

## Research Article

## Adaptation of the Prenatal Comfort Scale into Turkish: A Validity and Reliability Study

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## Abstract

**AIM:** This study aims to test the validity and the reliability of the Turkish version of the Prenatal Comfort Scale.**METHOD:** The sample of this methodological study included 260 pregnant women presenting to a prenatal screening outpatient clinic. The Prenatal Comfort Scale included 15 items and 5 subscales. Internal consistency analysis, item-total score correlations, and confirmatory factor analysis with Lisrel (8.51) were used to test the reliability of the scale.**RESULTS:** The internal consistency Cronbach's alpha value was .86 for the Prenatal Comfort Scale and .78, .79, .82, .69, and .60 for the subscales. The item-total score correlation coefficients ranged from .32 to .66 ( $r = .32-.66$ ). A factor analysis was made to evaluate consistency between the Turkish version of the scale and the original scale. The second item loaded on interacting with fetal movements in the original scale was found to load on recognizing changes during pregnancy in the Turkish version of the scale.**CONCLUSION:** The Turkish version of the Prenatal Comfort Scale was found to have sufficient compatibility. It is also a valid and reliable scale.**Keywords:** Pregnancy, Prenatal Comfort Scale, Turkish version, validity and reliability

## Introduction

Pregnancy is a period when psychological, physiological, and emotional changes are experienced, and the comfort of women decreases. Women's relationships with their spouses and social environments can be affected. Pregnant women should be able to adapt to all these changes. The difficulties they experience in adapting to the changes lead them to feel stressed out (Stojanowa et al., 2017). Prenatal stress can result from physiological, psychosocial, environmental, and economic factors (Dunkel, 2011). Low socio-economic status, unemployment, low education levels, being a single parent, and relationship problems between spouses are the factors that increase prenatal stress (O'Hara & Wisner, 2014). Insufficient familial and spousal support increases anxiety and depression in pregnancy (Cheng et al., 2016). It has been reported that the frequency of prenatal anxiety is 25% in the first trimester (Verly-Miguel et al., 2015) and 21% in the third trimester (Kang et al., 2016). The rate of

anxiety, increasing up to 30%, can decrease to 24.6% 4–6 weeks after labor and 16.2% in the 6th month after labor (Yildiz et al., 2017).

Comfort means a state of ease, free from physical, mental, and social stress. The comfort theory underlines helping to give care to reduce and/or eliminate stress and pain and improve comfort in patients (Bergman & Bergman, 2013; Kolcaba & DiMarco, 2005). Studies directed toward perinatal comfort levels have used the labor comfort scale (Potur et al., 2015) and the postnatal comfort scale (Karakaplan & Yıldız, 2010; Schuling et al., 2011). Low comfort can cause depression and reduce self-respect and life satisfaction. It may lead to pregnancy related complications, preterm labor, and low birth weight (Matvienko-Sikar, & Dockray, 2016). Increasing the comfort of pregnant women can help them to develop self-confidence and increase life satisfaction. Acquiring motherhood roles has positive effects on spousal and marital relationships. Increased comfort facilitates adaptation of women to their moth-

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erhood roles after labor and mother–baby bonding (Nakamura et al., 2015). The prenatal comfort scale (PCS) can be used as an objective evaluation tool to plan and implement physical, mental, and social services for pregnant women. This study aimed to test the validity and the reliability of the PCS for the Turkish population.

### Research Questions

1. Is the Prenatal Comfort Scale a suitable scale for the Turkish population?
2. Is the Prenatal Comfort Scale a valid reliable scale to determine the comfort levels of third trimester pregnant women?

## Method

### Study Design

This was a methodological study.

### Sample

The study was performed at the prenatal outpatient clinics of a hospital in a city in Middle Anatolia in Turkey between October 2016 and January 2017.

