

Validity and reliability study of the Tilburg Pregnancy Distress Scale into Turkish

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Accessible summary

- Several instruments have been developed for the assessment of distress (stress, anxiety, depression) in pregnancy. The Tilburg Pregnancy Distress Scale (TPDS) is a useful instrument for the evaluation of distress in pregnant women.
- There are no validated instruments for the evaluation of distress in pregnant women in the Turkish language.
- The reliability and validity of the Turkish version of the TPDS demonstrated good comprehensibility, internal consistency and validity, and is an adequate and useful instrument for the evaluation of distress in Turkish pregnant women.
- TPDS enables to practitioners determine distress in pregnant women in the early periods by practitioners. Assessment of distress levels of pregnant women constitutes an important area for both midwives and mental health nursing.

Abstract

This study was conducted to adapt the Tilburg Pregnancy Distress Scale (TPDS) into Turkish and test its validity and reliability. The study was conducted in six Family Health Center regions in the province of Kars between 20 February and 10 April 2013. A total of 275 pregnant women, who met the study criteria and agreed to participate in the study, constituted the sample group of the study. For validity and reliability analysis of the scale, content validity analysis, explanatory and confirmatory factor analysis, and Cronbach's alpha coefficient were used. It was found that the two-factor structure of the scale was valid and its fit indices were appropriate. The total Cronbach's alpha coefficient of the scale was 0.83. The cut-off point of the scale was specified as 28 for its total score. As a consequence, the adaptation of the TPDS into Turkish was determined to be a valid and reliable measurement instrument. Assessment of distress levels of pregnant women constitutes an important area for both midwives and mental health nursing.

Introduction

Being a major physiological process, pregnancy is also a time of high risk of encountering factors that might cause stress and anxiety for women (Vırit *et al.* 2008). While pregnancy has been considered as a 'protective period for psychiatric disorders' in the past, this view is

no longer accepted today because women might perceive the pregnancy not only as a source of joy, satisfaction, maturity, and happiness, but it can also be a period involving negative mental affects such as stress, anxiety and concerned waiting (Sevindik 2005, Marakoğlu & Şahsivar 2008). These reasons suggest that pregnancy is a stressful period in a woman's life that might often

be accompanied by anxiety and depression (Sevindik 2005).

Pregnancy is related to psychological distress due to reasons such as physiological, social and emotional changes; changes of the body image; failure of adaptation; anxiety about becoming a parent; financial needs; and lack of social support (Yali & Lobel 2002, Lavender 2007, Furber *et al.* 2009). Psychological distress is generally and clinically defined as depression, anxiety and/or stress (NICE 2006, Priest *et al.* 2008, Furber *et al.* 2009, Woods *et al.* 2010, Schuurmans & Kurrasch 2013). Psychological distress is a common problem of many women throughout their fertile years (ACOG 2000).

Background

Some studies investigating the prevalence of psychological distress in pregnancy indicate that 13–25% of women in developed countries experience clinically significant psychological distress episodes, primarily depression or anxiety disorders (Priest *et al.* 2003, Gavin *et al.* 2005). Another study specified that the prevalence of distress in pregnancy varies between 41.7% and 51% (Richter *et al.* 2012). Studies investigating the prevalence of depression during pregnancy have indicated the prevalence of depressive symptoms as 17.9% in Hungary (Bodecs *et al.* 2009), 20% in the United States (Marcus *et al.* 2003), 25% in Canada (Da Costa *et al.* 2000) and 30% in Finland (Kurki *et al.* 2000). There are limited studies on this subject in Turkey where the prevalence of depressive symptoms during pregnancy has been determined to be between 27.3% and 36.3% (Sevindik 2005, Gölbaşı *et al.* 2007, Karacam & Ancel 2009). Assessment instruments [Beck Depression Inventory (BDI), Edinburgh Postnatal Depression Scale (EPDS)] used in these studies conducted in Turkey are not aimed at determining depression in pregnancy. More sensitive measurements could be obtained during assessments made with standard materials prepared as pregnancy specific.

