Psychometric Properties of the Turkish Version of the Fertility Adjustment Scale

Fertilite Uyum Ölçeği Türk Versiyonunun Psikometrik Özellikleri

İlkay ARSLAN,[a]
Hülya OKUMUŞ[b]

[a]Department of Obstetrics and Gynecology Nursing, Akdeniz University Faculty of Nursing, Antalya
[b]Department of Obstetrics and Gynecology Nursing, Şifa University Faculty of Health Sciences, İzmir

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Yazışma Adresi/*Correspondence:*
İlkay ARSLAN
Akdeniz University Faculty of Nursing, Department of Obstetrics and Gynecology Nursing, Antalya, TÜRKİYE/TURKEY
ilkayarslan@akdeniz.edu.tr

ABSTRACT Objective: Infertile women are confronted with many difficulties during the treatment process, which require significant psychological adjustments. The level of infertility adjustment is only evaluated by using the Fertility Adjustment Scale (FAS), which is originally developed with English speaking populations. The objective of this study was translated and test psychometric properties of the Turkish version of FAS (T-FAS). **Material and Methods:** This methodological study was conducted with 240 infertile women in the infertility center of a university hospital in Turkey. The validity of the T-FAS was investigated by using Content Validity Indexing and Confirmatory Factor Analysis. Also, Cronbach's alpha coefficients for reliability were used. **Results:** The content validity of the T-FAS was good according to Content Validity Index score (0.89). A two-component structure was extracted from factor analysis. Cronbach's alpha of 0.81 showed moderate reliability while the stuck into having children and acceptation of life without children' subscales showed Cronbach's alphas of 0.80 and 0.71, respectively. **Conclusion:** The results supported the content and construct validity and reliability of the T-FAS for use with measuring infertility adjustment in a population of Turkish women. Evaluating infertile women' perception of adjustment with the T-FAS may be useful in clinical studies in Turkey. T-FAS can be used by health care professional as a counseling tool to help guide women.

Key Words: Adaptation, psychological; infertility, female; psychometrics

ÖZET Amaç: İnfertil kadınlar tedavi sürecinde önemli ölçüde psikolojik uyumlanmayı gerektiren birçok zorluklar yaşamaktadır. İnfertiliteye uyum düzeyi sadece Fertilite Uyum Ölçeği (FEYÖ) ile değerlendirilmektedir. Bu ölçeğin orjinali İngilizce konuşan popülasyonda geliştirilmiştir. Bu çalışmanın amacı FEYÖ'ni Türkçe'ye çevirmek ve Türkçe versiyonunun (T-FEYÖ) psikometrik özelliklerini test etmektir. **Gereç ve Yöntemler:** Metodolojik bu çalışma Türkiye'de bir üniversite hastanesinin tüp bebek merkezinde 240 infertil kadın ile yürütülmüştür. T-FEYÖ'nün geçerliliği İçerik Geçerlik İndeksi ve Doğrulayıcı Faktör Analizi kullanılarak değerlendirilmiştir. Ayrıca, güvenirlik için Cronbach sabiteleri alfa kullanılmıştır. **Bulgular:** T-FEYÖ'nün içerik geçerliği İçerik Geçerlik İndeksi skoruna göre iyi bulunmuştur (0,89). Faktör analizinden iki bileşenli bir yapı ortaya çıkarılmıştır. Çocuk sahibi olmaya sıkışıp kalma alt skalası 0,80 ve çocuksuz bir hayatı kabul etme alt skalası 0,71 Cronbach alfa değerine sahipken toplam Cronbach alfa 0,81 olarak bulunmuştur. **Sonuç:** Sonuçlar, T-FEYÖ'nün yapı ve içerik geçerliğini ve güvenirliği ile T-FEYÖ'nün Türk kadınlarının infertilite uyumunu ölçmek için kullanılabilir olduğunu desteklemiştir. T-FEYÖ ile infertil kadınların uyum algısının değerlendirilmesi Türkiye'deki klinik çalışmalarda yararlı olabilir. T-FEYÖ bir danışmanlık aracı olarak da sağlık bakım profesyonelleri tarafından kullanılabilir.