Sample size is an important factor in obtaining correct results in confirmatory factor analysis (Waltz et al., 2010). In the literature, it is stated that a sample size of twenty times the number of items is preferred, but ten times the number of items is sufficient (Andrew et al., 2011; Kline, 2005). Accordingly, 260 pregnant women were included in the study, based on the minimum 150 and maximum 300 range in the scale with 15 items. The sample consisted of 260 pregnant women presenting to the prenatal outpatient clinics of the hospital and fulfilling the following inclusion criteria: being in the third trimester, having a singleton, not having any risks of pregnancy (preeclampsia, placenta previa, etc.), and accepting to participate in the study. The PCS, to be adapted into Turkish, included 15 items.

### Data Collection

The data were collected at face-to-face interviews with the participants, satisfying the inclusion criteria, in a room reserved beforehand in the prenatal outpatient clinic. The data collection tools were completed by the participants and took 10 minutes on average. The scale was tested and retested on 30 people at a 2-week interval to evaluate its reliability across time.

### Data Collection Tools

The data were collected with the pregnancy information form and the PCS.

### The Pregnancy Information Form

The form was prepared by the researchers and included 14 questions about socio-demographic and obstetric features including age, education, occupation, number of pregnancies, and labor.

### Prenatal Comfort Scale

The PCS was developed by Takeishi et al. (2011) in Japan to determine prenatal comfort. The first version of the scale comprised 34 items. It was revised, and the number of the items was reduced to 15 by Nakamura et al. (2015). The short form of the PCS included 15 items and 5 subscales; deepening relationships with the husband going to be a father - husband, interacting with fetal movements - fetus, social support from people around - people, realization of becoming a mother and attachment with the baby - mother, and recognizing changes in pregnancy - myself. It is a 6-point Likert scale: 0 corresponding to completely disagree, 1 disagree, 2 indecisive, 3 partly agree, 4 agree, and 5 completely agree. None of the items are scored in the reverse order, and there is no cut-off value of the scale. The maximum score for the scale is 75. Low scores indicate low comfort levels and vice versa. The alpha internal consistency reliability of all the items was .95 and ranged from .81 to .92 for its subscales (Takeishi et al., 2011).

### Statistical Analysis

The data were analyzed with the IBM Statistical Package for Social Sciences (IBM SPSS Corp., Armonk, NY, USA) version 22.0 and Lisrel 8.51. Lisrel (8.51) was used to perform confirmatory factor analysis. The data about the descriptive characteristics of the participants were analyzed with the descriptive statistics number, percentage, mean, and standard deviation. Content validity index (CVI) was used to evaluate expert opinions. Kendall W test (Kendall coefficient of concordance) was used to evaluate consistency between expert opinions. Spearman's product moment correlation analysis was used for item analysis and Cronbach's alpha coefficient to test internal consistency. T test for dependent groups was used to test the reliability of the scale across time.

### Ethical Considerations

A written permission was obtained from Nakamura, one of the authors revising the original PCS and forming its short version including 15 items (Nakamura et al., 2015), through e-mail to adapt the

scale to Turkish. Ethical approval was obtained from the ethical board of Cankiri Karatekin University (approval date: 22.12.2016 and approval number: 2016/16). Written permission was also obtained from the hospital where the study was conducted. The interviews were scheduled appropriately so that they did not interrupt other procedures they had in the hospital. The aim of the study and publication of the obtained data for scientific purposes without using participants' names were explained to the participants, and their verbal consent was taken in accordance with the Declaration of Helsinki.

## Results

The mean age of the women was  $28.71 \pm 5.50$  years (range: 20–43). A total of 90.8% of the women were housewives, 39.7% were primary school graduates, and 81.9% had a nuclear family. A total of 56.2% of the women thought their income was equal to their expenses; 77.7% of the women were nulliparous, and 52.7% of the women were going to have a boy. All of the women reported to receive prenatal care. The mean gestational age of the women was  $33.89 \pm 5.06$  weeks (range: 20–41).

### Linguistic Validity

The PCS was translated into Turkish and then back to Japanese by a certified Japanese translator (recommended by the Japanese Consulate in Turkey) and a lecturer from the language and literature department of a Japanese university. The obtained Turkish version and the Japanese version of the scale were sent to Nakamura, and her suggestions were requested. Adaptation of the scale into Turkish was performed in accordance with the intercultural adaptation process recommended by Gjersing et al. (2010) (Table 1).

