

## VALIDITY AND RELIABILITY OF THE TURKISH VERSION OF SCREENING TOOL ON DISTRESS IN FERTILITY TREATMENT (SCREENIVF)

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### SUMMARY

**Background:** Women diagnosed with infertility and receiving infertility treatment reported high levels of depressive symptoms, anxiety and distress. Infertile women should first be screened for psychosocial risks. Psychosocial care interventions should be planned according to their needs. The aim of this methodologically designed study was to test the validity and reliability of the Screening Tool on Distress in Fertility Treatment's (SCREENIVF) Turkish version in infertile women.

**Subjects and methods:** The present study included 323 women diagnosed with nulliparous and undergoing fertility treatment. Women filled in the descriptive characteristics questionnaire, The Copenhagen Multi-Centre Psychosocial Infertility-Fertility Problem Stress Scale (COMPI-FPSS) and the SCREENIVF.

**Results:** To examine the contribution of the items to the scale, six items with an insufficient contribution to the scale were removed from the scale as a result of the item-total score correlation values (Corrected item-total correlation <0.25). The item-total score correlation coefficients and subscale-total score correlation coefficients obtained for each subscale ranged from 0.31 to 0.98. According to the regression equation formed in line with the multivariate linear regression model that will model the linear relationship between COMPI-FPSS, which is a scale equivalent to the subscale of the SCREENIVF, the total scores of the subscale were statistically significant predictors of the scores obtained from COMPI-FPSS, and ( $F=161.281$ ,  $p<0.001$ ) multiple explanatory coefficients were 77.2%. Cronbach's alpha coefficient was 0.77 and accepted to be reliable. 16% of the women participating in this study were above the cut-off scores concerning anxiety and depression, 13.9% acceptance, 8.2% hopelessness and 2% social support. The scale consisted of five subscales and 28 items.

**Conclusion:** The findings indicate that the Turkish version of SCREENIVF is a valid and reliable measurement tool that can be used in the routine assessment regarding psychosocial aspects in the infertility treatment process.

**Key words:** psychosocial care - infertility - distress - depression - validation

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### INTRODUCTION

Infertility is a disease characterized by the failure to establish a clinical pregnancy after a year of regular, unprotected conception (Zegers-Hochschild et al. 2017). Infertility is affecting patients from all around the world. Approximately 15% of the world population is infertile, and this condition is expected to rise (Thoma et al. 2013). National Survey of Family Growth reported that from 2011 to 2015, 15.5% of all women who intended to become pregnant were infertile, and 6.7% of married women aged 15 to 44 years were infertile. It was assumed that 53-57% of infertile couples were seeking infertility treatment (CDC).

Infertile patients diagnosed and undergoing treatment of infertility reported high rates of anxiety, depressive symptoms, and distress. In a meta-analysis study, the psychosocial outcomes were reported as anxiety, interpersonal functioning, depression, mental distress, and infertility-specific stress. The intervention strategies employed included counselling, cognitive-behavioural therapies, education, mind/body orientated

relaxation, psychodynamic/analytic and mixed interventions (Hammerli et al. 2009). Women appear to experience more stress and higher rates of depression and anxiety, although both men and women are emotionally affected by infertility (Ramazanzadeh et al. 2009). It was reported that having infertility problems increased the probability of having depression and anxiety in women. Furthermore, in the same study, it was shown that infertile women who were attempting to receive infertility treatments had more anxiety and depression scores (Lakatos et al. 2017). In infertile women, the most important underlying causes of stress and anxiety upon learning about their infertility were greater negative self-concept, loss of genetic continuity, reproductive abilities and the loss of motherhood (Schmidt et al. 2005). Of specific concern is the result of an analysis of the six studies which had included both anxiety and pregnancy as outcomes indicating that higher decreasing in anxiety were associated with major results of pregnancy (Frederiksen et al. 2015).

