuals (mean age: 53.3±13.0 years) diagnosed as SSc were included. Data on demographics, were collected via structured interview. All participants were evaluated by same investigator. The disability was evaluated with Scleroderma Health Assessment Questionnaire (SHAQ), disease severity with Medsger's Disease Severity Scale, and skin involvement with Modified Rodnan Skin Score. BFNE-S (TR) was applied to the patients with SSc who did not receive any treatment for test retest at one-week intervals.

Results

The one-factor structure was provided for all indices except Chi-Square. Factor loadings were significant. The patient responses to the BFNE-S (TR) demonstrated excellent internal consistency (Cronbach's α: 0.95). The floor effect (20%) percentage of patients who scored at floor level, was observed. Test-retest reliability of the scale was excellent with 0.91 (95%CI: 0.78–0.96). BFNE-S (TR) total score had positive correlation with SHAQ_Digestive (r=0.503) and SHAQ_Raynaud phenomenon (r=0.343)(p<0.05).

Conclusions

The BFNE-S (TR) is a reliable and valid scale and can be used for measurement of fear of negative evaluation in SSc.

Key words: Systemic Sclerosis, fear, questionnaire, disease severity, skin disease.

Introduction

Systemic sclerosis (SSc) is a rheumatic disease characterized by thickening and fibrosis of the skin and internal organs[1]. SSc causes widespread changes in appearance. These are altered facial features, digital ulcers, hypo- and hyper-pigmentation, hand contractures, and telangiectasias[2]. Disfiguring appearance changes may be permanent. Changes in the regions such as the hands and face, can be easily seen by another person and can have significant psychosocial effects on the person. Body image dissatisfaction and appearance-related social discomfort are major concerns for patients with SSc[3].

Visible changes in appearance due to diseases have been associated with negative behavioral, emotional and cognitive processes such as social withdrawal[4]. Body image dissatisfaction has also been associated with distress, depression, anxiety, and poor psychosocial functioning in patients with SSc[5]. Richards et al. (2004) reported that the fear of negative evaluation was strongly associated with general anxiety symptoms in patients with SSc[6].

Brief Fear of Negative Evaluation Scale (BFNE) is a widely used self-report scale designed to assess social anxiety[8]. It consists 30 questions and the score represents the fear of negative evaluation in social situations. Due to the length of the BFNE, various short forms have been developed. Brief Fear of Negative Evaluation Scale–Straightforwardly (BFNE-S) is one of these short forms. Fox et al. (2018) examined the suitability of different short versions of BFNE (BFNE-8, BFNE-II, and BFNE-S) for patients with SSc and concluded that the most appropriate one was BFNE-S[9].

The BFNE-S demonstrated excellent internal consistency in the patient and control samples (α:>0.92)[10,11]. In the confirmatory factor analysis for the psychometric properties of the Turkish version, the BFNE-S showed a good fit to the unitary model as in the original form. The reliability coefficients of the BFNE-S (TR) were 0.90 for the Cronbach's Alpha and 0.91 for the splithalf method[12]. Groth-Marnat (2009) emphasized that a possible reason for the lack of studies examining the fear of negative evaluation is the lack of valid and reliable outcome measures for use in patients with SSc[7]. The significant emotional distress experienced by patients with SSc due to social anxiety may be important factors in determining their vulnerability to the disease[13]. It seems extremely important for researchers and clinicians to be able to adequately measure negative evaluation by others[14].

This study aimed to examine the validity and reliability of the Turkish Brief Fear of Negative Evaluation Scale–Straightforwardly (BFNE-S) in patients with SSc.

Materials And Methods

Patients

This study was carried out by Pamukkale University Rheumatology Clinic and Pamukkale University Rheumatological Physical Therapy and Rehabilitation Unit. Total 35 patients (31 females, 4 males; mean age: 53.3±13.0 years) diagnosed as SSc according to the criteria of the 2013 EULAR/American College of Rheumatology were included in the study.

The inclusion criteria were as follows: (1) Having been diagnosed with SSc, (2) being 18 years or older, (3) being able to speak and understand Turkish fluently, and (4) volunteering to participate in the study. The exclusion criteria were: (1) Presence of another autoimmune disease, (2) having a neurological disease, (3) presence of any orthopedic problem that could affect functionality, (4) having heart failure and lung pathology that could affect daily living activities, (5) having a psychiatric illness that affects cooperation, and (6) having a history of orthopedic surgery in the last year.

