

## Validity and reliability study of the Turkish version of the Pregnancy-Related Empowerment Scale

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### ABSTRACT

**Purpose:** This study was conducted to determine the validity and reliability of the Turkish version of the Pregnancy-Related Empowerment Scale.

**Materials and methods:** The methodological study was carried out with 202 pregnant women who applied to the pregnancy polyclinic of a state hospital affiliated with the Ministry of Health in Izmir between June 1 and December 31, 2020. Primarily, the language validity of the scale was ensured. Content validity was achieved using the Davis technique. Exploratory factor analysis, confirmatory factor analysis, Cronbach Alpha reliability coefficient, item-total correlation, and test-retest were performed for the validity and reliability of the scale.

**Results:** In the study, all scale items' content validity index (CVI) values were above 0.80. After the exploratory factor analysis, the 5th, 6th, and seventh items of the original scale were excluded because of

overlapping. The scale was reduced to 13 items gathered under four factors (provider connectedness, skillful decision making, peer connectedness, gaining Voice). The Pregnancy-Related Empowerment Scale explained 80.12% of the total Variance. Kaiser-Meyer-Olkin value was 0.882; Bartlett's Test of sphericity was determined as  $\chi^2=1900.285$ . The total Cronbach Alpha reliability coefficient was  $\alpha=0.917$ . It was observed that repeated measurements were correlated, and consistent results were obtained in the intervening time ( $p<0.05$ ). As a result of the item-total correlation test, the correlation scores were found to vary between 0.626 and 0.860.

**Conclusions:** The 13-item Pregnancy-Related Empowerment Scale was determined to be a valid and reliable measurement tool for Turkish society.

**Keywords:** Validity, reliability, scale Pregnancy, empowerment, Prenatal care, Nursing

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## INTRODUCTION

The concept of power comes from the Latin word "potere"; the word "power" is defined as to be able [1]. The purpose of empowerment is to take control in order for one to shape his/her life [2]. The concept of power and empowerment is used in many different areas. Empowerment for women and families with children can be defined as increasing knowledge and capacity for health-related decision-making, raising awareness of health and vitality rights, improving social support opportunities, improving the quality of health services, and establishing relations with health care providers [3].

The biomedical model has been used in patient care from past to present. The approach in this model involves ignoring the patient's characteristics, not allowing the patient to make decisions about him/herself, and asking the patient to act based on the direction of a healthcare professional. The other approach is the empowerment model. In this model, healthcare professionals respect patients, help them make meaningful decisions, care about patients' opinions about their lives during the treatment process, and take joint responsibility. Patients are encouraged to act autonomously through shared information and cooperation in the decision-making process [4,5].

Pregnancy is the most important period requiring empowerment for maternal and infant health [6].

Patient-centered care, which provides individuals the power to control their health, can improve health outcomes, especially during pregnancy [3].

Empowerment of pregnant women has a positive effect in having a good experience at birth and adapting to the motherhood role after birth [7,8]. In this context, prenatal care services come into prominence. Prenatal training is provided in most western countries to empower and support parents and thus help them cope with changes [9].

Physicians, nurses, and midwives take charge of the planning and implementation of prenatal care services and improving the quality of training in our country [10].

Pregnant women are supported to become powerful with the training provided in childbirth preparation classes or pregnant schools. It is essential to determine the effectiveness of training programs and to plan accordingly. For this reason, there is a need for a measurement tool for healthcare professionals who provide prenatal care to determine the self-efficacy and empowerment levels of pregnant women. Unfortunately, there is no pregnancy-related empowerment scale adapted to our country. In this context, the study aimed to test the validity and reliability of the Turkish version of the Pregnancy-related Empowerment Scale (PRES).

## MATERIALS AND METHODS

### *Research design, place, and participants*

This methodological research was conducted with 202 pregnant women who applied to the pregnancy outpatient clinic of a state hospital affiliated with the Ministry of Health, in İzmir between June 1 and December 31, 2020, who participated in distance pregnancy school training, who was aged over 18, were in the gestational week of 21 and above, who had internet access, who watched at least 10 videos in distance training, and who voluntarily agreed to participate in the study. During the COVID-19 pandemic, pregnant schools suspended face-to-face education and started to carry out distance learning over the online system with a directive published by the Ministry of Health on May 12, 2020. For these training programs, pregnant women were directed to the website of the Ministry of Health, General Directorate of Public Hospitals. There are 27 distance learning videos on this website. (<https://khgm.saglik.gov.tr/TR,65461/uzaktan-egitim-gebe-okulu.html>) All state hospitals in Turkey benefit from the videos on this website for pregnancy school training. Pregnant women who volunteered to participate in the study were informed to watch at least ten videos.

