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# Reliability and validity of the Cambridge Worry Scale in pregnant Turkish women

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# ABSTRACT

*Objective:* this study examined the psychometric properties of the Cambridge Worry Scale (CWS) and assessed worries in pregnant Turkish women.

*Design:* a descriptive, cross sectional study.

Setting: the 35 Family Health Centres located in the Yıldırım sub-province of Bursa.

*Instruments:* the data were collected using the 'Pregnant Information Form', which determines the individual characteristics of the women and the 'CWS', which determines worries. The CWS is a Likert-type scale that consists of 16 items and has four sub-dimensions including the women's own health, relationships, socio-medical and socio-economic conditions. In the CWS, the total score is not calculated, and each article is evaluated in itself.

*Findings:* 200 pregnant women were recruited from December 2010 to November 2011. The mean age of the pregnant women was  $25.92 \pm 5.33$ , 43.0% had completed primary school, and 69.0% were not in paid employment. It has been determined that the content validity index for the Turkish form is 0.98 and that the internal consistency of Cronbach's alpha value of the scale is 0.795. As a result of exploratory factor analysis, it has been concluded that the factor loadings of the scale from 0.435 to 0.902, and it can be used in a particular dimension that is not divided into the components of the scale. On the basis of the confirmatory factor analysis, it has been determined that the Goodness of Fit Index of the one-factor structure is better than four-factor structure, but the values of the goodness fit index in each model are under 0.85 and the inaccuracy of the fit index is high.

*Conclusions:* the Turkish form of the CWS is an appropriate measurement tool in terms of language and content validity, and its single-factor structure can be applied to Turkish culture and can correctly identify the worries of pregnant women.

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# Introduction

Pregnancy is a period in one's life when various emotional fluctuations are experienced alongside happiness, a period in which all emotional, spiritual, and behavioural expectations, conflicts, hopes and desires regarding the role of a mother take front stage (Dülgerler et al., 2005; Erdem et al., 2010; Ertem and Sevil, 2010). While pregnancy and birth are physiological processes, they also put a profound burden and stress on the woman's body (Green et al., 2003; Karaçam and Ançel, 2009). The first trimester is a period of adapting to the fact of pregnancy (Akbaş, 2006).

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http://dx.doi.org/10.1016/j.midw.2014.10.003 0266-6138/© 2014 Elsevier Ltd. All rights reserved. In the second trimester, the baby is considered an independent individual (Körükcü et al., 2010). The third trimester is a period of psychological separation when the woman develops a curiosity about the baby (Georgsson Öhman et al., 2003).

During pregnancy, the woman undergoes biological and psychosocial changes, and along with these come the risk of encountering many sources of anxiety and stress (Virit et al., 2008; Karaçam and Ançel, 2009). Increased anxiety during pregnancy is caused by thoughts of having an anomalous baby, needing intervention during birth, being alone in a foreign environment, doing something wrong, and loss of life during pregnancy or birth. In addition, child care, changes in marital or family life, body image and effect on the relationship with one's spouse, financial difficulties, and added responsibilities may affect anxiety (Homer et al., 2002; Okanlı et al., 2003; Dülgerler et al., 2005; Kitapçıoğlu et al., 2008; Şahin and Kılıçarslan, 2010).