Ethics approval of the study was obtained from the local clinical research ethics committee at the board meeting dated 02.11.2021 and numbered 20. Verbal information was given to all patients and an informed consent form was signed.

Procedures

Necessary permission was obtained from Gok and Yalcinkaya Alkar, who made the Turkish validity and reliability of the BFNE-S, to be used in this study. A cross sectional survey study design was used to assess the validity and reliability of the Turkish Brief Fear of Negative Evaluation Scale–Straightforwardly (BFNE-S) in patients with SSc. For the sample of the study, all SSc patients who were registered in Pamukkale University Rheumatology Clinic and who met the inclusion criteria were reached.

Clinical Data

All patients who were registered in Pamukkale University Rheumatology Clinic and met the inclusion and exclusion criteria were verbally informed about the study with a face-to-face interview. And a written document containing the details of the study was provided. If the patient voluntarily agreed to participate in the study, consent form was signed and an appointment was made for a second face-to-face interview to be evaluated. Each patient was evaluated on different days.

Data on demographics, were collected via structured interview. All patients were evaluated by the same investigator. Medsger's Disease Severity Scale and Modified Rodnan Skin Score were evaluated by the same rheumatologist. The disability was evaluated with Scleroderma Health Assessment Questionnaire (SHAQ), disease severity with Medsger's Disease Severity Scale, and skin involvement with Modified Rodnan Skin Score. BFNE-S (TR) was applied to the patients with SSc who did not receive any treatment for test retest at one-week intervals. Evaluations were carried out in approximately 40-45 minutes and in a single session.

Brief Fear of Negative Evaluation Scale-Straightforwardly (BFNE-S): BFNE-S is designed to assess social anxiety and a short eight-item form of BFNE. Each item is rated on a 5-point likert-type scale ranging from 1 (not at all characteristics of me) to 5 (entirely characteristic of me). Turkish validity and reliability of BFNE-S was done by Gok and Yalcinkaya Alkar[12]. The total score is between 8 and 40. The higher scores indicate more fear of negative evaluation[15].

Scleroderma Health Assessment Questionnaire (SHAQ): The Health Assessment Questionnaire Disability Index (HAQ-DI) part evaluates the standard physical disability and consists of 20 items (each item scored from 0 (no disability) to 3 (severe disability) in 8 domains (dressing and grooming, arising, eating, walking, hygiene, reach, grip, and activities). In addition to HAQ-DI, there are 5 more questions about disease related symptoms (Raynaud's phenomenon, digital ulcers, digestive, pulmonary, and overall disease severity). The each answer of this five questions is marked on a visual analogue scale (VAS) with a length of 15 cm. Then, the score of the marked point is converted to a continuous scale from 0 to 3. The SHAQ-global score was calculated by adding five SSc-related VAS to eight HAQ-DI domains and dividing the sum by 13 [8 HAQ-DI domains + 5 SSc VAS)/13]. Higher scores denote worse functional capacity[16].

Medsger's Disease Severity Scale: In order to evaluate the disease severity, nine organ systems are examined in Medsger's Disease Severity Scale developed by Medsger et al. It is scoring from 0 to 4 for each organ system (0:no documented involvement, 1:mild involvement, 2:moderate involvement, 3:severe involvement, and 4:end stage organ failure). Higher score means more disease severity[17].

Modified Rodnan Skin Score: The skin in 17 different body areas (face, chest, abdomen, right and left fingers, hands, forearms, arms, thighs, lower legs, feet) is compressed between the fingers and skin thickness is scored between 0-3 (0=normal, 1=mild, 2=moderate, 3=severe). The total score is obtained by summing the scores of each area (0-51). Higher score means more skin involvement[18].

Statistical analysis

All analyses were carried out in the R Statistical Software using "psych", "lavaan", "semTools", "semPlot", "DescTools", and "ggplot2" packages. A p-value <0.05 was considered statistically significant. The COSMIN checklist was used to support the selection of statistical tests[19].

The variables were expressed as frequency (percentage), mean±standard deviation, and median (minimum; maximum) based on the variable type and distribution. To determine the appropriateness of factor analysis and evaluate the sample adequacy, the Bartlett test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure was calculated, respectively. The significant p-value from the Bartlett test and the KMO value greater than 0.70 indicated that the data was suitable for factor analysis[20].