It is known that mental illnesses (particularly depression, anxiety, distress etc.) might affect the mood of mothers and increase the rate of maternal and foetal morbidity and mortality (Marakoğlu & Şahsivar 2008, Brenda *et al.* 2009, Muzik *et al.* 2009). Contributing factors to the adverse effects of this process on both mother and infant include: spontaneous abortus, antenatal bleeding, preeclampsia-eclampsia, perinatal and birth complications, preterm delivery, neonatal growth retardation, low birthweight newborn infants, lower apgar scores and foetal death. Furthermore, depression in pregnancy has also been shown to be an important risk factor for the development of postpartum depression (Bowen & Muhajarine 2006, Marakoğlu & Şahsivar 2008, Brenda *et al.* 2009, Muzik *et al.* 2009).

It is important to recognize and takes steps to prevent ongoing distress that has the potential to spiral into severe distress in pregnancy through preventive mental health services, thereby decreasing the effects on both maternal and child health and development. Hence, it is emphasized that both physical evaluation and psychological assessment are performed in pregnancy follow-ups as part of an integrated approach (Kuğu & Akyüz 2001, Midmer *et al.* 2004, Matthey 2005, Virit *et al.* 2008).

Within health services, there is a conventional focus on postpartum depression. However, the developing literature has also started to focus on risks associated with antenatal psychological distress (Furber *et al.* 2009). Since psychological distress in pregnancy adversely affects the well-being of foetus and mother, its importance should be emphasized and treated with early diagnosis (Kuğu & Akyüz 2001, Midmer *et al.* 2004, Matthey 2005, Virit *et al.* 2008). The first step to be taken in preventing the psychological distress in pregnancy is the identifying those women at risk. Mental illnesses (particularly depression, anxiety, distress etc.) in pregnancy should be determined by using convenient screening methods that have already been developed. Scales used commonly for these screenings involve the Beck Anxiety Inventory (Ulusoy *et al.* 1998), BDI (Hisli 1989), State-Trait Anxiety Inventory (Öner & Lecompte 1985) and EPDS (Engindeniz *et al.* 1997). It is obvious that these scales are not specific to pregnancy and they are measurement instruments used for diagnosis of a single facet. Thus, an instrument is needed that will measure the psychological distress (stress, anxiety, depression) particular to pregnancy. Such a tool been developed in 2011 by Pop *et al.* – the Tilburg Pregnancy Distress Scale (TPDS) – in order to diagnose the psychological distress particular to pregnancy. Distress in pregnancy is associated with load and changes brought by the pregnancy to the woman. This scale is used only in diagnosing psychological distress caused by pregnancy. Furthermore, it approaches the distress from a multidimensional aspect (stress, anxiety, depression) instead of single problem. At the same time, TPDS enables to determine distress in pregnant women in the early periods. It is a useful assessment instrument to determine pregnant women, who are in the high risk group, and take necessary measures. More sensitive measurements could be obtained during assessments made with standard materials prepared as pregnancy specific. Therefore, it is considered that adaptation of this scale to Turkish language is important.

The purpose of this study is to translate the TPDS into Turkish, determine its validity and reliability, and to adapt the scale to recognize the Turkish culture in order to identify the psychological problems of pregnant women more specifically and objectively.

Methods

Setting and study participants

This methodological study was conducted in six Family Health Center (FHC) regions in the province of Kars (a city in eastern Turkey) between 20 February 2013 and 10 April 2013. In total, 603 pregnant women were registered to the FHCs on the aforementioned dates and this constituted the study population. The adaptation of a scale into a different culture requires reaching a group at least 5–10 times greater than the number of scale items (Gözüm & Aksayan 2002). Thus, without selecting a sample group for the study, the data were collected from a total of 275 pregnant women who met the study criteria and agreed to participate in the study. Inclusion criteria;

- 'who were at least primary school graduates';
- 'had completed their 12th gestational week';
- 'and had no associated pregnancy risks or previous mental health complaints'.

Data were collected via face-to-face interviews during home visits by the first author to the homes of pregnant women based on address information obtained from the FHCs.

Instruments

TPDS

The TPDS was developed by Pop *et al.* in 2011 to diagnose distress in pregnancy. The scale consists of 16 items and it has two subscales – 'negative affect (NA)' and 'partner involvement (PI)' (Pop *et al.* 2011).