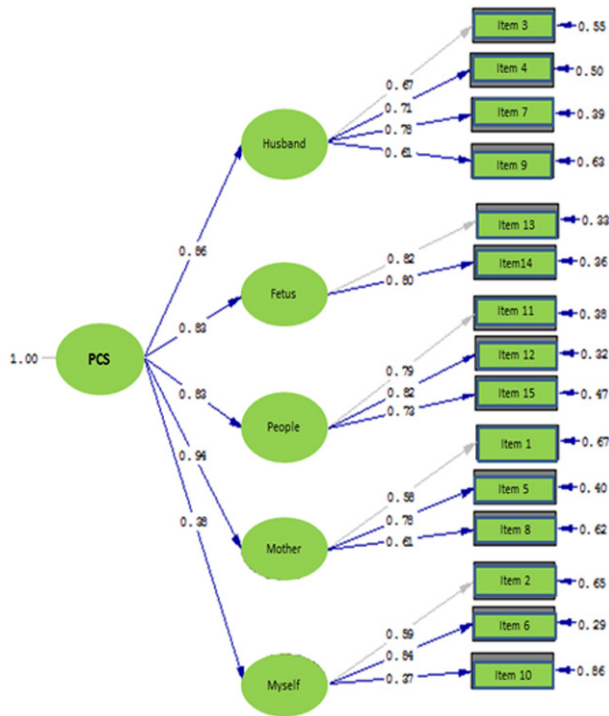
### Content Validity

After the linguistic validity of the scale was achieved, expert opinion was obtained to achieve the content validity of the Turkish version. A total of six experts specializing in obstetrics and gynecology evaluated discriminatory power, clarity, relevance, and cultural appropriateness of the items by using CVI. The experts were asked to rate the items according to the following: 1-unacceptable, 2-somewhat acceptable (the wording of the item should be revised), 3-acceptable but minor changes are necessary, and 4-acceptable. According to the expert opinion, based on Davis technique, the total item validity was

**Table 1**  
*Intercultural Adaptation Process Recommended by Gjersing et al., 2010*

Examination of conceptual and item equivalence	Literature review Evaluation of the scale by experts Evaluation of members of the target population (pretest)
Translating the original scale into Turkish	The first translator: Japanese translator working in a translation agency The second translator: Lecturer in the Department of Japanese Language and Literature at a university
Back-translating the Turkish version into Japanese	The first translator: a translator recommended by the Japanese Consulate in Turkey The second translator: Lecturer in the Department of Japanese Language and Literature at a university
A synthesized back-translated version Receiving expert opinion	Evaluation of the back-translated version of the scale by the authors developing the original version Receiving expert opinion for discrimination, understandability, appropriateness for purpose, and cultural appropriateness from 6 experts specializing in obstetrics and gynecology
Piloting the scale	Piloting the scale on 20 women for test-retest
Revising the scale	Deciding to use the scale as no problems regarding the items were reported
Evaluating sufficiency of the scale to use	Determining content validity index for evaluation of expert opinions
Main study	Receiving permission from Takeishi et al., developing the scale to adapt it into Turkish, obtaining approval from the ethical board of the university, taking written permission from the administration of the hospital where the study was performed and implementing the scale in 260 pregnant women
Exploratory and confirmatory analysis	Confirming the factor structure with confirmatory analysis
Final version of the scale	15 items and 5 subscales

1 for all the items in the scale. At this stage, none of the items were removed. Recommended revisions were made in the items (Davis, 1992).