Anahtar Kelimeler: Uyum, psikolojik; infertilite, kadın; psikometri

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The level of childlessness among married women at the end of their reproductive period was only 9% in Turkey.[1] Although it may appear to be a small percentage, according to the World Health Organiza-

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tion, Turkey is among the countries with the highest percentages of infertility.[2] Infertility is often experienced as a major life crisis.[3] Comprehensive studies showed the adverse effects of infertility, such as low quality of life, loss of control, hopelessness, low level of self-efficacy, emotional distress, and anxiety and depression.[4-12]

Infertile women are confronted with many difficulties during the treatment process, which require significant psychological adjustments.[13] Adjustment in infertile women during treatment has important effects on their attitudes and accepting to treatments. It is crucial to be able to determine the degree to which women are affected by their infertility, as reflected by their adjustment. Infertility adjustment is a multidimensional concept that includes behavioral and emotional aspects.[14] Also, infertility adjustment is a cognitive process that the individual thinks and evaluates the possibility of having or not having a child and as well as their ability to satisfactory manages their reactions to infertility such as distress and isolation.[14,15] More than half of infertile couples can get over fertility problems.[16] For others, the continuing hope of having a child involved with uninterrupted treatment-seeking may interrupt to adjustment processing.[11,14,17] Nevertheless, adjustment and psychosocial well-being of women with infertility could be increased with psychosocial support and psycho educational programmes.[18] Also, researchers stated that nursing care based on the Theory of Human Caring was increased infertility adjustment.[19,20]

OBJECTIVE

The level of infertility adjustment is only evaluated by using the Fertility Adjustment Scale (FAS), which is originally developed with English speaking populations.[14] FAS items were designed to assess an indication of the extent to which individuals had considered, or come to terms with, the possibility of life with and without a child. Each item is scored on a six-point Likert scale ranging from 1 (''strongly disagree'') to 6 (''strongly agree'') with avoid having a neutral midpoint. The mean score of the 12 items is used as the FAS score.[14] Also, FAS provides a useful and helpful tool for the health care professionals who wish to gain an understanding of infertile women's adjustment and infertile women who want to express their feelings and wanting to understand, and receive to support and care. And no translations of FAS have performed yet in Turkish.

We were observed some difficulties Turkish women's in terms of infertility adjustment because of in traditional and developing countries such as Turkey, associated negative psychosocial consequences associated with infertility have been reported.[10,12] In Turkey, motherhood is believed to be the major role for women. According to Turkish cultural beliefs, it is important to get married and, soon after, have children. In particular, Turkish women typically face one question: "Do you have a child?" If the answer is no, it can cause negative social consequences such as poor self-esteem loneliness, hopelessness, depression, grief and isolation.[8,9,12]

In this research, we were interested in Turkish women's level of infertility adjustment. However, there is no scale to measure Turkish women's perception of infertility adjustment, hence a need for standardized and well-tested instruments to measure infertile women's adjustment to fertility problem. Thus, the aim of the study was to test the translated version of the FAS if a relevant, valid and reliable scale for determining adjustment of the infertile women's in Turkey.

MATERIAL AND METHODS

DESIGN

A methodological research design was used.

PARTICIPANTS AND SETTINGS

The participants were chosen with convenience sample from a group of women undergoing treatments at the infertility center of a university hospital in Antalya, which is the one of southwestern capital cities in Turkey. This center which is a central place that infertile couples come from all around the Antalya for the treatments has adequate infrastructural facilities for all kinds of clinical investigations of infertility.

Polit and Beck (2013) suggest 10 participants for each scale item to set sample size.[21] The number of items in this scale is 12. Thus, the sample size of 120 was deemed sufficient. Also, sample size is important for factor analysis. There are several recommendations related to how many participants are necessary for each variable, often showed as *N:p* ratio. For instance, rules of thumb arranged from 3:1 to 20:1.[22,23] *N:p* ratio as 20:1 was choose to in this study. Eventually, a sample size of this study was 240 women.