Subscale of NA

This consists of 11 items – 3, 5, 6, 7, 9, 10, 11, 12, 13, 14 and 16. The lowest score to be obtained from this subscale is 0, the highest score is 33.

Subscale of PI

This consists of 5 items – 1, 2, 4, 8 and 15. The lowest score to be obtained from this subscale is 0 and the highest score is 15.

Each item of the original scale is graded on a 4-point Likert scale ranging from 'very often' (0 point), 'highly often' (1 point), 'occasionally' (2 points), 'rarely or never' (3 points). Items 3, 5, 6, 7, 9, 10, 11, 12, 13, 14 and 16 in the scale are reverse coded. While the lowest score to be obtained from the overall scale is 0, the highest score is 48.

The scale is used on pregnant women in their 12th gestational week and above, and has defined cut-off points. These cut-off points are calculated according to the 90th

percentile of total scores of the overall scale and subscales. When the score obtained from the scale is above the cut-off points, this enables identification of those pregnant women who are at risk in terms of distress (depression, anxiety and stress).

The Cronbach's alpha coefficient of the original scale is 0.78. As a result of the factor analysis, the scale consisted of two subscales and the Cronbach's alpha coefficient of each subscale is 0.80 (Pop *et al.* 2011).

Translation, content validity and pilot study

The translation–back translation method was used in this study. The scale was translated from English to Turkish by two linguistic experts. The translated Turkish items were then examined by researchers and then the back translation was performed on items by another linguistic expert. Following the translation process, the scale was applied on a group of 20 pregnant women as a pilot test (these 20 pregnant women were not included in the later study). Following the pilot test, any required changes were made according to the opinions of the participants.

Content validity was assessed after completing the translation process. The scale was presented to an expert group of 10 academicians for their opinions. The experts examined the scale items in terms of content validity. For each item: (1 = not suitable; 4 = very suitable). The Davis technique was used for content validity, which was reviewed based on the expert opinions (Yurdugül 2005). After this evaluation, the total of the first two items was divided into the total number of experts and the content validity index (CVI) was obtained. When the CVI is greater than 0.80, this signifies that the item is sufficient in terms of content validity (Yurdugül 2005). The CVI scores of all scale items were above 0.80; thus, no item was excluded from the scale regarding the content/scope validity. Following the content validity analysis, the scale was applied on a group of 30 pregnant women as a second pilot application (these 30 pregnant women were not included in the final study). The scale was finalized after this application.

Statistical analysis

SPSS (version 16, SPSS Inc., Chicago) and Lisrel 8.0 software programmes (Scientific Software International, Inc., Lincolnwood, IL, USA) were used to analyse the data. In order to conduct the statistical analysis, number, percentages, mean and standard deviations were used. On the other hand, analysis and techniques used for validity and reliability analyses are as follows.

Validity analysis

Exploratory and confirmatory factor analyses were used for the construct validity of the scale. Before conducting the factor analysis, Kaiser–Meyer–Olkin (KMO) and Bartlett's tests were applied in order to evaluate the sample size of the scale and its suitability for the factor analysis. It is requested that KMO value should be more than 0.50 in order to conduct factor analysis (Akgül 2003). Moreover, the fact that the Bartlett test was found to be significant signified that the dataset was convenient for the factor analysis (Özdamar 2004).

During exploratory factor analysis (EFA), the principal components analysis was used and the data were examined by using the direct oblimin rotation method. The lowest factor load of 0.40 was considered as a criterion (Özdamar 2004). Direct oblimin rotation method allows factors to be related to each other (Şencan 2005).

Asymptotic variance matrix was examined by using the diagonally weighted least squares (DWLS) estimation method that is suggested in categorical data for the confirmatory factor analysis (CFA) (Scientific-Software-International 2012). The CFA results were evaluated according to various fit index results (P, χ^2/SD), comparative fit index (CFI), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) (Munro 2005, Daire Hooper & Michael 2008, Wang & Wang 2012).

Reliability analysis

Internal consistency of the scale was assessed with Cronbach's alpha coefficient and item total score correlations. A Cronbach's alpha coefficient of at least 0.60 is required and item total score correlations of at least 0.20 in each item (Şimsek 2007).