### *Data collection tools*

The data collection tool used in the study consists of two parts. The first part includes an information form on sociodemographic characteristics, and the second part includes the "Pregnancy-Related Empowerment Scale". The data were collected as follows. Surveys were sent to the participants via WhatsApp. Two hundred ten pregnant women were included in the study, but the study was completed with 202 pregnant women as 1 of the pregnant women had a premature birth; 1 wanted to withdraw; 3 did not respond to phone calls and messages; 3 did not watch at least 10 videos.

### *Individual Introduction Form*

The form consists of 11 questions regarding the descriptive characteristics of pregnant women (age, gestational week, number of pregnancies, number of births, education status, income status, "did you watch all videos in distance learning?", "which videos did you not watch?", "which video did you find most useful?", etc.).

### *Pregnancy-Related Empowerment Scale (PRES)*

The scale was developed originally in English and Spanish by Klima et al. (2015) to measure empowerment in pregnant women given prenatal care. It is designed as a four-category scale and consists of 16 items with positive statements, which are ranked from strongly disagree (1) to agree strongly (4). The scale consists of 4 subscales:

provider connectedness, skillful decision making, peer connectedness, and gaining Voice. The lowest score obtainable from the scale is 16, and the highest score is 64 the degree of empowerment in pregnant women increases as the scale score increases. The Cronbach alpha coefficient for the English version of the scale is 0.91 [3].

### **Validity**

**Language validity:** It is the first step in validity and reliability studies. Language validity was ensured in line with the guideline published by the International Test Commission [11].

Six experts translated PRES from English to Turkish; the translations were then analyzed and integrated into a single scale. Later, the items of this scale were back-translated from Turkish to English by three linguists. Three English scales were analyzed and integrated into a single scale. The final English scale, whose translation was accepted, was sent to the original scale's author and obtained author approval [12].

After the translation process, a pilot application was made with 32 pregnant women who met the inclusion criteria through face-to-face interviews in order to determine the intelligibility of the scale items by pregnant women. The data of the pilot study were not included in the sample.

**Content validity:** Opinions of 17 experts were received, and the Davis technique was used to ensure the scale's content validity [13]. According to the expert opinions, content validity indices were calculated using the Davis technique, and arrangements were made.

**Construct validity:** Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to ensure construct validity. "Kaiser-Meyer-Olkin (KMO) test and Bartlett's Sphericity Test" were used to test the suitability of the data structure for factorization.

### **Reliability**

**Internal consistency:** The Cronbach alpha reliability coefficient was calculated for the scale and its subscales. The accepted value for the Cronbach alpha coefficient is at least 0.70 [14].

**Test-retest reliability:** It was used to measure the invariance or stability of the scale. For the reliability analysis of the scale, the test-retest method should be applied to at least 50 individuals and at least 15 days later [15]. For the reliability analysis, test-retest was applied to 50 voluntary pregnant women 15 days later.

### **Statistical analysis**

The data collected were analyzed in the Statistical Package for the Social Sciences (SPSS) 25 and AMOS programs. Percentage and mean were used for descriptive statistics; Skewness-Kurtosis normality test was used to determine the fitness of

the data to normal distribution; content validity index was calculated for the compatibility analysis of expert opinions; Kaiser-Mayer-Olkin index (KMO) and Bartlett's test were used to test the suitability of sample size for factorization; exploratory factor analysis (EFA) was used to determine item-factor correlation; confirmatory factor analysis (CFA) was used to determine whether scale items and subscales explained the original structure of the scale; Cronbach  $\alpha$  coefficient and test-retest were used to determine the reliability of the scale and its subscales; Spearman's product-moment correlation analysis was used to determine the correlations between the subscales and total scale score.

### **Research ethics**

Written permission was received via e-mail from Professor Carrie S. Klima, who developed PRES. Ethics Committee approval (dated 09/10/2019 and numbered 2019-14-36) and institutional permission were obtained for the study. Written informed consent was taken from the voluntary pregnant women who participated in the study. The study was carried out in accordance with the principles of the Declaration of Helsinki.