Chi-Square=198.64, df=85, P-value=0.00000, RMSEA=0.072

**Figure 1**  
PCS Confirmatory Factor Analysis Diagram

**Table 2**  
Goodness of Fit Index for Possible Models and the Structural Model

PCS		Cronbach Alpha for the PCS	Cronbach Alpha for Subscales	Item Total Score Correlation
Model 1	15 items (their original versions)	.86	.33–.82	25–65
Model 2	15 items (the second item on myself)	.86	.60–.82	25–65
Model 3	14 items (with the second item removed)	.87	.45–.82	33–84

Note. PCS = Prenatal comfort scale

**Table 3**  
Cronbach's Alpha for the PCS and its Subscales

PCS and its Subscales	Cronbach's Alpha
Husband "deepening relationships with the husband growing to father"	.78
Fetus "interacting with fetal movements"	.79
People "social support from people around"	.82
Mother "realization of becoming a mother and attachment with the baby"	.69
Myself "recognizing changes in pregnancy"	.60
Prenatal Comfort Scale	.86

Note. PCS = Prenatal comfort scale

Kendall coefficient of concordance (Kendall W) test was used to evaluate consistency in applicability and understandability of the items of the PCS with 6 expert opinions. The opinions were found to be significantly consistent (KW = .107,  $p = .832$ ). A significant  $p$  value ( $p < .05$ ) in Kendall W test shows inconsistency between expert opinions, where an insignificant  $p$  value ( $p > .05$ ) indicates consistency between the opinions (Drost, 2011). In this study, as the Kendall W test result ranged between .10 and .30, the experts were found to have a moderate agreement.

**Confirmatory Factor Analysis of the PCS**

Lisrel (8.51) was used to perform confirmatory factor analysis. The factor structure of the original scale was evaluated. The second item loaded on the subscale fetus in the original scale was found to load on the subscale myself in the Turkish version. The factor load of the Turkish version ranged from .37 to .84 with  $\chi^2 = 198.64$ ,  $df = 85$ ,  $RMSEA = .072$ ,  $GFI = .91$ ,  $IFI = .92$ , and  $CFI = .92$ . The Turkish version with this factor structure had sufficient consistency (Figure 1).

In model 2, Cronbach's alpha was found to be .60 as the second item in fetus in the original scale was loaded on myself in the Turkish version (Table 2). In model 3, the reliability analysis made after removal of the second item showed that Cronbach's alpha was .45 with item 2 on myself (items 6–10). Model 3

provided a better fit for the overall scale, but model 2 had higher reliability (Table 2).

### Internal Consistency of the PCS

Cronbach's alpha, appropriate for Likert scales, was used to evaluate the internal consistency of the PCS. When all the items of the scale were analyzed, Cronbach's alpha was found to be .86. Cronbach's alpha ranged from .60 to .82 for the subscales (Table 3).

Item-total score correlations were performed to determine the reliability of the Turkish version of the PCS. Correlation coefficients (Spearman product moment correlation) ranged between  $r = .37$  and  $.66$ . There was a significant positive relation between the item scores and the total score for the PCS (Table 4).

**Table 4**  
*Item-Total Correlations for the PCS*

Items	$r^*$	$p$
Item 1	.54	.000
Item 2	.37	.000
Item 3	.55	.000
Item 4	.52	.000
Item 5	.61	.000
Item 6	.52	.001
Item 7	.61	.000
Item 8	.50	.000
Item 9	.58	.000
Item 10	.57	.000
Item 11	.56	.000
Item 12	.56	.000
Item 13	.50	.000
Item 14	.55	.000
Item 15	.66	.000

**Table 5**  
*Comparison and Correlations between Test-Retest Scores for the PCS and its Subscales*

	Pretest Mean $\pm$ SD	Retest Mean $\pm$ SD	t	$p$	r	$p$
PCS	63.87 $\pm$ 7.36	66.80 $\pm$ 3.76	-3.168	.004	.771	.000
Husband	17.47 $\pm$ 2.34	18.00 $\pm$ 1.23	-1.504	.144	.561	.001
Fetus	8.93 $\pm$ 1.20	9.07 $\pm$ .91	-.812	.423	.669	.000
People	12.83 $\pm$ 1.78	13.47 $\pm$ 1.22	-2.520	.018	.637	.000
Mother	13.07 $\pm$ 1.80	13.33 $\pm$ 1.06	-1.216	.234	.764	.000
Myself	11.57 $\pm$ 1.92	12.93 $\pm$ 1.23	-4.227	.000	.439	.015

Note. T = t-test for dependent group; r = Pearson product moment correlation; PCS = Prenatal comfort scale