Cut-off point

In the original scale, the cut-off point was calculated according to the 90th percentile. Cut-off points of the original scale were >17 for overall scale, >12 for 'NA', >7 for 'PI' sub-scale (Pop *et al.* 2011). In the Turkish version of the scale, the cut-off point was recalculated according to the 90th percentile of the total score.

Ethics

Permission of the author of the original scale, Victor JM Pop, was sought to adapt the TPDS into Turkish. The study received approval from the Ethics Committee of Atatürk University Institute of Health Sciences, and written permission from the Provincial Directorate of Health of Kars in

order to conduct the study. Moreover, verbal consent was obtained from the pregnant women who agreed to participate in the study.

The ethical principles of '*informed consent*' (by informing pregnant women about the study objectives), '*privacy and protection of privacy*' (by specifying that the information would be kept confidential), '*respect for autonomy*' (by involving pregnant women voluntarily participating) and generally '*nonmaleficence/beneficence*' were fulfilled (Erefe 2002).

Results

Characteristics of participants

Pregnant women in this study had an average age of 26.30 \pm 4.95 and their average household income was 1582.1 \pm 1429.08 Turkish liras. There were 40.8% of pregnant women who were primary school graduates, 82.5% were housewives and 55.3% lived in a nuclear family. Regarding the husbands of pregnant women, 30.9% had completed their high school education and husbands of 49.1% were workers. The average number of pregnancies was 2.21 \pm 1.14, the average number of alive children was 1.16 \pm 1.15 and 81.8% of women became pregnant intentionally. Table 1 illustrates the participants' sociodemographic characteristics.

Validity

Before the principal components analysis was carried out to provide more precise findings, the KMO and Bartlett's tests were conducted for the purpose of determining the sample adequacy and suitability of the data for the factor analysis. As a result of the analysis, the KMO value was determined as 0.81 and this value shows the suitability for the principal components analysis (Özdamar 2004). Likewise, the results of the Bartlett's test were determined as $\chi^2 = 1268.70$, $df = 120$ and $P = 0.000$, and it was specified that the data were inter-related and acceptable for a factor analytic approach (Özdamar 2004).

EFA

The data were examined by using the direct oblimin rotation method in the analysis, as applied in the original scale. As a consequence, it was determined to be suitable for the two-subscale structure in the Turkish language, as used in its original language (PI, NA). Factor loads of items varied between 0.44 and 0.76, and factor loads of all items were

Table 1
Sociodemographic characteristics of the sample

Sociodemographic characteristics	Mean	SD
Income	1582.1	1429.08
Age (mean: 26.30 ± 4.95)	<i>n</i>	%
18–24	105	38.3
25–29	101	36.7
30–34	51	18.5
35 and ↑	18	6.5
Education level		
Primary school	112	40.8
Middle school	60	21.8
High school	49	17.8
University and above	54	19.6
Employment status		
Housewife	227	82.5
Officer	44	16.0
Worker	4	1.5
Spouse education		
Primary school	82	29.8
Middle school	49	17.8
High school	85	30.9
University	59	21.5
Spouse occupation		
Unemployed	22	8.0
Officer	58	21.1
Worker	135	49.1
Other (Artisan, farmer . . .)	60	21.8
Family type		
Nuclear family	152	55.3
Extended family	123	44.7
Number of pregnancy (Mean: 2.21 ± 1.14)		
1	100	36.4
2	71	25.8
3	49	17.8
4 and ↑	55	20.0
Number of children living (mean: 1.16 ± 1.15)		
No	108	39.3
1	68	24.7
2	45	16.4
3 and ↑	54	19.6
Pregnancy status		
Wanted	225	81.8
Unwanted	50	18.2
Trimester		
1st Trimester	12	4.4
2nd Trimester	115	41.8
3rd Trimester	148	53.8

above 0.40. The total variance being explained was 41.61% (Table 2).

CFA

In the CFA, a two-subscale structure that consisted of the subscales of PI and NA was involved in the model. Calculations in this model were as follows: χ^2 value 369.03, degree of freedom 103, $P = 1.00$, χ^2/SD value 3.58, CFI 0.97 and RMSEA 0.00. Other fit index results, item factor loads and PATH diagram of the scale are presented in

Tables 3 and 4, and Fig. 1. Fit indices were found to be acceptable in this study (Schumacker & Lomax 2010, Waltz *et al.* 2010, Wang & Wang 2012).