## **RESULTS**

### **Sample characteristics**

The mean age of the pregnant women was  $25.98 \pm 5.08$ ; the mean duration of marriage was  $5.76 \pm 4.44$ ; the mean gestation week was  $31.96 \pm 3.43$ ; the mean number of pregnancies was  $1.73 \pm 0.93$ . Of the pregnant women, 50.0% were secondary school graduates; 79.7% were not employed; the monthly income of 54.5% was between and 2001 and 3000 TRY; 52.5% had their first pregnancy; 77.2% had not had miscarriage or abortion; 25.2% had a living child. 81.7% ( $n=165$ ) of the pregnant women watched all of the distance learning videos whereas 18.3% ( $n=37$ ) watched at least 10 videos but could not watch all of them (Table 1).

### **Validity**

The content validity index (CVI) values varied between 0.82 and 1.00, that is, above 0.80 [16]. In the study, the result of KMO analysis was 0.88 and the Chi-square value was  $\chi^2(78)=1900.285$  in Bartlett's sphericity test.

The scale, which has 4 subscales and 16 items in its original language, was found to be suitable for a structure with 4 subscales and 13 items in Turkish. Three items (5th, 6th, 7th) in the original scale were excluded since they were overlapping. Factor loads of the items varied between 0.67 and 0.87. The contribution of the factors to the total Variance was 80.12% (Table 2).

Given the results of the four-factor model, RMSEA (0.08) and NFI (0.93) showed acceptable fit whereas  $\chi^2$  (2.53), GFI (0.90), CFI (0.95), TLI

(0.94), and IFI (0.95) showed excellent fit [17,18] (Table 3).

**Table 1.** Distribution of pregnant women by sociodemographic and obstetric characteristics (n=202)

| Sociodemographic characteristics   |                  | Number (n) | Percentage (%) |
|--|------------------|------------|----------------|
| Age group  | 18-25            | 102        | 50.5           |
|  | 26-43            | 100        | 49.5           |
| Education status   | Primary school   | 27         | 13.4           |
|  | High school      | 44         | 21.8           |
|  | Secondary school | 101        | 50.0           |
|  | University       | 30         | 14.8           |
| Employment status  | Employed         | 41         | 20.3           |
|  | Unemployed       | 161        | 79.7           |
| Monthly income   | 2000 and below   | 25         | 12.3           |
|  | 2001-3000        | 110        | 54.5           |
|  | 3001-4000        | 39         | 19.3           |
|  | 4001 and above   | 28         | 13.9           |
| Could you watch all the videos in the Pregnant School Distance Learning program? | Yes              | 165        | 81.7           |
|  | No               | 37         | 18.3           |
| Mean   | $\bar{X}\pm SD$  | Min-Max    |                |
| Age  | 25.98±5.078      | 18-43      |                |
| Duration of marriage   | 5.76±4.44        | 2-21       |                |
| Gestational week   | 31.96±3.43       | 24-39      |                |
| Number of pregnancies  | 1.73±0.93        | 1-4        |                |
| Number of miscarriages / abortions   | 0.26±0.51        | 0-2        |                |
| Number of births   | 0.55±0.79        | 0-3        |                |
| Number of living children  | 0.52±0.77        | 0-3        |                |

**Table 2.** Exploratory factor analysis results regarding PRES

| Factors and items        | Explained Variance (%) | Factor Load |
|--------------------------|------------------------|-------------|
| <i>Factor 1</i>          |                        |             |
| M16                      | 51.14                  | 0.87        |
| M14                      |                        | 0.86        |
| M15                      |                        | 0.85        |
| M13                      |                        | 0.79        |
| M12                      |                        | 0.74        |
| <i>Factor 2</i>          |                        |             |
| M4                       | 14.84                  | <b>0.87</b> |
| M3                       |                        | 0.86        |
| M2                       |                        | 0.83        |
| M1                       |                        | 0.79        |
| <i>Factor 3</i>          |                        |             |
| M11                      | 9.43                   | 0.84        |
| M10                      |                        | 0.83        |
| <i>Factor 4</i>          |                        |             |
| M9                       | <b>4.71</b>            | 0.80        |
| M8                       |                        | <b>0.67</b> |
| Total Variance Explained | <b>80.12%</b>          |             |