The Confirmatory Factor Analysis (CFA) was based on the diagonally weighted least square (DWLS) estimation method, in which Polychoric correlation was applied to test the theoretical pattern of the factor loadings on prespecified constructs. The Satorra-Bentler scaling corrections for Chi-square statistics in covariance structure analysis were used[21]. The average variance extracted (AVE) calculated as the mean of the square of a standardized factor loading, and composite reliability (CR) were used in establishing convergent validity. The AVE≥0.50 and CR≥0.70 presented adequate convergence and good reliability, respectively.

Table 1. Demographic and disease-related variables for patients with Systemic Sclerosis (SSc) (n=35)

Variable	Value	Scale	Value
Sex		HAQ-DI	0.88 (0; 2.5)
Female / Male	31 (88.6) / 4 (11.4)	SHAQ_Raynaud_phenomenon	1.5 (0; 3)
Age (years)	53.3±13.0 54 (28; 79)	SHAQ_Digital_ ulcers	0 (0; 3)
BMI (kg/m²)	26.2±5.5 26.8 (16.2; 37.5)	SHAQ_Digestive	0.6 (0; 3)
Disease duration (years)	12.8±9.1 12 (2; 38)	SHAQ_Pulmonary	0.6 (0; 3)
Oral apertura (cm)	3.3±0.9 3.5 (1.0; 4.6)	SHAQ_Overall_disease_severity	1.5 (0; 3)
Dominant side		SHAQ_Global Score	0.87 (0; 2.26)
Right / Left	33 (94.3) / 2 (5.7)	Medsger's Disease Severity Scale	5 (2; 13)
Employment		Modified Rodnan Skin Score	15 (5; 34)
Not working / Working	28 (80.0) / 7 (20.0)		
Subtypes of SSc Limited / Diffuse	25(71.42) /10 (28.57)		
Qualitative and quantitative variables were summarized as frequency (percentage), and the mean ± standard deviation, median (minimum; maximum), respectively. *BMI: Body Mass Index, HAQ DI: Health Assessment Questionnaire Disability Index, SHAQ:Scleroderma Health Assessment Questionnaire*			

classification was assessed: <0.30 negligible, <0.50 low, <0.70 moderate, <0.90 high, ≥0.90 very high correlation[27]. The estimated minimum sample size was 29 to detect at least a 0.50 correlation coefficient based on an alpha of 0.05 and power of 0.80[28].

Results

The mean age of the study sample, which was 88.6% female, was 53.3±13.0 years. The descriptive variables and the median scores obtained from the scales were displayed in Table 1.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.728 for the total group of variables, and acceptable. The polychoric correlation matrix was not an identity matrix (p-value from Bartlett's test of sphericity <0.001). So, the data was suited for factor analysis. The scree-plot indicated the one-factor structure.

The standardized factor loading estimates were higher than 0.70 (p<0.001 for each item) and ranged from 0.749 to 0.968 for the BFNE-S scale items (Table 2). The AVE and CR were obtained as 0.735 (>0.50) and 0.956 (>0.70), respectively. The path diagram for the one-factor model was displayed in Figure 1. The χ^2 goodness of fit statistic did not indicate that the observed covariance matrix matches the estimated covariance matrix (p=0.023). The normed Chi-Square (χ^2/df:1.72) was 1.72 and suggested a very good (<2.0) fit for

The model fit was evaluated based on the CFA goodness of fit indices (GOF): The normed χ^2, reflects the Chi-square divided by the degrees of freedom, (<2.0), Root mean square error of approximation (RMSEA≤0.08), Standardized root mean residual (SRMR≤0.08), Comparative fit index (CFI≥0.95), Tucker-Lewis's index (≥0.95), and Goodness-of-fit index (GFI≥0.95) were calculated[22].

The internal consistency reliability of the scale was determined by the Cronbach's alpha coefficient (>0.90 was accepted as excellent internal consistency)[23]. The floor/ceiling effect of the scale was defined as the proportion of respondents scoring the lowest/highest possible score and considered significant when greater than 15%[24]. The reproducibility was evaluated by intraclass correlation coefficient (ICC), and >0.90 was accepted as excellent reliability[25]. The minimum sample size required for detecting the 0.90 (>0.70) test-retest reliability was calculated as at least 25 people with 90% of power, and 0.05 alpha[26]. The measurement error was expressed as the standard error of measurement (SEM: SD√(1-ICC), SD represents the standard deviation of the measure). The Bland-Altman graph was drawn from the quantile estimations based on the order statistics, and the 95% confidence interval (CI) of percentiles was presented.