According to the findings of the exploratory and confirmatory factor analyses, the Turkish form of the TPDS with 16 items was determined as two factor in accordance with the original form.

Reliability

Internal consistency findings of the scale were examined using Cronbach's alpha coefficient. The Cronbach's alpha coefficient of the total scale was determined as 0.83. Table 5 illustrates Cronbach's alpha coefficients of the overall scale and subscales.

Item total score correlations of the scale varied between 0.30 and 0.63. The exclusion of no item increased the Cronbach's alpha coefficient and item total score correlations of all items were above 0.30 (Table 6).

Cut-off point

In the original scale, the cut-off point was determined according to the 90th percentile (Pop *et al.* 2011). The cut-off point of the scale was recalculated as a score corresponding to the 90th percentile based on the opinions of authors who developed the original scale. In this study, the score that corresponded to the 90th percentile was determined to be 28. Pregnant women who obtained a score of 28 and above based on the scale were at risk of distress. While the cut-off point was 10.40 for the subscale of PI, it was 22.40 for the subscale of NA.

Discussion

This study was conducted in order to determine the validity and reliability of the TPDS and to integrate the scale into Turkish society. Prior to this study, there has not been a standard measurement instrument developed for the diagnosis of pregnancy distress in Turkey.

Translation of a scale into another language potentially changes the nature of the scale. This inevitable change is caused by both conceptualization and psycholinguistic differences. During the adaptation process of a scale, it is necessary to examine the scale items carefully and to perform the necessary conversions in order to minimize the differences (Öner 1997).

Validity relates to what the test measures, how accurately/exactly the test measures the concept in question and how it shows whether the scale actually measures a variable that the researcher is intending to measure by the scale or not (Erefe 2002, Özgüven 2004, Karasar 2008).

Table 2
Factor loads of Tilburg Pregnancy Distress Scale items

Items	Factor I Negative affect	Factor II Partner involvement
1	0.21	0.57
2	0.21	0.73
4	0.26	0.66
8	0.17	0.76
15	0.14	0.67
3	0.52	-0.00
5	0.72	0.08
6	0.67	0.29
7	0.50	0.17
9	0.56	0.32
10	0.71	0.35
11	0.64	0.24
12	0.71	0.09
13	0.67	0.07
14	0.45	0.30
16	0.44	0.16
Explained Variance	%28.7	%12.9
Total Explained Variance	%41.6	

The bold characters shows which item must be in which factor.

Table 3
CFA results fit index

Fit index	Results	Original scale
χ^2/SD	3.58	-
CFI	0.97	0.91
GFI	0.96	-
AGFI	0.95	-
RMSEA	0.00	0.06
SRMR	0.07	0.07

AGFI, ; adjusted goodness of fit index; CFA, confirmatory factor analysis; CFI, comparative fit index; GFI, goodness of fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

Table 4
Confirmatory factor analysis results ($n = 275$)

	Items	t	$\lambda(R^2)$	Factor loadings
Partner involvement	Item 1	11.56	0.27	0.52
	Item 2	13.88	0.46	0.68
	Item 4	13.08	0.37	0.60
	Item 8	13.02	0.39	0.62
	Item 15	12.00	0.30	0.55
Negative affect	Item 3	12.24	0.17	0.41
	Item 5	17.07	0.40	0.63
	Item 6	17.03	0.41	0.64
	Item 7	12.46	0.19	0.44
	Item 9	15.81	0.30	0.55
	Item 10	20.66	0.53	0.60
	Item 11	17.82	0.36	0.73
	Item 12	19.43	0.41	0.64
	Item 13	17.27	0.37	0.61
	Item 14	12.61	0.20	0.44
	Item 16	11.22	0.15	0.39

Assessment instruments require a validity study (Öner 1997). This study investigated the content validity and construct validity in order to examine the validity of the scale.

Table 5
Cronbach's alpha values

Scale and subscale	Item number	Range	Mean \pm SD	Cronbach's α
TPDS	16	0-41	15.72 \pm 9.31	0.83
Partner involvement	5	0-15	5.42 \pm 3.48	0.72
Negative affect	11	0-33	10.31 \pm 7.59	0.83

TPDS, Tilburg Pregnancy Distress Scale.