Fertility staff can provide psychosocial care that offers during common infertility treatment, which is

accessible to all patients and determine exactly their most prevalent needs (Gameiro et al. 2015). Psychosocial care is significant in infertility treatment because most patients experience emotional distress during treatment. Approximately 23% discontinue before the usual time because of the perceived burden of treatment, more than 30% of patients end treatment without pregnancy and also experience hardship in adjusting to unrealized parenthood expectations (Verhaak et al. 2007a,b, Brandes et al. 2009, Pinborg 2009, Gameiro et al. 2015).

Infertile individuals should first be screened for psychosocial risk, and psychosocial care interventions should be planned according to their needs. Verhaak et al. indicated that a study identified pretreatment distress concerning depression and anxiety and a strong focus on less acceptance of the fertility problems, the child wish and deficiency of perceived social support as risk factors for emotional problems after unsuccessful IVF in women (Verhaak et al. 2001).

A wide range of psychosocial interventions for infertile men and women have been developed, including couple therapy, coping skills training, mind-body interventions, cognitive-behavioural therapy, sexual counselling, support groups, and education programs (Lemmens et al. 2004). Many types of psychosocial interventions have been adopted in several studies and the evidence of their success is far from conclusive (Wischmann 2008, Hammerli et al. 2009, Frederiksen et al. 2015).

European Society of Human Reproduction and Embryology (ESHRE) published a guide in March 2015: "Routine psychosocial care in infertility and medically assisted reproduction – A guide for fertility staff." It was written to guide two main issues; "first, information is provided to fertility staff about preferences of patients regarding the psychosocial care they receive at clinics and how this care is associated with their well-being. Secondary, the guideline provides information about the psychosocial needs that patients experience across their treatment trail, and how fertility staff can perceive and address these needs." This knowledge is considered helpful to raise awareness of the staff about patient preferences for psychosocial care (ESHRE Psychosocial care guideline).

Screening Tool on Distress in Fertility Treatment (SCREENIVF) is an infertility-specific tool for evaluating individuals' relational and social, emotional and cognitive needs and assessing risk factors before, during and after treatment (ESHRE Psychosocial care guideline). SCREENIVF aims to assign women at risk for emotional maladjustment before the start of their "in vitro fertilization" (IVF) treatment. SCREENIVF results in a risk profile that is offered to the patients. Based on this risk profile, further psychosocial care can be offered. SCREENIVF is a screening tool that can provide patients with the knowledge on their risk description and could give them the feedback that they

could profit from psychosocial support. Studies indicated that the SCREENIVF is an admissible instrument to recognize women at risk for psychological maladjustment and that its usage in the clinic context is possible (Verhaak et al. 2010).

This study aimed to test the validity and reliability of the Turkish version of SCREENIVF in women with infertility.

## **SUBJECTS AND METHODS**

This methodological designed study was conducted in Reproductive Endocrinology and Infertility Clinic at a university hospital in Istanbul between December 2018 and July 2019. Ethical approval was obtained from the Ethical Committee of the Istanbul Medipol University for Non-Interventional Research (approval number: 10840098-604.01.01-E.47616).

The number of items on the SCREENIVF scale is 34. Hu and Bentler recommend that the sample size would be more than 10 times the number of free model parameters (Hu and Bentler, 1995). Three hundred forty people who applied to the clinic where the research was conducted and who met the inclusion criteria were included in the study sample. Seventeen people who did not want to participate in this study and left their scale forms uncompleted were excluded from the sample in this research. This study was completed with 323 infertile women.