### Comparison and Correlations between Test-Retest Scores for the PCS

Test-retest measures of the PCS were evaluated by using Pearson product moment correlation and t-test for dependent groups. The relation between the scores for the first administration and those for the second administration of the PCS was analyzed to determine the reliability of the scale and its subscales. There was a significant, strong positive relation between Cronbach's alpha coefficients for the 2 measures made at 2-week intervals (.44-.77). High correlation coefficients indicate the power of consistency between the 2 administrations of the scale. The mean test-retest scores for the subscales Husband, Fetus, and Mother did not have significantly similar distributions ( $p > .05$ ). The mean scores for the scale and its subscales people and myself had a significant distribution ( $p < .05$ ) (Table 5).

### Discussion

Scales developed in one language and culture are adapted to other languages and cultures (Beaton et al., 2000; Vieira, 2011). In this study, the PCS was adapted from Japanese to Turkish, and the Turkish version of the scale was found to have good psychometric properties. The primary characteristics of a good measurement tool are that it has validity and reliability (Esin, 2014).

Prior to adapting a scale to another culture, permission must first be obtained from the authors who created that scale. In this study, a written permission was obtained through e-mail from the authors who developed the PCS. Translation of a scale into another language changes the nature of that scale. Back translation has been reported to be the most frequently used to achieve cultural equality between the original and adapted versions of a scale (Esin,

2014). In this study, the Turkish version of the PCS was back translated into Japanese to obtain cultural equality.

Content validity refers to a method used to determine whether a scale and its subscales measure the construct they are supposed to test. To achieve content validity, expert opinion is requested from an expert group of 3–20 experts specializing in the relevant field of study (Esin, 2014; Polit & Beck, 2014; Vieira, 2011). In this study, six experts were requested to provide their opinions about discriminatory power, understandability, appropriateness for purpose, and cultural appropriateness of the scale. The CVI based on the scores ranging from 1 to 4 and assigned by the experts was found to be 1 for all the items. The expert opinions obtained for the scale were significantly consistent ( $KW = .107, p = .832$ ). A significant  $p$  value indicates a lack of consistency ( $p < .05$ ) whereas an insignificant  $p$  value shows consistency between expert opinions ( $p > .05$ ) (Vieira, 2011). The results of the Kendal W analysis did not show significant differences between the views of the experts, which indicated content validity (Strauss & Smith, 2009). This suggests that the expert opinions were consistent and that the PCS was appropriate for the Turkish culture.

The study sample comprised 260 pregnant women presenting to prenatal outpatient clinics of a hospital and meeting the inclusion criteria. Sample size is an important factor that plays a role in obtaining accurate results in a confirmatory factor analysis (Waltz et al., 2010). Kline (2005) stated that the sample size should be 10 times the number of items in a scale. Andrew et al., (2011) have reported that the sample size, which is 20 times the number of items, was preferable but the size of 10 times the number of items was sufficient. The sample size of this study is consistent with the literature.

The factor load of the original scale varied from .37 to .84 with  $c^2 = 198.64, df = 85, RMSEA = .072, GFI = .91, IFI = .92, \text{ and } CFI = .92$ . As Harrington (2009) reported, factor loads of a scale should not be lower than .30. The factor loads of .71 and more than .71 are excellent, a factor of load of .63 is very good, a factor load of .55 is good, a factor load of .45 is acceptable, and a factor load of .32 is weak (Harrington, 2009). GFI changes from 0 to 1, and GFI of over .90 indicates a good model (Hoyle, 2012; Munro, 2005). An acceptable RMSEA should be  $< .08$ . CFI of  $> .90$  is

acceptable (Hoyle, 2012). Accordingly, because the goodness of fit measurements showed good and acceptable fit, and because the adjusted chi-squared value was a good fit, study data fit the model well, thereby proving the model to be both statistically significant and valid (Harrington, 2009).