Table 6
Item-total correlations

Items	Mean	SD	Cronbach's α if item deleted	Item-total correlations
Item 1	1.49	1.14	0.82	0.31
Item 2	0.96	0.98	0.82	0.38
Item 3	0.82	1.09	0.82	0.34
Item 4	1.40	1.10	0.82	0.37
Item 5	1.17	1.17	0.81	0.53
Item 6	0.87	1.11	0.81	0.57
Item 7	0.55	0.92	0.82	0.39
Item 8	0.82	0.94	0.82	0.34
Item 9	0.86	1.13	0.81	0.49
Item 10	1.03	1.14	0.80	0.63
Item 11	1.11	1.29	0.81	0.52
Item 12	1.54	1.22	0.81	0.52
Item 13	1.07	1.24	0.81	0.48
Item 14	0.64	1.06	0.82	0.40
Item 15	0.74	0.87	0.82	0.30
Item 16	0.66	1.07	0.82	0.34

Content validity examines to what extent the scale contains the basic elements of a structure to be measured (Erefe 2002). Accordingly, the scale was presented to the opinions of 10 expert academicians after the translation process and they were asked to evaluate the measurement rate of each item between 1 and 4. As cited by Tavşancıl (2002), the

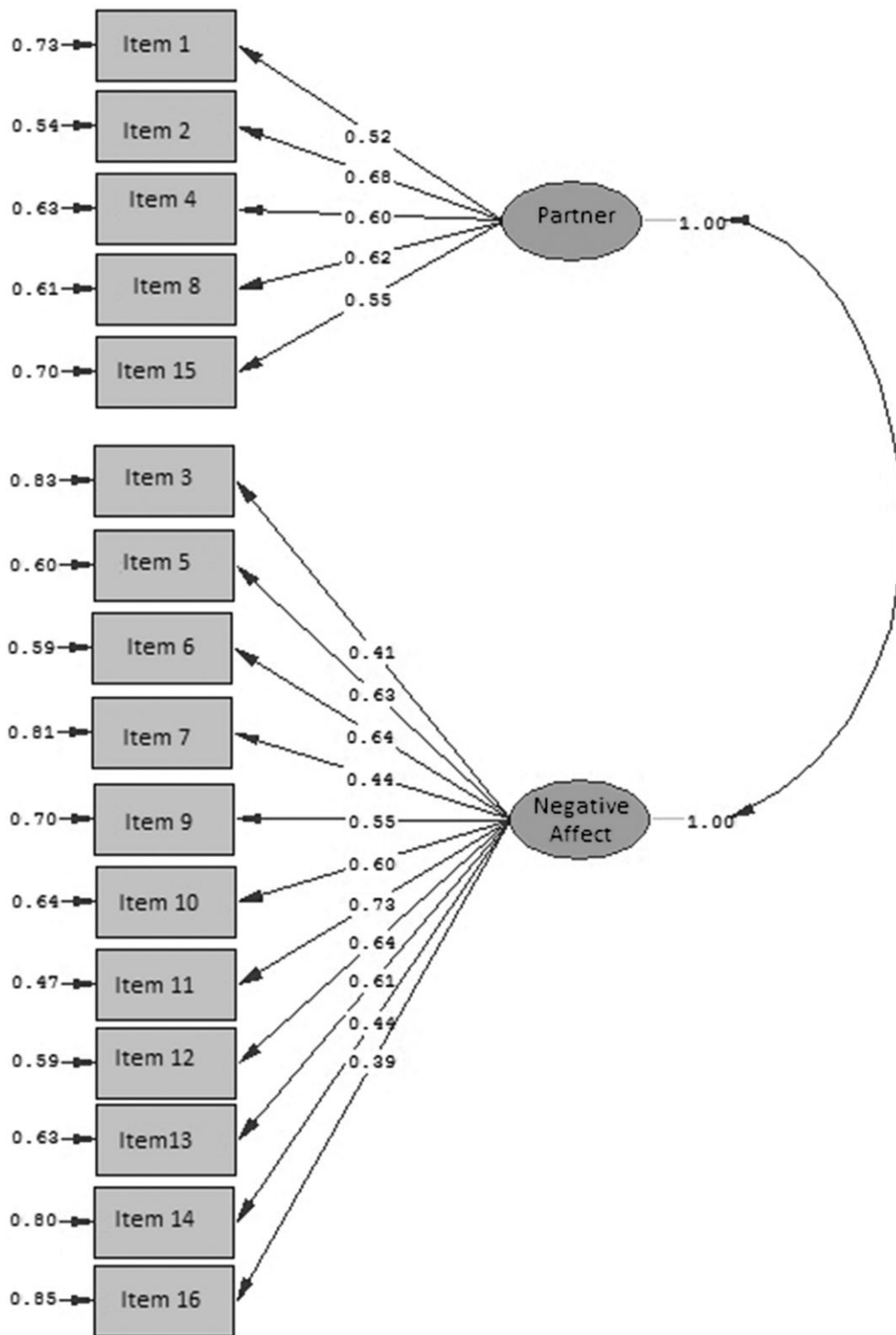


Figure 1
Diagram of the PATH. $\chi^2 = 369.03$; $df = 103$; P value = 1.00000; RMSEA = 0.000

number of experts who are consulted in studies of scale adaptation and development vary between 3 and 20. This study consulted the opinions of 10 experts regarding the scale, which shows a parallelism with the literature. The

Davis technique was used to prove the content validity with numerical values and the CVI of the scale was found to be 0.80. Yurdugül (2005) stated that the CVI score should be 0.80 and above in content validities that are evaluated with

the Davis technique. Thus, the scale is acceptable in terms of content validity (Erefe 2002).

The objective of construct validity is to form a consistent scale by selecting items that can measure a certain structure without mixing it with other structures (Öner 1997). KMO was applied in order to evaluate whether the sample group was sufficient for the factor analysis or not. This was conducted before examining the factor structure of TPDS, and Bartlett's test was performed in order to assess whether the sample group was convenient for the factor analysis or not (Özdamar 2004). The KMO value was reported as 0.81 in the original scale (Pop *et al.* 2011). In this study, the KMO value was determined as 0.81, just as in the original scale. This value is required to be above 0.50 and values of 0.80 and above are interpreted as a very good result (Akdağ 2011). This finding indicates that the sample size was sufficient for the factor analysis.