Data were collected using "the descriptive characteristics questionnaire," "The Copenhagen Multi-Centre Psychosocial Infertility-Fertility Problem Stress Scales" (COMPI-FPSS) and "The Screening Tool on Distress in Fertility Treatment" (SCREENIVF). "The descriptive characteristics questionnaire" was designed by the researchers. It contained 26 items about demographics (age, educational status, employment status), medical (chronic illness, surgical operations have undergone), and gynaecological (number of pregnancies, number of miscarriages, infertility diagnosis, previous infertility treatment) characteristics. The COMPI-FPSS; fertility-related stress was measured using 14 items concerned with the strains related to infertility produced in the social, personal, and marital domain (Schmidt et al. 2003). The personal domain had six items. "The lowest and highest possible scores" to be obtained from this subscale were 0 to 20, "the higher the score, the higher the level of stress." The measure included questions regarding one's personal distress (six items), marital distress (four items) and social distress (four items). The Cronbach's alpha coefficients differed depending on the subscale; marital domain 0.73, personal and social domain 0.82 (Schmidt et al. 2003). This scale was included in this study as a parallel form containing questions and items with similar content and difficulty degree in determining validity and reliability of SCREENIVF. The validity and reliability study of the

Turkish version of the scale showed that Cronbach's alpha scores for the four subscales were 0.82 for the personal domain, 0.75 for the marital domain, and 0.78 for the social domain in women (Yılmaz and Yesiltepe Oskay, 2016). In this study, Cronbach's alpha score was 0.76.

The SCREENIVF is used for screening on distress in fertility treatment. The SCREENIVF assigns patients at risk for maladjustment throughout IVF treatment by evaluating them on five factors recognized in prospective research as risk factors for emotional problems after ineffective assisted reproductive treatment. In addition, patients who are identified as at-risk could be provided with additional psychosocial care to prevent them from discontinuing the treatment. The advantage of the SCREENIVF compared to other already present screening instruments is that it identifies five risk areas in the field of emotional maladjustment. The SCREENIVF is the first screening tool special in fertility care (Verhaak et al. 2010). Situated on the study of Verhaak et al. (2010), a questionnaire comprising of the scales evaluating these five risk factors resulted in a 34 item questionnaire consisting of "10 items evaluating state anxiety," "7 items evaluating depression," "12 items evaluating cognitions regarding fertility problems (6 items evaluating helplessness, 6 items evaluating lack of acceptance)" and "5 items evaluating perceived social support." In the first Dutch format, the "cognitions regarding fertility problems" section was created from 14 items, but after 4 and 6 items were removed, 12 items were published in SCREENIVF English version 2.0. (Verhaak et al. 2005a,b, 2010). In this research, the study was conducted based on English version 2.0. The items evaluating anxiety were situated on a short version of the "Spielberger State-Trait Anxiety Inventory" (Spielberger, 1983). The depression items were the 7 items of the short "Beck Depression Inventory" version for practitioners' patients (Beck et al. 1997). The items on helplessness regarding fertility problems and acceptance of fertility were taken from "the Illness Cognition Questionnaire" (Evers et al. 2001, Verhaak et al. 2005a). Perceived social support was assessed by 5 items reproduced from "the Inventory of Social Involvement" (Van Dam-Baggen & Kraaimaat 1992).

To classify the patients as at risk, the procedures were defined by Verhaak et al. (2010). The cut-off score for "depression" was 4 or higher, which is in line with previous studies in the literature (Beck et al. 1997, Verhaak et al. 2010). For "anxiety," "helplessness" and "acceptance cognitions" and "social support," scores were based on below the sample mean scores. Consequently, the cut-off score for "anxiety" was 27 or above, for "helplessness cognitions," it was 15 or above, for "acceptance cognitions," it was 11 or below and for "social support," it was 13 or below. In each of the five risk factors, if patients scored above/below the cut-off point, they were determined a score of 1 (at risk);

conversely, the score was 0 (not at risk). Classifying as at risk if the patient is at risk in at least one of the five risk factors (Verhaak et al. 2010). There are only Dutch and Portuguese versions in the literature (Verhaak et al. 2010, Ockhuijsen et al. 2017; Lopes et al. 2013). The original version of the SCREENIVF indicated ideal reliability (Cronbach's alpha coefficients between 0.82-0.92) (Verhaak et al. 2010).

In this study, regression analysis was performed, and the compliance was analyzed using explanatory factor analysis, item analysis, reliability (Cronbach's alpha coefficient), subscales of SCREENIVF scale and parallel forms with COMPI-FPSS, which is an equivalent scale. The internal consistency of the SCREENIVF was examined using Cronbach's alpha and by analyzing the correlation between each item and its special dimension. The Cronbach's alpha is the measure that is frequently used to determine internal consistency (Velikova et al. 1999).