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Because anxiety during pregnancy affects the ongoing biological changes and their results, it is important to determine the anxiety levels of pregnant women (Chung et al., 2001; O'Connor et al., 2002; Green et al., 2003). The Spielberger State-Trait Anxiety Inventory (STAI) has been used in many studies of pregnant women (Grant and Davis, 1997; Green et al., 2003; Petersen et al., 2009). For example, Grant and Davis (1997) have used, STAI to examine maternal anxiety during the process of passage to parenthood. STAI is a relatively short measurement tool that is easy to apply. However, it should be noted that STAI measures anxiety at a given time, and it does not provide information on the specific subject of the anxieties (Green et al., 2003). Thus, Green et al. (2003) developed the Cambridge Worry Scale in 1990 in order to determine and evaluate the worries experienced during pregnancy. In this scale, the general sources of anxiety related to pregnancy were determined, and the scale was applied to 1072 women in the context of the 'Cambridge Parental Scanning Test'. The study proved that the scale was valid and reliable for use in pregnant populations (Green et al., 2003). The scale was later tested for validity and reliability in 2003 in Sweden, Germany, Spain and Greece (Georgsson Öhman et al., 2003; Petersen et al., 2009; Carmona Monge et al., 2012; Gourounti et al., 2012). The importance of using the CWS in studies has increased in recent years (Petersen et al., 2009). This scale has recently been used in many studies (Georgsson Öhman et al., 2004; Waldenström et al., 2004; Hildingsson and Radestad, 2005; Georgsson Öhman et al., 2007; Jomeen and Martin, 2008; Petersen et al., 2009).

This study was carried out to examine the psychometric of the CWS, which could be used in the pregnant Turkish women and determine the factors causing worry in women.

# Methods

# Sample and data collection

Before starting the study, written permission was obtained from Josephine Green, who developed CWS, the institution where the study would be performed. This study was approved by the local Ethical Board. The study, which was planned to be cross sectional, descriptive, and prospective, consisted of pregnant women registered to the 35 Family Health Centres located in the Yıldırım sub-province of Bursa. Data were collected using the 'Information Form for Pregnant Women', which is used to determine the personal characteristics of pregnant women, and the 'Cambridge Worry Scale'. The questionnaire was administered to a sample of 200 pregnant women in December 2010–November 2011. The inclusion criteria were that women were able to read and write in Turkish, did not have a history of mental disorders and agreed to participate in the study.

#### Instruments

## The pregnant information form

The obstetric and demographic characteristics of women are determined. It contains six closed ended and seven open-ended questions for a total of 13 that are used to determine the age, level of education, employment status, occupation, status regarding health insurance, type of family, week of pregnancy in pregnant women, number of pregnancies, live births, miscarriages, abortions, and living children.

### The Cambridge Worry Scale

Women's worries during pregnancy were measured with the CWS developed by Green et al. The scale was translated into Turkish by three people with proficiency in the language in order to perform a language validity test in accordance with translation

methodology. The obtained Turkish manuscript was then translated back into the original language (Gözüm and Aksayan, 2003). Minor changes based on the suggestions of the original developers of the scale were made, and the language equivalency and cultural adaptation of the scale were determined. It is a Likert-type scale scored by a six-point system from 'not a worry' (0) to 'major worry' (5). A higher score reflects higher worries. At the end of the scale is an open-ended question. The question enquires about worries not listed on the scale. The scale has a four-factor structure, which is socio-medical, socio-economical, health, and relationships. The socio-medical aspects include giving birth, going to hospital, internal examinations, coping with the new baby, and whether your partner will be with you for the birth. The socioeconomic aspects include money problems, housing, problems with the law, employment problems, and giving up work. The health aspects include the possibility of miscarriage, the possibility of something being wrong with the baby, your own health and the health of someone else close to you. Relationships aspects include your relationships with your family/friends and relationships with your husband/partner. The scale was applied at the 16th, 22nd, and 35th weeks of pregnancy and the 6th week after birth. Although the scale consists of 16 items depending on the week of pregnancy, additional specific items can be added or removed as appropriate. In the 35th week an additional form consisting of 11 items was also applied (Green et al., 2003). Because the scale consists of 16 items for the 16th week and 17 items for the other weeks and a sample size of 5-10 times the number of items was the goal (Erefe, 2004), 170 pregnant women were included in the sample. Considering the potential for dropouts, 200 pregnant women formed the study group.

## Test-retest of the Cambridge Worry Scale

To evaluate the scale's constancy through time, the scale was applied to 30 pregnant women four weeks later. The internal consistency reliability Cronbach's alpha value of the scale was 0.795.