Internal consistency shows the extent to which questions directed to measure a field are homogeneous and whether the questions really measure the construct they are supposed to measure. Each item of a scale should be examined to determine whether they measure the same behavior. The most appropriate method for this is the calculation of Cronbach's alpha coefficient. This measure is frequently used to determine internal consistency of Likert scales (Polit & Beck, 2014). Total score analyses indicating reliability of each item in adapted scales is the method employed for evaluation of internal consistency. If items of a scale have equal importance and are in the form of independent units, correlation coefficients between each item and the scale are expected to be high. It has been reported that Cronbach's alpha coefficient ranges from 0 to 1. Cronbach's alpha of  $.60 \leq \alpha < .80$  is considerably reliable, and Cronbach's alpha of  $.80 \leq \alpha < 1.00$  is extremely reliable (Polit & Beck, 2014). Cronbach's alpha coefficient, considered appropriate for all Likert scales, was used to evaluate internal consistency of the PCS. When all the items were analyzed, Cronbach's alpha was .86. It was reported to be .95 for all the items of the original scale and ranged from .81 to .92 for its five subscales (Takeishi et al., 2011). Cronbach's alpha found in this study is consistent with that of the original scale.

The higher the correlation coefficients, the more significant the relation of an item with the quality supposed to be measured. A weak relationship of an item with the total score for the scale suggests that the item measures a quality different from the one measured by the other items and is not reliable and should be deleted from the scale. The items with an item-total correlation of over .30 are considered as acceptable (Büyüköztürk et al., 2012; Hoyle, 2012). The correlation coefficients for the PCS ranged from .37 to .66 (Spearman product moment correlation), and there was a significant, positive relation between item-total scores and total scores for the scale.

Test-retest is administration of a measurement tool to the same group of subjects under the same conditions two times at an interval, which prevents the

subjects from remembering items to a great extent and does not prevent important changes in the construct to be measured. The correlation coefficient for the two administrations is the reliability coefficient for the scale (Polit & Beck, 2014). Test-retest reliability indicates an ability of a scale to give consistent results across time. To determine the reliability, the correlation between scores for two administrations is calculated. The resultant correlation provides the reliability coefficient for the retest. The correlation coefficient shows stability of measures obtained from the test and indicates that there is not a great change in the quality measured between the two measurements across times (Polit & Beck, 2014). It may range between 0 and 1. The obtained correlation coefficient ( $r$ ) should be close to 1 and at least higher than .70 (Esin, 2014). It is recommended that Likert scales should be administered to the same group at 2-week intervals (Hoyle, 2012; Polit & Beck, 2014). The mean score from test-retest of the PCS completed by 30 pregnant women at 2-week intervals were compared with  $t$  test for dependent groups to evaluate its reliability across time. There was a significant difference between the mean score for the PCS and the mean scores for its subscales people and myself ( $p < .05$ ). However, there was not a significant difference between the scores for husband, fetus, and mother ( $p > .05$ ). The exploration of the relation between the scores for the PCS and its subscales in the first and the second administrations with Pearson correlation analysis revealed that the reliability coefficient ranged from .44 and .77 for the 2 administrations of the scale at 2-week intervals. The insignificant relation between the test-retest scores for husband, fetus, and mother supports the idea that these subscales are reliable across time. However, the presence of a statistical difference between the score for the PCS and the scores for people and myself shows that the relation between the test-retest scores were affected across time. Owing to the nature of pregnancy, many physiological, psychological, and social changes are experienced, and they differ between gestational weeks. This can explain the changes in the total score for the PCS and in the scores for its 2 subscales, people and myself.

### Conclusion and Recommendations

The Turkish version of the PCS, composed of 15 items, was found to be easily understood and complete. It is a valid and reliable tool to determine comfort levels in pregnant women. The scale could also be used to de-

termine prenatal comfort in pregnant women at risk. The self-esteem and life satisfaction of the expectant mother will increase, and pregnancy complications such as preterm labor and low birth weight infants will decrease. Increased comfort will also facilitate the adaptation of the postpartum woman to the role of motherhood and the mother-infant attachment.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Çankırı Karatekin University (approval date: 22.12.2016 and approval number: 2016/16).

**Informed Consent:** Written informed consent was obtained from participants who participated in this study.

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**Conflict of Interest:** The authors have no conflicts of interest to declare.

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