The language validity process of the scale in Turkish consists of the following stages. For the scale to be understood by the researchers, the original form of the scale was translated into Turkish and English by a native Dutch translator under oath. Then, its English version was translated back into Turkish by a different sworn translator. The scale was adapted to Turkish in line with the intercultural adaptation process suggested by Gjersing et al. (2010) (Table 1).

After ensuring language validity, expert opinion was obtained to ensure the content validity of the Turkish form of the scale. In this study, opinions were received from seven experts concerning distinctiveness, comprehensibility, fitness for purpose and cultural appropriateness. The content validity index was used to appraise expert opinions. According to the appropriateness of the items, experts were asked to evaluate by giving the following points: 1 point: not appropriate, 2 points: a little bit appropriate (the item and statement needed to be adjusted), 3 points: appropriate but minor changes are required, 4 points: very appropriate. According to the results of the expert opinion made according to the Davis technique, the total item validity index of all items was 1. In this phase, no items were eliminated. The corrections suggested in the statements were applied (Davis 1992).

Kendall's W (Kendall's Coefficient of Concordance) test was used in the SPSS program to evaluate the consistency of expert opinions on the applicability and intelligibility of SCREENIVF items. Expert opinions of SCREENIVF items were statistically compatible ( $KW = 0.107$ ,  $p=0.832$ ). A meaningful "p" value ( $p<0.05$ ) in the analysis shows that there is no harmony between the expert opinions, and the meaningless "p" value ( $p>0.05$ ) indicates that there is harmony (Hoyle 2012). In this study, there was a consensus among the experts. In the analysis, due to Kendall's W value being between 0.10-0.30, a moderate consensus was determined.

**Table 1.** Intercultural adaptation process in language adaptation (Gjersing et al. 2010)

Conceptual and item equivalence analysis (Investigation of conceptual and item equivalence)	Literature review Discussion with experts in the field and members of the target population
Translation of the original scale into Turkish (Original instrument translated to Turkish)	Translator 1 and 2: Fluent in the target language, a good understanding of original language ( a sworn translator employed in a translating office)
A synthesized translated Turkish version	Translator 3: Fluent in the target language, a good understanding of original language (a translator employed in a translation office)
Back-translations	Back-translator 1 and 2: Fluent in the original language, a good understanding of target language
A synthesized back-translated version	Back-translator 3: Fluent in the original language, a good understanding of target language
Presenting to expert opinion (Expert Committee)	Getting opinions from 7 academicians who are experts in their fields in terms of discrimination, comprehensibility, fitness for purpose and cultural appropriateness
Scale Pre-Test (Instrument pretested)	Reaching 20 women for the pre-test
Review of the scale (Revised instrument)	Since no problems related to scale items were reported, using the scale as it was
Evaluation of adequacy for use (Investigation of operational equivalence)	Literature review Content Validity Index-CVI for the evaluation of expert opinions
Main Study (Main study)	Obtaining permission from Verhaak et al., who developed SCREENIVF, for the Turkish adaptation of the instrument, written approval from the ethics committee of a university before the research, written permission from the hospital where the study will be conducted and applying the scale to 323 women.
Exploratory and Confirmatory Analysis	Verification of factor structure with confirmatory analysis
The final version of the instrument (Final instrument)	It consists of 28 items and 5 sub-dimensions.