### Data analysis

The data were evaluated by coding in the Statistical Package for the Social Sciences (SPSS version 15 program). Descriptive statistics such as the means, standard deviations, and frequencies were used to present the demographic characteristics of participants. In the analysis, which was conducted according to expert opinions, the content validity ratio (CVR=15.67) and the content validity index (CVI=0.98) were determined. A test of sampling adequacy was computed by Kaiser–Meyer–Olkin (KMO) criterion, and the Barlett test of sphericity was applied to the data (Gözüm and Aksayan, 2003; Bayram, 2004; Erefe, 2004).

The structural validity of the CWS was evaluated. The test–retest fit analysis of the scale and its sub-dimensions were performed with the Pearson correlation test and with the *t* test in independent groups. The internal consistency of the scale and its sub-groups was determined using Cronbach's alpha coefficient. The item-factor relationship and the items and sub-groups explaining the original structure of the scale were tested using confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) (Erkorkmaz et al., 2013).

# Findings

#### Descriptive characteristics of the pregnant women

The mean age of the pregnant women in our sample was  $25.92 \pm 5.33$  (min=18-max=42). Table 1 shows the descriptive characteristics of the women.

Table 1Descriptive characteristics of the women.

Characteristics	N	%				
Age 25.92 ± 5.33 (min=18, max=42) Education level						
Illiterate	8	4.0				
Literate	57	28.5				
Primary school	86	43.0				
High school	39	19.5				
University or higher	10	5.0				
Employment status						
Employed	62	31.0				
Unemployed	138	69.0				
Social security coverage						
Yes	177	88.5				
No	23	11.5				
Family type						
Extended family	61	30.5				
Nuclear family	139	69.5				
	100	0010				
Parity	02	41.0				
Primiparity	82	41.0				
Multiparity	118	59.0				
Number of live birth						
0	94	47.0				
$\geq 1$	106	53.0				
Miscarriage						
0	173	86.5				
$\geq 1$	27	13.5				

# Test-retest of the Cambridge Worry Scale

The results of the correlational analysis, which shows the level of consistency between test–retest mean scores, indicated that there is no statistically significant difference between the two test scores (t= – 1.087, p=0.286). The correlation coefficient was found to be 0.994, and the relationship between the two test scores was determined to be highly significant (Table 2).

Cronbach's alpha is used as a measure of the internal consistency and reliability of a test. The item score correlations ranged from 0.140 to 0.646. Cronbach's alpha value for the total CWS was found to be 0.795.

The KMO value was 0.749 and Bartlett's test result was 1448.82 (p < 0.001). To test the construct validity, a CFA and an EFA on the total 16 items of CWS was conducted. The four-factor model revealed that the factor loadings of each item in the CWS ranged between 0.02 and 0.95. In the single-factor model, the factor loadings of each item ranged between -0.05 and 0.82. The goodness-of-fit statistics for the four-factors and single-factor CFA results are given in Table 3.

On the basis of these results, the Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI), and Comparative Fit Index (CFI) values are below 0.90 for both models, whereas the Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) values were above 0.08, and the Root Mean Square Residual (RMR) value was above 0.05. Because the required criteria could not be met for the CFA, an EFA was conducted. EFA showed that the scale items grouped into four sub-dimensions. The CWS showed a four-factor structure with factor loadings between 0.435 and 0.902 and that explained 64.499% of the variance (Table 4).

### Responses to the Cambridge Worry Scale by the pregnant women

The mean scores of topics including giving birth (3.97), internal examinations (3.12), the possibility of something being wrong with the baby (2.72), and money problems (2.54) were determined

Та	bl	e	2

Comparison of the Cambridge Worry Scale test-retest scores.

Test-retest administrations	Total test score $M \pm SD$	df	t p	r p
1st administration 2nd administration	$\begin{array}{c} 29.23 \pm 11.18 \\ 29.53 \pm 10.38 \end{array}$	29	– 1.087 0.286	0.994 < 0.001

Table	3
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Goodness of fit indices for the confirmatory factor analysis.