Turkish men usually don't come along with their wives to the infertility center. Because of that, treatment and care are being implemented more women-oriented in Turkey. Also, studies concerning adjustment after unsuccessful in vitro fertilization (IVF) report that women were more affected by treatment than men.[3] Therefore women was only included in this study. The inclusion criteria were: (a) being a primary infertile, (b) willing to take part in the research, (c) 18 to 45 years of age, (d) able speak, read, and write in Turkish.

INSTRUMENTS

The Fertility Adjustment Scale

The FAS was come out in the United Kingdom by Glover et al. (1999). The FAS was usable to evaluate psychological responds to fertility problems, and the extent of adjustment to infertility. The FAS was consists of 12 items. Items were balanced in terms of positive and negative statements to minimize the effect of a response set. A six point likert scale were used that range from strongly disagree to strongly agree. A total score was derived by summing the scores on the individual items; positive items were reverse-scored. The minimum possible score was 12 and the maximum score was 72. There was no cut off point. An indication of poor adjustment was a high score on the FAS.[14] Cronbach's alpha coefficient for the original scale was 0.85 and test-retest reliability of 0.88.

The Personal Information Questionnaire

The Personal Information Questionnaire, which consisted of 13 questions. The variables measured were age, highest level of education, length of marriage in years, employment status, and income status, as well as infertility characteristics including prior and current treatments.

RESEARCH PROCEDURE

This psychometric research was conducted in four steps in accordance with the recommendations of key reference books:[24,25] Step 1: Translation of the FAS, Step 2: Content validity of the T-FAS, Step 3: Construct Validity of the T-FAS, Step 4: Reliability of the T-FAS.

Step 1: Translation of the FAS

The English version of the FAS was translated into Turkish following the standard translation methodology.[26] Several methodological researchers in Turkey developed guidelines for translation and testing of instruments originally developed in other languages.[27,28] Consistent with the back-translation method first described by Brislin (1970), these guidelines required that an instrument is subjected to a vigorous scientific translation process before they were implemented for use with Turkish populations.[29] Adhering to these guidelines, the back-translation procedure was implemented to translate FAS into Turkish. The translation was undertaken through four steps: (a) the scale was first translated from English into Turkish by three Turkish researchers specialized in obstetrics and gynecological nursing, who were proficient in English. (b), the translated instrument, then, was captured in a modified scale format more graspable in Turkish language (c) The scale in Turkish language then was translated back into English by a bilingual native speaker, not part of step 1. (d) Correspondence of the back translated scale in English with that of the original scale was further assesses by all the translators along with the primary investigator to ascertain if the conceptual meaning of each item was maintained. After two modifications, an agreement was reached among the translators that the T-FAS was ready for testing its psychometric properties. These steps helped in determine semantic equivalence of the instrument.

Step 2: Content Validity of the T-FAS

The content validity was analyzed using the Content Validity Indexing (CVI). The items were pre-

sented to 10 experts to check and score the items to the field of content in the instrument using the CVI. In addition, the experts were asked to evaluate item wording, response format and instrument length. All items were considered by the experts to be relevant and appropriate. Experts rated each item as: 1, not relevant to 4, highly relevant.[30] Some phrasing changes were performed to better improve intelligibility. After these revisions, the scales were pilot tested with a relevance sample of 10 women. The pilot test results showed no detectable language problems. And the data of the pilot test were not included in the study data.

Step 3: Construct Validity of the T-FAS

Kaiser-Meyer-Olkin (KMO) was used to analyze sampling adequacy and Bartlett Test of Sphericity was performed to identify whether the correlation matrix was a suitable matrix for factor analysis. A KMO value >0.50 indicates that the sample size is adequate for factor analysis.[22,28]

Confirmatory factor analyses was carried out to test T-FAS' construct validity with maximum likelihood estimation with an oblique method. Model fit was evaluated by using several goodness-of-fit indices. The measures of fit and their generally recommended criterion for an acceptable model are as follows: chi-square goodness-of-fit indices (a non-significant chi-square), goodness-of-fit index (GFI) adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA).