## RESULTS

The mean age of women was  $30.62 \pm 3.48$  (min = 22-max = 38) and the mean age of their partners was  $35.43 \pm 3.44$  (min = 26-max = 49). 60.4% of women and 47.1% of their spouses were secondary school graduates. 21.7% of women were working, and 80% of working women had difficulty obtaining permission for treatment from their workplace. 11.8% of women smoked, and the daily number of cigarettes smoked was  $9.50 \pm 4.79$  (min = 5-max = 20) on average. The mean marriage duration of the women participating in this study was  $6.63 \pm 3.47$  (min = 2-max = 18). The desire to have children in couples was  $35.07 \pm 23.01$  (min = 5-max = 168) months. The duration of diagnosis of infertility was  $19.08 \pm 13.47$  (min = 5-max = 72) months. The cause of infertility was 41.5% related to women, 40.2% uncertain and 18.3% belonging to men. 74.3% of the women participating in the present study stated that they had previously been treated for infertility (n=240), and 78.3% of those who received treatment had intrauterine insemination. It was determined that 60.8% of women receiving infertility treatment conceived (n=146) but resulted in miscarriage (80.8%), ectopic pregnancy (10.3%), or stillbirth (8.9%).

No item of the Helplessness subscale was below 0.25, and the lowest value was 0.26 on the item, "My

fertility problems control my life." Thus, it can be said that the contribution of the items to the scale was sufficient. The acceptance subscale had two items below 0.25, which were "I have learned to accept my fertility problems." (-0.18) and "I can accept my fertility problems." (-0.29), and they made a negative and inadequate contribution to the scale. Therefore, these items were excluded from the scale.

No item in the Social Support subscale was below 0.25, and the lowest value was 0.29 on the item, "When I need help with a job I cannot carry out alone, there is someone to help me." Hence, it can be said that the contribution of the items to the scale was sufficient.

Items 2, 4, 6 and 7 (0.03, -0.28; -0.07, -0.06) of the Depression subscale were below 0.25 and did not contribute to the scale. Therefore, these items were excluded from the scale (Table 2).

Factor loads are correlation coefficients that define the relationship of items with the relevant factor. The Anxiety subscale of the SCREENIVF scale had factor loads between 0.89 and 0.31. Factor loads for Helplessness and Acceptance subscales were between 0.94-0.31 and 0.90-0.44, respectively. The Social Support subscale had factor loads between 0.98 and 0.38. The depression subscale had factor loads between 0.95 and 0.75 (Table 3).

**Table 2.** Item average and total score correlation analysis of the subscale of the SCREENIVF scale (n=323)

Item	SCREENIVF	Mean	Standard deviation	Corrected item-total correlation
<b>ANXIETY SUBSCALE ITEM ANALYSIS</b>				
1	I feel fine	1.91	0.75	0.44
2	I feel satisfied	2.20	0.87	0.72
3	I worry too much about not really important things	2.04	0.50	0.58
4	I am happy	1.72	0.70	0.61
5	I am troubled by disturbing thoughts	2.00	0.20	0.32
6	I feel safe	1.75	0.98	0.77
7	I am pleased	1.76	0.71	0.72
8	Some thoughts keep haunting me	2.01	0.23	0.33
9	I take disappointments so seriously that I cannot get them out of my mind	1.69	0.71	0.31
10	I get very nervous and worried when thinking about my current troubles	1.72	0.62	0.29
<b>COGNITIONS REGARDING FERTILITY PROBLEMS</b>				
<b>Helplessness Subscale Item Analysis</b>				
1	Because of my fertility problems, I miss things that are most important for me	1.66	0.66	0.56
4	My fertility problems control my life	1.39	0.54	0.26
5	My fertility problems sometimes give me the feeling of being useless.	1.42	0.60	0.53
6	My fertility problems make my life incomplete	1.41	0.67	0.76
8	My fertility problems affect everything important for me	1.60	0.75	0.85
11	I often feel helpless because of my fertility problems	1.80	0.60	0.27
<b>Acceptance Subscale Item Analysis</b>				
2	I can deal with the consequences of my fertility problems	3.07	0.90	0.36
3	I have learned to live with my fertility problems	1.89	0.87	0.63
7	I have learned to accept my fertility problems	1.64	1.17	-0.18
9	I can accept my fertility problems	2.89	0.63	-0.29
10	I think I can cope with my fertility problems. even if they are not solved	2.89	0.82	0.43
12	I can cope well with my fertility problems	2.73	0.82	0.69
<b>SOCIAL SUPPORT SUBSCALE ITEM ANALYSIS</b>				
1	When I feel tense or nervous, there is someone to help me	3.96	0.28	0.81
2	When I experience some nice things, there is someone with whom to talk about it	3.96	0.28	0.81
3	When I am in pain there is someone to comfort me	3.96	0.28	0.81
4	When I am sad there is someone with whom to talk about it	3.90	0.36	0.69
5	When I need help with a job I cannot carry out alone there is someone to help me	3.31	0.68	0.29
<b>DEPRESSION SUBSCALE ITEM ANALYSIS</b>				
1	Unhappiness	0.15	0.35	0.75
2	Hopeless	0.01	0.11	0.03
3	Lack of stress	0.54	0.74	0.45
4	Dissatisfied	0.12	0.32	-0.28
5	Disappointed	0.31	0.46	0.33
6	Blame yourself	0.18	0.50	-0.07
7	Suicidal ideation	0.004	0.06	-0.06