The convergent and divergent validity were evaluated by the Spearman rho correlation coefficient. The following

Table 2. Standardized factor loadings of the items in the BFNE-S (TR)

BFNE-S Item [Turkish] *	Median	Item-total correlations	Std. factor loading (lower – upper)
1. I worry about what people will think of me even when I know it doesn't make any difference. [Hiçbir şeyi değiştirmeyeceğini bilsem bile diğer insanların benimle ilgili düşündükleri hakkında endişelenirim.]	2	0.609	0.759 (0.671-0.846)
2. I am frequently afraid of other people noticing my shortcomings. [Sıklıkla diğer insanların benim kusurlarımı fark edecek olmalarından korkarım.]	2	0.791	0.872 (0.797-0.947)
3. I am afraid that others will not approve of me. [Diğer insanların beni onaylamayacağından korkarım.]	1	0.708	0.846 (0.773-0.919)
4. I am afraid that people will find fault with me. [Diğer insanlar bende bir kusur bulacaklar diye korkarım.]	1	0.902	0.968 (0.906-0.999)
5. When I am talking with someone, I worry about what they may be thinking about me. [Biriyle konuşurken benim hakkımda ne düşündüğü konusunda endişelenirim.]	1	0.808	0.887 (0.817-0.957)
6. I am usually worried about what kind of impression I make. [Genellikle ne tür bir izlenim bıraktığımla ilgili endişelenirim.]	1	0.876	0.944 (0.881-1.008)
7. Sometimes I think I am too concerned with what other people think of me. [Bazen diğer insanların benim hakkımda ne düşündükleri konusunda çok fazla kafa yorduğumu düşünüyorum.]	2	0.749	0.806 (0.719-0.892)
8. I often worry that I will say or do the wrong things. [Yanlış şeyler söyleyeceğim ya da yapacağım diye sıklıkla endişe duyarım.]	3	0.639	0.749 (0.658-0.840)
Average Variance Extracted (AVE>0.50)			0.735
Composite Reliability (CR>0.70)			0.956

* BFNE-S: Brief Fear of Negative Evaluation Scale – Straightforward items. Each item rated on a 5-point Likert-type scale, ranging from 1 to 5 (1: not at all characteristics of me, 2: a little characteristic of me, 3: somewhat characteristic of me, 4: very characteristic of me, 5: entirely characteristic of me) [Türkçe: 1: Bana hiç uygun değil, 2: Bana biraz uygun, 3: Bana kısmen uygun, 4: Bana oldukça uygun, 5: Bana tamamen uygun]

Std. factor loading: Standardized factor loadings with the lower and upper limits 95% confidence interval.

Factor loading for all items was significant (p<0.05)

Table 3. Reliability results for BFNE-S (TR)

Statistics	Cronbach's alpha* (lower - upper)	Median (Q1 – Q3)	Median** (Q1 – Q3)	Floor - ceiling effect %	ICC (lower - upper)	SEM
BFNE-S	0.95 (0.89 – 0.99)	15 (10 – 21)	21.9 (6.3 – 40.6)	20.0 - 2.9	0.91 (0.78 – 0.96)	2.26
BFNE-S retest	0.89 (0.82 – 0.94)	13 (10 – 19)	15.6 (6.3 – 34.4)	20.0 – 0.0		

*Cronbach alpha coefficient from the Polychoric correlation matrix (>0.90 - excellent) and limits of the 95% Confidence interval (CI). Cronbach's alpha >0.90 was accepted as excellent internal consistency. Median (Q1 – Q3): the median value of scale score (quartile 1 – quartile 3), **obtained from transformed scores ranging 0-100 with the formula [(X-8)/32] *100.

Floor - ceiling effect %: The percentage of the lowest - highest total scores. ICC: Intraclass correlation coefficient with limits of the 95% CI. ICC>0.90 is accepted as excellent reliability. SEM: standard error of measurements (, SD represents the standard deviation of the measure).