Step 4: Reliability of the T-FAS

Reliability was assessed using the corrected item–total correlations, the alpha-if-item deleted procedure. Items with a coefficient of 0.25 or high were assumed as homogeneous to the T-FAS. Internal consistency of the T-FAS was assessed by Cronbach's alpha coefficients. The coefficient value range was 0-1. The higher score, the more reliable is the generated scale. The criterion of α >0.70 was fixed as a proof of internal consistency reliability.[21]

DATA COLLECTION

The questionnaires administered to eligible women in a private room off the waiting hall of the infertility center between March 2009 and May 2010. The face-to-face interview method was selected due to the sensitive nature of the subject. During the initial contact, primary investigator explained the study, method of questionnaire administration, and privacy issues. Randomly potential participants were invited to ask questions. It took 15-20 minutes for each participant to complete the T-FAS.

Once the translation process was completed, items in the Turkish version on the basis of suitability for Turkish culture were organized in four Likert type statements and to be ranked as 1= poor fit-to-4=excellent fit for orientation of the center to reduce and ensure a precise assessment. Additionally, sociologists have expressed that the five-point and upper Likert scales are a problem in terms of interpretation in Turkish population.[31]

A high score on the T-FAS was taken to represent an indication of poor adjustment. Such as "I seem to live my life from month to month" yielding a score of 4 (excellent fit), indicating a low level of adjustment. Other items included statements such as "I think I could adjust to a future life without a child" and "I will continue with investigations/treatment until I succeed in having a child".

ETHICAL CONSIDERATIONS

Ethics approval was attained from the two ethics committees, one from the Ethic Committees of School of Nursing, and the other from Akdeniz University Faculty of Medicine, the official proprietor of the clinic from which the data were collected. Finally, an Informed Consent Form was given to all participants, which included statements that the participation in the study was voluntary, participants could withdraw with no penalty towards their treatment, and that data collected would be reported as aggregate, be kept confidential. In addition, a written permission to translate the FAS into Turkish was obtained from Glover et al.

DATA ANALYSES

The data were coded, scored, and analyzed using SPSS 20.0 statistical package program (SPSS, Inc., Chicago, IL, USA). Percentage, mean, standard deviation, CVI, KMO, Bartlett Test, Cronbach's a coeffi-

cient, and item-total correlations were used to the evaluation of the scale. The confirmatory factor analysis (CFA) was performed by using the AMOS v20.0.

The socio-demographic data were analyzed by using descriptive statistical analysis. Following testing the normality of variables with the Kolmogorov-Smirnov (K-S) test, the distributions weren't significantly normal. Therefore, the non-parametric Kruskal-Wallis test was used. Values less than 0.05 were considered statistically significant.

RESULTS

A total of 240 infertile women completed the questionnaires. The average age of women was 31.5 years (SD= 5.3, range 19-48 years) and 60.8% of women were between 26 and 35 years old. The average length of marriage was 7.6 years (SD= 3.4, range 1-23 years), and 57.2 % of women were married for one to five years. According to data, it was understood that 41.7% of the women had experienced infertility between 3-6 years. Also, 69.6% of the women have taken infertility treatments for under 3 years.

T-FAS SCORES

The total average score of the T-FAS was 23.3 (SD= 5.8, a range 11-35). Item means was ranged from 2.34 (SD= 5.8, range 1.55-3.41) (Table 1).

CONTENT VALIDITY

According to the expert ratings, item CVI scores ranged from 0.65 to 1 in the T-FAS. Two of the 12 items had a CVI below 0.8. These items are: "I will continue with investigations and treatment until I succeed in having a child" and "I can talk to my partner about the possibility of not having a child". CVI scores were 0.89. Consequently, the content validity of the T-FAS was found to be great.