**Table 3.** The factor load and variance of the subscales of the SCREENIVF scale explained for scale

Item	SCREENIVF	Rotated Factor Loads	Described Variance ( $\sigma^2$ )
Anxiety Subscale ( $\alpha=0.818$ ) ( $\lambda=4.078$ )			40.77%
1	I feel fine	0.49	
2	I feel satisfied	0.75	
3	I worry too much about not really important things	0.72	
4	I am happy	0.78	
5	I am troubled by disturbing thoughts	0.40	
6	I feel safe	0.89	
7	I am pleased	0.86	
8	Some thoughts keep haunting me	0.42	
9	I take disappointments so seriously that I cannot get them out of my mind	0.36	
10	I get very nervous and worried when thinking about my current troubles	0.31	
COGNITIONS REGARDING FERTILITY PROBLEMS			
Helplessness Subscale ( $\alpha=0.788$ ) ( $\lambda=3.837$ )			38.36%
1	Because of my fertility problems, I miss things that are most important for me	0.64	
4	My fertility problems control my life	0.48	
5	My fertility problems sometimes give me the feeling of being useless.	0.74	
6	My fertility problems make my life incomplete	0.85	
8	My fertility problems affect everything important for me	0.94	
11	I often feel helpless because of my fertility problems	0.31	
Acceptance Subscale ( $\alpha=0.771$ ) ( $\lambda=1.983$ )			19.83%
2	I can deal with the consequences of my fertility problems	0.65	
3	I have learned to live with my fertility problems	0.77	
10	I think I can cope with my fertility problems, even if they are not solved	0.44	
12	I can cope well with my fertility problems	0.90	
Social Support Subscale ( $\alpha=0.785$ ) ( $\lambda=3.771$ )			75.42%
1	When I feel tense or nervous, there is someone to help me	0.98	
2	When I experience some nice things, there is someone with whom to talk about it.	0.98	
3	When I am in pain there is someone to comfort me	0.98	
4	When I am sad there is someone with whom to talk about it	0.85	
5	When I need help with a job I cannot carry out alone there is someone to help me	0.38	
Depression Subscale ( $\alpha=0.750$ ) ( $\lambda=2.213$ )			73.78%
1	Unhappiness	0.95	
3	Lack of stress	0.86	
5	Disappointed	0.75	

**Table 4.** Psychosocial risk status according to women's cut-off scores

	Cronbach's Alpha	Cut-off scores	Risk status	
			Yes - n (%)	No - n (%)
Anxiety	0.818	24 and above	40 (16.4)	204 (83.6)
Helplessness	0.788	14 and above	20 (8.2)	224 (91.8)
Acceptance*	0.771	7 and below	34 (13.9)	210 (86.1)
Social Support	0.785	15 and below	5 (2.0)	239 (98.0)
Depression**	0.750	2 and above	39 (16.0)	205 (84.0)