	Results for the four-factor model	Results for the single-factor model
$\chi^2/p$ value	355.96/0.0	294.36/0.0
	(3.7)	(2.8)
Degrees of freedom/df	94	103
Root Mean Square Error of Approximation (RMSEA)	0.12	0.11
Root Mean Square Residual (RMR)	0.18	0.14
Standardized RMR (SRMR)	0.09	0.08
Comparative Fit Index (CFI)	0.81	0.85
Non-Normed Fit Index (NNFI)	0.75	0.80
Goodness of Fit Index (GFI)	0.81	0.84
Adjusted Goodness of Fit Index (AGFI)	0.76	0.76

to be higher than others (Table 5). Fig. 1 shows the ranking of pregnant women's worries.

# Discussion

This study aimed to adapt the CWS for Turkish pregnant women. The participants were homogeneous and did not show statistically significant differences in the means of their ages, educational level, status of having children, or employment status. The results suggested that the Turkish version of CWS was a reliable and valid measure that assessed worries during pregnancy.

Construct validity refers to a scale's ability to measure the target concept and/or conceptual structure. Factor analysis is a commonly used method for evaluating construct validity (Gözüm and Aksayan, 2003). In this study, the KMO test value was found to be 0.749. When we looked at studies that used the CWS, we observed that Gourounti et al. (2012) found the KMO value to be 0.78 and the Bartlett test value to be below < 0.001. The KMO test result indicated that the CWS is moderately reliable, and the Bartlett test result was found to be statistically significant, which means that the structure of the CWS is suitable for factor analysis. In our study, in order to determine the scale's construct validity, confirmatory factor analysis was performed first. In the literature, in order to evaluate the results of a confirmatory factor analysis, goodness of fit indices, which are among the independent evaluation criteria, should be considered (Erkorkmaz et al., 2013).

As the value of goodness of fit indices approaches 1, the fit between the model and data increases. Goodness of fit indices (GFI, AGFI, CFI) are acceptable between 0.90 and 0.95, whereas a value above 0.95 indicates increased fit (Okur and Yalçın Özdilek, 2012; Erkorkmaz et al., 2013). In contrast, error indices such as RMSEA and SRMR are acceptable when they are below 0.08, whereas values below 0.05 indicate better fit (Doğan and Başokçu, 2010; Okur and Yalçın Özdilek, 2012). The  $\chi^2$  value should be close to 0 and non-significant in order to accept that the model fits the data to be analysed. The  $\chi^2$ /df ratio should be smaller than 3, whereas a value below 5 is also acceptable (Doğan and

# Table 4

Factor loading of the Cambridge Worry Scale.

Items	<i>F</i> 1	F2	F3	F4
Problems with the law	0.613			
Your relationship with your family and friends	0.609			
Your own health	0.806			
The possibility of something being wrong with the baby	0.717			
Going to hospital	0.797			
Coping with the new baby	0.646			
The possibility of miscarriage	0.845			
Your housing		0.546		
Money problems		0.763		
Your relationship with your husband/partner		0.676		
The health of someone close to you		0.643		
Internal examinations			0.777	
Giving birth			0.821	
Whether your partner will be with you for the birth			0.435	
Employment problems				0.900
Giving up work (if applicable)				0.902
Variance explained by the factors	29.023			
Cumulative variance	64.499			

# Table 5

Participants' responses to the Turkish version of the Cambridge Worry Scale.