**Table 3.** Confirmatory factor analysis and goodness of fit indices of PRES

| Goodness of Fit Measurements | Excellent Fit              | Acceptable Fit             | Values |
|------------------------------|----------------------------|----------------------------|--------|
| CMIN/Df                      | $0 \leq \chi^2/df \leq 3$  | $3 \leq \chi^2/df \leq 5$  | 2.53   |
| GFI                          | $0.90 \leq GFI$            | $0.80 \leq GFI$            | 0.90   |
| AGFI                         | $0.90 \leq AGFI$           | $0.80 \leq AGFI$           | 0.83   |
| CFI                          | $0.95 \leq CFI$            | $0.85 \leq CFI$            | 0.95   |
| RMSEA                        | $0.0 \leq RMSEA \leq 0.05$ | $0.06 \leq RMSEA \leq 1.0$ | 0.08   |
| NFI                          | $0.95 \leq NFI$            | $0.80 \leq NFI$            | 0.93   |
| TLI                          | $0.90 \leq TLI$            | $0.80 \leq TLI$            | 0.94   |
| IFI                          | $0.95 \leq IFI$            | $0.85 \leq IFI$            | 0.95   |

In order to determine the distinctiveness of the scale items, the raw scores obtained from the scale were ranked from highest to lowest, and the mean scores of the lower 27% and upper 27% groups were compared with the independent group t-test.

As a result of the comparison, a statistically significant difference was determined between the lower and upper groups ( $p < 0.05$ ).

**Reliability**

In the analysis performed to test the internal consistency, the Cronbach alpha reliability

coefficient was  $\alpha_{Total} = 0.92$  for the overall scale. Cronbach alpha values of the subscales were  $\alpha_{provider\ connectedness} = 0.91$ ,  $\alpha_{skillful\ decision\ making} = 0.77$ ,  $\alpha_{peer\ connectedness} = 0.86$ , and  $\alpha_{gaining\ voice} = 0.92$  (Table 4).

The item correlation for the 13 items in the scale varied between 0.74-0.86 for gaining Voice, between 0.74-0.82 for provider connectedness, was 0.75 for peer connectedness, and was 0.63 for skillful decision making ( $p = 0.00$ ) (Table 4).

**Table 4.** Item-total correlation coefficients of PRES

| 13 Items   | Item-Total Correlation (202) |      |
|--|------------------------------|------|
|  | r                            | p    |
| <b>Gaining Voice (<math>\alpha = 0.92</math>)</b>            |                              |      |
| M12  | 0.75                         | 0.00 |
| M13  | 0.79                         | 0.00 |
| M14  | 0.86                         | 0.00 |
| M15  | 0.74                         | 0.00 |
| M16  | 0.82                         | 0.00 |
| <b>Provider Connectedness (<math>\alpha = 0.91</math>)</b>   |                              |      |
| M1   | 0.74                         | 0.00 |
| M2   | 0.80                         | 0.00 |
| M3   | 0.82                         | 0.00 |
| M4   | 0.81                         | 0.00 |
| <b>Peer Connectedness (<math>\alpha = 0.86</math>)</b>       |                              |      |
| M10  | 0.75                         | 0.00 |
| M11  | 0.75                         | 0.00 |
| <b>Skillful Decision Making (<math>\alpha = 0.77</math>)</b> |                              |      |
| M8   | 0.63                         | 0.00 |
| M9   | 0.63                         | 0.00 |
| <b>Total (<math>\alpha = 0.92</math>)</b>                    |                              |      |

Correlation analysis was made between the total scores on the subscales obtained in both applications. The test-retest correlations were statistically significant in the positive direction for

overall scale ( $r=0.75$ ), *provider connectedness* ( $r=0.78$ ), *skillful decision making* ( $r=0.79$ ), *peer connectedness* ( $r=0.74$ ), and *gaining voice* ( $r=0.76$ ) (Table 5).

**Table 5.** Test-retest results

| Subscales                | Retest 1       | Retest 2       | Retest 3       | Retest 4       | Total retest |
|--------------------------|----------------|----------------|----------------|----------------|--------------|
| Provider connectedness   | <b>0.776**</b> | 0.364**        | 0.246          | 0.180          | 0.466**      |
| Skillful decision making | 0.308*         | <b>0.790**</b> | 0.376**        | 0.417**        | 0.696**      |
| Peer connectedness       | 0.202          | 0.350*         | <b>0.738**</b> | 0.341*         | 0.469**      |
| Gaining voice            | 0.154          | 0.404**        | 0.355*         | <b>0.758**</b> | 0.496**      |
| Total                    | 0.413**        | 0.684**        | 0.495**        | 0.488**        | 0.750**      |

## DISCUSSION

Content validity values of the scale were between 0.82 and 1.00. Before determining the scale's factor structure, KMO and Bartlett's sphericity tests were used to test the suitability of the sample size for factorization. It was found that the KMO value was 0.882 and that the sample size was "perfectly suitable" for factor analysis [19].