The Bartlett's test value was reported as $\chi^2 = 1268.70$, $df = 120$ and $P = 0.000$ in the original scale (Pop *et al.* 2011). The Bartlett's test needs to be significant in scale adaptation studies (Akdağ 2011). In this study, the result of the Bartlett's test was found to be $P = 0.000$. These findings demonstrated that the data exhibited a normal distribution, measurement results were not affected by the sample size and the sample group was sufficient and convenient for the factor analysis.

The data were examined with the direct oblimin rotation method in EFA, just as in the original scale (Pop *et al.* 2011). As a result of the analysis, it was determined that the factor structure of the scale was convenient for the two-subscale structure as in the original study. Factor loads are required to be above 0.30 in a scale (Akdağ 2011). In this study, the factor loads of all items were above 0.30 as in the original scale (Pop *et al.* 2011) and varied between 0.44 and 0.76.

The variance being explained in the original scale was 34% (Pop *et al.* 2011). In contrast, the variance explained in this study was 41.61%. The higher variance being explained could signify that the related concept or structure was measured well (Kirtak 2013). In social sciences, the variance being explained for multi-factor patterns is deemed sufficient between 40% and 60% (Akdağ 2011).

After the EFA, the scale items were examined with CFA in order to reveal the convenience of the dataset for the theoretical structure (Şimsek 2007). The primary objective in the CFA is to test the significance of the relation between the structure and observable variables. CFA is an application to be conducted, especially in the adaptation of previously developed scales (Eser 2006). During the establishment of a model for CFA, a two-subscale structure consisting of the subscales of 'PI' and 'NA' was examined as in the original scale. Some calculations in the model were as

follows: χ^2 value 369.03, degree of freedom 103, $P = 1.00$, χ^2/SD value 3.58, CFI 0.97, RMSEA 0.00 and SRMR 0.07. In comparison, in the original scale, some of these values were reported as follows: RMSEA 0.06, SRMR 0.07, CFI 0.91 (Pop *et al.* 2011). It could be asserted that fit indexes obtained in this study had generally close values to original study. In the literature, it is stated that the RMSEA and SRMR values should be below 0.08; similarly, the GFI, AGFI and CFI values should be above 0.9 (Schumacker & Lomax 2010, Waltz *et al.* 2010, Wang & Wang 2012). It could be thought that fit index values obtained in this study were within desired limits and complied with data set of the model.