CONSTRUCT VALIDITY

Confirmatory factor analysis (CFA) was carried out to test the construct validity of the T-FAS. First the sampling adequacy for factor analysis was analyzed with two tests yielding the following results: the KMO test result was 0.866 and the Bartlett's test was 740.276 ($p<0.001$), each test was showed that the sample size was big enough to make a factor analysis and for the psychometric testing of a 12 item scale.[22] The two first-order factor was explored for T-FAS' best fit to the data and statistical values were X^2 =75.4, Sd=34. The ratio of the chi-squared to degrees of freedom (x^2/df) = 2.21, which indicates a good fit. However, the x^2-value was also highly significant, which is common in large data sets. Concerning the fits of the model, RMSEA indicate acceptable fit as 0.071, and its 90% confidence (CI) interval (0.05-0.09). It considered that RMSEA values <0.10 as an acceptable model fit.[28]

TABLE 1: Mean item scores and item-to-total correlations for the T-FAS.

Items	Mean (SD)	Item to Total correlation
Factor 1 Stuck into having children (α = .80)		
I will continue with investigation and treatments until I succeed in having a child	1.8 (0.7)	0.286
I cannot plan for the future until I sure whether or not I can have a child	2.8 (1.2)	0.372
I want my own child more than anything else in life	3.4 (0.9)	0.520
I seem to live my life from month to month	2.6 (1.2)	0.629
I will always feel unfulfilled if I am unable to have my own child	2.3 (1.2)	0.704
I cannot imagine a future without a child	0.6 (0.3)	0.646
Factor 2 Acceptation of life without children* (α=71)		
There are both advantages and disadvantages to having a child	1.5 (0.7)	0.356
I can talk to my partner about the possibility of not having a child	2.7 (1.2)	0.352
I have made plans for a possible future life without a child	2.5 (1.1)	0.428
I think I could adjust to a future life without a child	2.4 (0.9)	0.669
I make sure that I carry on with my normal life activities	1.5 (0.7)	0.321
I think life could be rewarding either with or without children	1.8 (0.9)	0.553

Cronbach α =0 .81; * Reverse-scored.

While the AGFI' value from the others goodness-of-fit indices found 0.91 with an acceptable for model, the CFI, GFI and RMR found a good values, respectively 0.95, 0.96 and 0.05.

RELIABILITY

Two statistical methods were used to evaluate the reliability of the scale: (1) Item-total correlations to determine the degree to which the individual items on the scale correlated with the total scale score. This analysis is particularly appropriate for identifying those items that poorly correlate with others, hence could be discarded to reduce the variables to a more manageable number. (2) Cronbach's alpha to test internal consistency of the T-FAS.

The item-total correlations ranged from 0.18 to 0.70. Two items (item 1 and item 4), however, scored below 0.25 on the translated instrument. But these two items were understandable and interpretable and to avoid of any detonations these items did not delete. This was supported the construct validity analysis previously reported. The values of the items-total correlations are presented on Table 1. Cronbach's alpha reliability coefficient was performed for the 12-item scale yielding 0.81 showing a high reliability. Cronbach's alpha's for each factor were 0.80 and 0.71, respectively (Table 1).

T-FAS DEMOGRAPHIC RESPONSE PATTERNS

The relationships between women age, education, length of marriage, and T-FAS were evaluated by using the Kruskal-Wallis test. There were no statistically difference in T- FAS score based on age (X^2=0.13, df=2, p=0.94) and years of marriage (X^2=0.03, df.=2, p=0.99). Besides, statistically differences were found (X^2=25.90, df=3, p=<0.05) in the T-FAS scores of women and education levels. The high school and upper level of education is related to higher adjustment to infertility. Additionally, there was a statistically significant difference in T-FAS scores based on income (X^2=22.98, df=2, p<0.05) and employment status (X^2=25.93, df=1, p<0.05). The high-income level (1000 Turkish Liras=US$ 521 and upper) was related to high T-FAS score and employed women' T-FAS score was higher than housewife'. Also, significant differences were found among duration of infertility and T-FAS score, 6 years and upper duration of infertility is related to lower adjustment to infertility.

DISCUSSION

STUDY LIMITATIONS

The sample was obtained among the infertile women attending a university clinic, who lived in a city, and mostly low to moderate income. We suggest that, the suitability of the instrument for clinical use is further investigated with diverse populations, with those living in non-urban communities, those who don't have the financial means, and with those having had less than primary education. Finally, to attain homogeneity, this research was performed among infertile women with female factor as the etiology.