It was revealed that the result of Bartlett's sphericity test was  $\chi^2(78)=1900.285$  ( $p<0.001$ ) and that the items were suitable for factor analysis. In the study conducted by Aires et al. (2016) in Portugal, the KMO value was 0.815, and Bartlett's sphericity test result was  $\chi^2(351)=1474.82$  ( $p<0.001$ ) [20]. In the study conducted by Borghei et al. (2015) in Iran, it was found that the KMO value was 0.864, and Bartlett's sphericity test result was  $\chi^2=4.394$  ( $p\leq 0.001$ ) [21].

Exploratory factor analysis was performed to examine the factor structure of the scale. According to the factor design, the original scale's 5th, 6th, and 7th items were loaded on other factors or overlapping, thus excluded from the scale [22]. Factor analysis was re-performed, and a four-factor design was created with the remaining 13 items. The contribution of these components to the total Variance was found to be 80.12%.

The factor loads obtained in CFA varied between 0.74-0.92. Since there was no item with a factor load below 0.40, all items were within acceptable limits [19].

In Klima et al.'s (2015) study, the factor loads in the original scale also varied between 0.42-0.86 [3]. No items with a factor load below 0.40 were found in the original scale.

The distinctiveness of the scale items was tested. And there was a statistically significant difference ( $p<0.05$ ) in the distinctiveness of all items. It was determined that the scale is distinctive in terms of measuring the desired quality.

### Reliability

Internal consistency, invariance analysis, and item-total correlation analysis were used to test

the reliability. Cronbach alpha reliability coefficient was used for internal consistency reliability. The Cronbach alpha value was to be  $\alpha=0.92$  for all items. In their study, Klima et al. (2015) reported that the Cronbach alpha value of all items was  $\alpha=0.91$ . In the original scale, which was translated into Spanish, the Cronbach alpha value was  $\alpha=0.93$  [3]. It was stated that a Cronbach alpha value above 0.70 is sufficient for reliability [18]. In this case, it was determined that the reliability was high for both the original and adapted scales. The Cronbach alpha value for all items was reported to be  $\alpha=0.89$  in the study conducted by Kameda et al. (2008) [23],  $\alpha=0.92$  in the study conducted by Borghei et al. (2015) [21], and  $\alpha=0.88$  in the study conducted by Aires et al. (2016) [20]. According to studies, Cronbach alpha coefficients had high reliability in all pregnancy-related empowerment scales.

The test-retest method was used for invariance reliability. It is accepted that a measurement tool must have a test-retest reliability correlation value of at least 0.70 in order to consider it stable [24].

Test-retest reliability correlation values of the subscales of PRES were found to be between 0.74 and 0.79. It was seen that retest measurements were related and that consistent results were obtained in the intervening time ( $p<0.05$ ).

The minimum value required for the item-total correlation to be sufficient is 0.40 [25].

The lowest item-total correlation score of the scale was 0.63 for the 8th and ninth items, and the highest score was 0.86 for the 14th item. When the entire scale was considered, it was seen that the scale provided a high item correlation. In the original scale, the item-total correlation value varied between 0.46 and 0.70 for all items. It was stated that the values varied between 0.37-0.78 in the scale adapted to Spanish [3].

In our study and on the original scale, a value below 0.40 was not reached. In the study conducted by Aires et al. (2016), it was stated that the item-total correlation values of all items varied between 0.23 and 0.57 [20].

## CONCLUSION

The Turkish version of the Pregnancy-Related Empowerment Scale is a valid and reliable measurement tool for Turkish society. The scale can be used in different studies on the empowerment of pregnant women. It can be recommended to apply the scale in pregnant schools and childbirth preparation classes, which are common in our country, to identify and support the shortcomings of pregnant women with low empowerment scores.

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## Conflicts of Interest

The authors declared no conflicts of interest.

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