Chi-Square/df:1.72 (p:0.023),
RMSEA:0.081 (p=0.143), SRMR:0.055,
CFI:0.998, TLI:0.997, GFI: 0.996
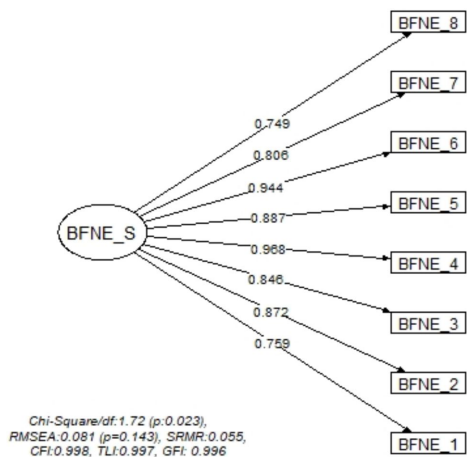
One-factor model of the Confirmatory Factor Analysis

Figure 1: Confirmatory factor analysis result based on the polychoric correlation matrix
[df: degree of freedom, RMSEA: Root Mean Square Error of Approximation, SRMR: Standardized Root Mean Square Residuals, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, GFI: Goodness of fit Index]
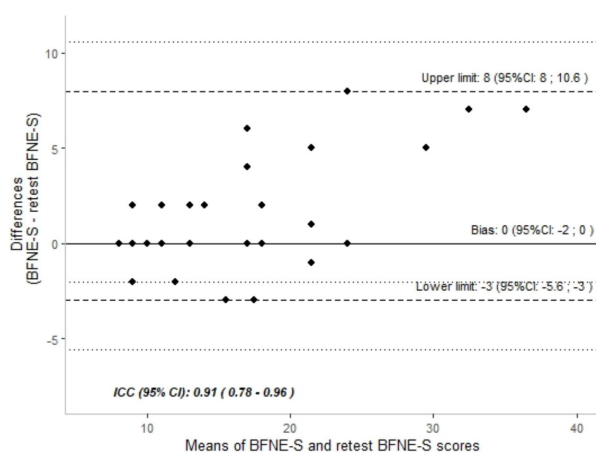

Figure 2: The Bland_Altman graph for the BFNE-S scale test and retest values based on nonparametric quantile estimators
[The dashed lines represent the nonparametric limits of agreement and median of differences. The dotted lines represent 95% CI based on the binomial distribution.]

the one-factor CFA model. When looking at the other fit indices, they provided the additional support for model fit (RMSEA: 0.081 with p=0.143, SRMR:0.055, CFI: 0.998, TLI:0.997, GFI: 0.996).

The patient responses to the BFNE-S scale demonstrated excellent internal consistency (Cronbach's α: 0.95), and the high internal consistency indicated the measures represent the same latent construct (Table 3). The median of the total score was obtained as 15 (Q1:10 – Q3:21). The floor effect (20%) the percentage of the patients who scored at floor level, was observed. This value was above the suggested threshold (15%). Test-retest reliability of the scale was 0.91 (95%CI: 0.78 – 0.96). The values were in the lower and upper limits of agreement (Figure 2).

BFNE-S (TR) total score had positive correlation with SHAQ_Digestive (r=0.503) and SHAQ_Raynaud phenomenon (r=0.343)(p<0.05). The BFNE-S total score was not significantly correlated with the other scales (other SHAQ subscales, Medsger's Disease Severity Scale, and Modified Rodnan Skin Score) (p>0.05).

Discussion

BFNE-S (TR) is a reliable and valid scale and can be used for measurement of fear of negative evaluation in SSc. The test-retest reliability (ICC) was 0.91 and internal consistency was

0.95. BFNE-S (TR) total score had positive correlation with the SHAQ_Digestive and SHAQ_Raynaud phenomenon.

Patient-reported outcome measures (PROMs), which evaluate the patient's health, well-being and psychological state based on the patient's perspective, are increasingly becoming a fundamental element of evaluation in both research and clinics[29].

For SSc, a rare disease, changes in appearance are the hallmark of the disease. Psychological influence is an important problem in these patients due to involvement such as skin thickness and fibrosis on the hands and face, which are prominent regions in social environments. For this reason, Kwakkenbos et al. (2015) recommended to carry out the studies on the evaluation of psychological influence in order to take psychological measures[30].

Despite the growing recognition that chronic disease is multifactorial and often involves the interaction of physical, social, environmental, and psychological events, only recently has attention been paid to the psychological adjustment of patients with SSc in the research studies. These studies showed that patients with SSc experience a range of psychological phenomena, including depression, anxiety, somatization, obsessive-compulsiveness, and interpersonal sensitivity[31]. Adults with SSc report high rates of anxiety, with 64% reporting at least one anxiety disorder in their lifetime, and social anxiety is among the most common[32]. However, research on social anxiety about appearance among adults with SSc is currently limited[33].