INSTRUMENT EVALUATION

The aim of this study was to test the psychometric properties of the T-FAS step by step, namely, content validity, the factor structure, and internal consistency reliability. The results suggested that the T-FAS was a reliable and valid measure that assessed adjustment to infertility in Turkish women.

The FAS is a comprehensive instrument for assessment of fertility adjustment and also is single scale in this area. The FAS has been applied in a variety of researches, in Australia, United Kingdom and Kuwait.[32-34]

Turkish women's scores on the FAS were found to be 23.3±5.8 and the range of possible scores was 12-48 because the T-FAS was used 4-point Likert-type scale. It is means that the level of infertility adjustment in Turkish women was near to the average FAS. Majority of Turkish society has pro-natalist perspective. According to Turkish cultural beliefs, it is important to get married and, soon after, have children.[8] Thus, the notion of a married couple who lives happily without children is unimaginable. A study done by Turkish investigators showed that infertile women exhibited significantly higher levels of distress than the women with children because of the social stigmatization associated with infertility.[35] Other researchers cor-

roborated the findings of Guz et al. who showed that in contemporary Turkey there were enduring beliefs regarding women and fertility and that not bearing children significantly altered the psychological and social well-being of Turkish women.[8]

Items in the T-FAS were initially assessed in terms of its cultural appropriateness. We first examined T-FAS' CVI scores. The CVI provides quantitative proof for content validity relevance by a board of content experts by using ratings of items.[30] And numerous nurse researchers support use of the CVI.[36] CVI covers the evaluate critique from five to ten "expert" raters. The experts are evaluate if the statement is suitable and proper to the research population, if the format of the statement is suitable, and submit advices for development. Agreement for the items should be minimum 80% in other words a CVI of 0.80 or more is desirable.[30] And T-FAS' CVI scores (0.89) were found to be great.

Consequently, T-FAS was composed of a total of 12 items and two-dimensional structure in measuring adjustment level in the Turkish population. Internal consistency of the T-FAS was acceptable (T-FAS whole: 0.81 Factor 1: 0.80 and Factor 2: 0.71). These values indicate that the T-FAS and its components have good internal consistency. Besides, these results were very much similar to those reported for the original English version and Arabic versions, which was from 0.80 to 0.85.[14,34] The internal consistency of two subscales of Portugal version was lower than 0.70 (ranged from 0.60. to 0.69).[37] Nevertheless, we must note that the number of items within each subscale of the T-FAS is higher than in the Portugal version of FAS, which likely influenced these results. As is known, higher reliability is related to more items.[21]

Confirmatory factor analysis (CFA) is a statistical technique used to verify the factor structure of a set of observed variables. CFA allows the researcher to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists.[28,31] As far as known, the CFA of FAS has not done before, it was done for the first time in Turkish adaptation study. Model fit of T-FAS evaluated by using goodness-of-fit indices was good and confirmed two factors model in the current study. CFA yielded two factors in the current study. As wide as we know only one study has analyzed FAS's factor structure in Portugal version.[37] The factorial structures that best fit our sample's data is slightly different from that obtained in Lopes and Leal (2010) validation study. Lopes and Leal (2010) demonstrated that FAS was a three factors instrument in Portugal population, which were parenthood centered, wait for life and acceptation of life without children.[37] But closely items loading on the two components have been reported as the T-FAS. Also in the present study, the T-FAS point that the loading of positive and negative items is fit with the Portugal FAS. The first factor "stuck into having children" is composed of items that how to manage present and future with couldn't have a child. This factor is an indicator that women couldn't to achieve adjustment to infertility. The second factor "acceptation of life without children" is composed of items that adjust to possible future life without a child.

CONCLUSION

T-FAS is a simple test consisting of 10 items and two factors, easy-to-use instrument for staff. T-FAS is a reliable and quite valid instrument to assess infertile women's adjustment level before and during infertility treatments hat guarantee next studies. Next studies of this issue might identify whether T-FAS is a suitable scale for Turkish infertile men, and adjustment level of men with fertility difficulties in Turkey. Consequently, it is relied that T-FAS will highly approve science and care.

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