\*7 and 9 items were removed; \*\* 2,4,6,7 items were removed

**Table 5.** Regression model summary

Model	R	R <sup>2</sup>	Corrected R <sup>2</sup>	Standard Error of Estimates
1	0.879 <sup>a</sup>	0.772	0.767	2.92944

a. Estimators: (Constant), Acceptance (2,3,10,12), Depression (1,3,5), Social Support, Helplessness, Anxiety Total  
R: correlation coefficient; R<sup>2</sup>: coefficient of determination

**Table 6.** Comparison of COMPI-FPSS and SCREENIVF subscale scores

Model	Coefficients <sup>a</sup>	Estimated Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant Term)	83.378	3.609			23.102	0.000
	Anxiety	-1.631	0.085	-1.109		-19.099	0.000
	Helplessness	-0.082	0.081	-0.036		-1.003	0.317
	Acceptance*	1.130	0.076	0.492		14.858	0.000
	Social Support	-0.955	0.139	-0.237		-6.854	0.000
	Depression*	2.375	0.252	0.518		9.417	0.000

<sup>a</sup> The dependent variable: Infertility; t : F – Test; F= 161.281; p<0.001; MSE (Mean squared error =8.582)

16% of the women were above the cut-off scores about Anxiety and Depression subscales, 13.9% of acceptance, 8.2% of Helplessness and 2% of Social Support (Table 4).

A multivariate linear regression model was created to model the linear relationship between COMPI-FPSS, which is a scale equivalent to the Anxiety, Helplessness, Acceptance, Social Support and Depression subscales of the SCREENIVF (Table 5).

“Taking SCREENIVF subscales as independent variables and COMPI-FPSS as the dependent variable,” the following system of equations was created:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \varepsilon_i$$

The theoretically established regression model is given in the equation above. In this equation,

$Y$  = Infertility Stress Scale

$X_j$  = SCREENIVF j. subscale

$\beta_0$  = Constant coefficient of Regression Model

$\beta_j$  = Coefficient demonstrating the influence of j.independent variable on the dependent variable

According to the results of the regression analysis obtained, the regression model was obtained as follows:

$$Y_i = 83.378 - 1.631 X_{1i} - 0.082 X_{2i} + 1.130 X_{3i} - 0.955 X_{4i} + 2.375 X_{5i}$$

According to this model, five subscales of the SCREENIVF scale were very successful in explaining COMPI-FPSS. According to the regression equation, the total scores of the subscales were observed to be a statistically significant predictor of the scores obtained from COMPI-FPSS (F=161.281, p<0.001).

Multiple explanatory coefficients were obtained as 77.2%, almost 80% successful in explanation (Table 6).

## DISCUSSION

The current tools that all fertility staff can use to evaluate the needs of patients’ fertility treatment cycle

can be found in ESHRE psychosocial care guideline (ESHRE Psychosocial care guideline). It was realized that SCREENIVF, one of the measurement tools included in this guide, is not included in Turkish, and this scale, which evaluates infertile individuals about psychosocial aspects and various aspects, should be brought into the literature. In this study, the validity and reliability of the Turkish version of the SCREENIVF scale used in the psychosocial screening of infertile women were tested.

Verhaak et al. (2010) investigated the validity of SCREENIVF in Dutch women. They investigated to what extent SCREENIVF administered before the start of the first treatment cycle indicated a predictive value for the emotional adjustment of women after this cycle in different fertility centres. SCREENIVF was based on the results of prospective studies of Verhaak et al. (2005) into the prediction of the emotional response to unsuccessful IVF treatments (Verhaak et al. 2005a,b). Accordingly, these studies published five risk factors as risk factors for increased emotional problems; pretreatment anxiety, pretreatment depression, cognitions regarding fertility problems about helplessness, less acceptance regarding fertility problems, and finally, a lack of social support (Verhaak et al. 2010).