Similar to the research in other chronic diseases, the relationship between physical symptoms and psychological problems in SSc is complex. Indeed, studies in SSc did not find a simple linear relationship between disease severity and psychological impact in proportion to research findings for other chronic disease states[34,35]. The role of cognitive variables or the opinions of individuals have about themselves or situations were shown to be important[31]. Thompson and Kent (2001) emphasize that the thoughts and interpretations of individuals about themselves are effective on their emotional and behavioral reactions to their own situation, rather than demographic and physical factors[36]. Indeed, the studies have also reported this. For example, negative self-perceptions in rheumatoid arthritis patients are a strong predictor of willingness to undergo reparative surgery even when considering clinical and functional variables and objectively evaluated parameters of the hand[37]. Therefore, Richards et al. (2004) thought and noted that how much patients are interested in the reactions and evaluations of others may also play a role in determining compliance[6]. For these reasons, we think that we observed the result of disease severity (Medsger's Disease Severity Scale) is not associated with social anxiety (BFNE-S total) in present study.

Fear of negative evaluation was described as a characteristic feature of social anxiety disorder. Fear of negative evaluation may contribute to avoidance of situations[38]. Patients who are more concerned about their bodies may limit the level of social interaction. And this results in social withdrawal and depression, as well as anxiety associated with social interactions.

In multiple regression analysis, Richards et al. (2004) showed that cognitive factors related to fear of negative evaluation were the primary correlates of anxiety. SSc can be disabling both physically and psychologically. Given the prevalence of emotional distress in this population, they recommended that assessment of psychological morbidity in SSc become a routine part of clinical practice that provides a more holistic assessment, and that SSc-specific methods should be developed to assess such parameters[6].

Fox et al. (2018) examined the measurement properties of three versions of BFNE (BFNE-II, BFNE-8 and BFNE-S) in a large sample of patients with SSc. The data of all three versions of BFNE provided an adequate fit when considered as one-dimensional. BFNE-II, consisting of 12 items, did not improve the measurement of the construct compared to the shorter 8-item versions (BFNE-8 and BFNE-S). In conclusion, the authors emphasized that BFNE-S and BFNE-8 could be preferred to BFNE-II for use in SSc, since the additional substances in BFNE-II did not provide benefit. This study also showed that Cronbach's alpha coefficient values for internal consistency reliability of all three versions of the BFNE were acceptable. The total scores of the three BFNE versions were more strongly associated with social anxiety than with body attitudes and depressive symptoms. BFNE-8 and BFNE-S were found to be highly correlated and have similar associations with validity measures. But the authors repoted that BFNE-S may be an optimal outcome measure for assessing fear of negative evaluation in patients with SSc as BFNE-S has historically been studied more widely and is valid in more populations[9].

Although there are studies examining the validity and reliability of BFNE-S in healthy people, there is no translated version in patients with SSc. The internal consistency of the BFNE-S in a non-clinical Spanish population and in Iran population was 0.89[39,40].

In the light of the results of the study by Fox et al. (2018)[9], we used the BFNE-S version to determine the validity and reliability of the BFNE in patients with Turkish SSc. The results of the test-retest reliability (ICC=0.91) and internal consistency (0.95) indicate that the BFNE-S (TR) is a reliable and valid scale and can be used for measurement of fear of negative evaluation in SSc. In addition, interesting results of this study was observed that a BFNE-S (TR) total score had positive correlation with the SHAQ_Digestive and SHAQ_Raynaud phenomenon. Drossman and Hasler (2016) reported that conditions such as anxiety disorder and adverse life events can trigger the development of functional gastrointestinal symptoms and increase their severity[41]. Cutolo et al. (2017) also stated that Raynaud's phenomenon can occur when exposed to emotional stress in addition to a cold environment and other physical or drug exposures[42] .We attributed our results to these information. The strength of the study was that the sample group is a good representative of the patients population with SSc with varying levels of disease severity and skin thickness. The limitation was more disease-specific scales could not used.

Knowledge of variables in SSc that can contribute to adjustment and enhance coping abilities is vital to develop and use appropriate interventions.7 Therefore, in future studies, we recommend that new version study and/or studies that develop new outcome measures for psychological aspects should be conducted in order to better explore the psychological aspects of patients with SSc.

Conclusions

The one-factor structure was provided for all indices except Chi-Square. Factor loadings were significant. The patient responses to the BFNE-S (TR) demonstrated excellent internal consistency and test-retest reliability. The floor effect (20%) the percentage of the patients who scored at floor level, was observed. BFNE-S (TR) total score had positive correlation with the SHAQ_Digestive and SHAQ_Raynaud phenomenon.

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