As cited by Harrington (2009), factor loads should not be below 0.30 in the CFA. Results of 0.71 and above are excellent, 0.63 very good, 0.55 good, 0.45 acceptable and 0.32 is poor. In this study, the factor loads in CFA varied between 0.39 and 0.73. Fit indexes, factor loads and t values were sufficient in the CFA. Since fit indexes were at a sufficient level in the study, no modification was performed. As a consequence, the two-factor structure of the TPDS with 16 items is convenient for the model and provides the construct validity of the scale.

In the reliability study of the TPDS, the item analysis method was used and Cronbach's alpha coefficient was calculated for the purpose of measuring the internal consistency and homogeneity. Cronbach's alpha coefficient is an internal consistency estimation method for Likert-type scales. The higher the Cronbach's alpha coefficient of a scale is, the increased possibility for a scale to involve consistent items measuring the elements of the same feature becomes (Akgül 2003). In this study, it was determined that the total Cronbach's alpha coefficient of the scale was 0.83, and while the subscale of 'PI' was 0.72, the subscale of 'NA' was 0.83. In the original scale, in contrast, the total alpha is 0.78, and while the subscale of 'PI' is 0.80, the subscale of 'NA' is 0.81 (Pop *et al.* 2011). The literature asserts that when the Cronbach's alpha coefficient is between 0.60 and 0.80, this is sufficient to be used in research (Akgül 2003). In this case, it could be asserted that internal validity of the scale is sufficient. However, it should be kept in mind that it is required to reassess internal validity in the future studies in which this scale would be performed.

Another internal consistency criterion is the item total correlation. As the item total score correlation increases, the efficiency of that item increases; when the correlation coefficient is low, scale items are not reliable enough (Akgül 2003). In order to consider an item as acceptable, the item total correlation coefficient needs to be positive and at a minimum of 0.20. Items with a total item correlation coefficient lower than 0.20 should be excluded from the scale as they decrease the reliability (Öner 1997). In this study, the

item total correlations varied between 0.30 and 0.63. Item total correlations of all items were sufficient.

Cut-off points of the original scale were >17 for the overall scale, >12 for its subscale 'NA' and >7 for its subscale 'PI'. Scores determined for cut-off points were calculated according to the 90th percentile. Regarding whether cut-off point should be the same with cut-off point of original scale or it should be recalculated in its Turkish version, opinions of researchers developing the scale were taken via e-mail. Cut-off point was determined again for Turkish society in this study. The point corresponding to 90th percentile of total point was accepted as cut-off point. In conclusion, in the current study, the cut-off points were determined as 28 for the overall scale score, 10 for the subscale of 'PI' and 22 for the subscale of 'NA'. The fact that cut-off points of original and Turkish versions of the scale are different is thought that this scale shows different sensitivity in both languages. Moreover, this difference could be associated with different distress thresholds in both societies.

Conclusion

In consequence of this study, the TPDS was determined to be a valid and reliable instrument for use in a Turkish sample. The consistency of the TPDS was adequate. The TPDS could be used as a helpful instrument in the early

diagnosis of distress in pregnant women and examination of factors affecting the distress.

Relevance to clinical practice

Psychological distress in pregnancy is an important condition to be monitored in terms of mother, infant and family health. The importance given to distress during pregnancy, however, lags behind postpartum depression. The TPDS will therefore be a useful tool to highlight an important problem through a faster and more objective evaluation of those at risk of pregnancy distress. The TPDS is a very important measurement instrument in terms of determining personal, gestational, social and psychological factors that might play a role in the development of distress during pregnancy, and for developing constant and systematic diagnostic approaches to determine this in routine pregnancy monitoring. To conduct studies related to distress control in pregnancy, to subsequently determine those who are at risk and to enable these pregnant women to take necessary precautions will decrease the adverse effects of distress.

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