Firstly, scale compliance procedures were applied to assign the language and content validity of the scale. Then psychometric evaluations were made. For the language validity of the scale, translation from Dutch, which is the original language, to Turkish and English was done by expert translators, then it was back-translated from English into Turkish, and the English version created by Verhaak et al. was taken as the basis (Verhaak et al. 2010). For content validity, academicians who are experts in their fields evaluated the scale about language and culture, and the scale was revised with the feedback received (Beaton et al. 2000). At this stage, the Davis technique was applied, and no item was eliminated as a result (Davis 1992).

Similar scale validity used for the construct validity of this study is based on the assumption that the scale's subscale score that concerns a particular area shows a high correlation with the same dimension of another scale that is claimed to question the same concept or some other parameters that show the same thing (Daniel and Cross, 2018). With the COMPI-FPSS, a scale equivalent to the subscale of the SCREENIVF scale, a multivariate linear regression model was created to model the linear relationship between them. According to the regression equation created in line with this model, the total scores of the subscale were observed to be a statistically significant predictor of the scores obtained from COMPI-FPSS, and the multiple explanatory coefficients were obtained as 77.2% ( $F=161.281$   $p<0.001$ ). This result shows that there is harmony between the two-scale scores, and the scale is valid for measuring the desired feature.

In evaluating internal consistency, which is one of the signs of reliability, "Cronbach's alpha technique," a method appropriate to research instruments utilizing Likert scales, can be used. If Cronbach's alpha reliability score is less than 0.40, then the measurement method is not suitable; 0.40-0.59 is low; 0.60-0.79 is considerable; 0.80-1.00 is highly reliable (Özgülven, 2000). Very good/adequate Cronbach's alpha internal consistency was obtained in the original study (Verhaak et al. 2010). In our study, it ranged from 0.75 to 0.81.

Internal consistency is a good measure of how homogeneous the questions assumed to measure a certain area are among themselves, whether the questions go to the correct address, that is, if they only measure the desired concept. In this study, six items with item-total score correlation reliability coefficient below 0.25 were excluded from the scale, and the contribution of other items to the scale was sufficient. Thus, the test showed internal reliability. In this study, item-total score correlation coefficients and subscale total score correlation coefficients obtained for each subscale varied between 0.31 and 0.98.

16% of the women in the present study were above the cut-off scores about "Anxiety" and "Depression," 13.9% of "Acceptance," 8.2% of "Hopelessness" and 2% of "Social Support." In the original study of the scale, in the pretreatment SCREENIVF scale, it was stated that 16% of women were above the cut-off value about "Hopelessness," "Acceptance" and "Social Support," 11% of "Depression," and 10% of "Anxiety" (Verhaak et al. 2010). In the Portuguese validation study of SCREENIVF, more participants scored above the cut-off scores (Lopes et al. 2013).

This study presented some methodological limitations that should be considered. In this study, validity and reliability were tested only in women. However, each of the partners should be included in this study because the only women who were going to be treated were admitted to the clinic. The emotional

impact of fertility problems in men is still insufficiently investigated (Verhaak et al. 2010). Besides, test-retest measurements could not be made because the women participating in this study were taken to IVF afterwards and the results were put on the waiting period for pregnancy. This study could not be applied to women before and after the treatment, only once during the treatment process. The present study was conducted at a hospital in Turkey in Istanbul. Thus, we cannot generalize the findings.

## CONCLUSION

As a result, our findings showed that "the Turkish version of SCREENIVF" is a valid and reliable measurement tool that can be used in the routine psychosocial assessment in the infertility treatment process. The scale consists of five subscales, including Anxiety (10 items), Helplessness (6 items), Acceptance (4 items), Social Support (5 items), Depression (3 items) and 28 items in total. Health professionals can determine the psychosocial care needs of women using this scale to increase compliance and success in treatment in infertility. It may also be recommended to test the Turkish version of the scale in infertile men.

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### Contribution of individual authors:

Pınar Irmak Vural was involved in all aspects of the manuscript's conception, writing, analysis, revision and finding of references.

Gülşah Körpe was involved in all aspects of the manuscript's conception writing, structure and revision.

Ergül Aslan was involved in all aspects of the course design, conception, writing and revision of this manuscript.

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