Items		Not a worry		Major worry			Mean value [95% CI]	
		0	1	2	3	4	5	
		%	%	%	%	%	%	
1.	Your housing	56	12.5	11	15	5.5	0	1.01 [0.82-1.20]
2.	Money problems	15	14	15	21	27.5	7.5	2.54 [2.32-2.76]
3.	Problems with the law	69.5	18	8.5	3.5	0.5	0	0.47 [0.35-0.59]
4.	Your relationship with your husband/partner	41.5	28.5	15	13.5	1.0	0.5	1.05 [0.89–1.21]
5.	Your relationship with your family and friends	57.5	27	10	4.5	1.0	0	0.64 [0.51-0.77]
6.	Your own health	27.5	12.5	30	20.5	8.0	1.5	1.73 [1.54–1.92]
7.	The health of someone close to you	32.5	20.5	22.5	15	5.0	4.5	1.53 [1.33-1.72]
8.	Employment problems	74.5	7.5	7.5	6.0	4.0	0.5	0.59 [0.42-0.75]
9.	The possibility of something being wrong with the baby	13	9.5	20	22	20.5	15	2.72 [2.50-2.94]
10.	Going to hospital	55	20.5	16	6.5	1.0	1.0	0.81 [0.65-0.96]
11.	Internal examinations	3.5	5.5	16.5	36.5	26	12	3.12 [2.95-3.28]
12	Giving birth	5.0	2.5	6.5	9.0	30	47	3.97 [3.78-4.16]
13.	Coping with the new baby	20	20.5	31.5	21	5.0	2.0	1.76 [1.59-1.93]
14.	Giving up work (if applicable)	76	6.0	7.0	7.5	3.5	0	0.56 [0.40-0.72]
15.	Whether your partner will be with you for the birth	47	26	17.5	8.0	1.0	0.5	0.91 [0.76-1.06]
16.	The possibility of miscarriage	37.5	5.0	14.5	18	16.5	8.5	1.96 [1.71-2.21]





Başokçu, 2010; Erkorkmaz et al., 2013). The  $\chi^2$ /df value was determined to be below 3 for the single-factor model and 3.7 for the multifactorial model, indicating a very good fit for the single-factor model and good fit for the multifactorial model. When we looked at the other goodness of fit indices, neither model met the criteria of the fit indices, and the fit values were below 0.85 for both models. In addition, error indices were higher than expected. Therefore, it was concluded that the model did not exhibit a good fit. However, the single-factor model had better fit indices compared to the four-factor model.

Factor loadings of 0.10 are accepted as low, 0.30 is moderate and values of 0.59 or above are considered high. A high factor loading shows that the item is a valid indicator of the related factor (Çetin, 2011). In the current study, it was observed that the factor loadings were above 0.435. However, despite our efforts, the main components and factors of the scale pertaining to each period of pregnancy could not be discriminated via factor analysis. In accordance with the opinions of expert statistician, it was decided to evaluate each item independently. As a result, the scale could not be separated into components and could include a single dimension.

Scale reliability is examined in order to show that the scale can measure related variables without error, collect data accurately, and be repeated (Çam and Baysan Arabacı, 2010). In our study, the scale was administered before and after a four-week interval. The two measurements were positively and significantly correlated. Green et al. (2003) reported that each of the test–retest correlation coefficients was high. On the basis of this result, the items are highly correlated with each other, and the test reliability is high. Even if the test–retest correlations are of sufficient magnitude, similar test–retest mean scores (Gözüm and Aksayan, 2003) indicate that a scale is unchanging and that the items in it are understandable and measure variables in a consistent way.

It has been reported that scales with a Cronbach's alpha value above 0.70 have internal consistency, meaning that the scale is a reliable (Bayram, 2004). In our study, Cronbach's alpha value for the total CWS was found to be above 0.70. Green et al. (2003) found Cronbach's alpha reliability coefficient for the original scale to be 0.73, whereas Georgsson Öhman et al. (2003) and Carmona Monge et al. (2012) found it to be 0.81 and Gourounti et al. (2012) found it to be 0.85. Our finding is similar to the results of other studies conducted in different countries. This result indicates that the items in the scale are consistent with each other and that the scale contains items that measure the same characteristic.

Among the responses to the CWS by pregnant women, giving birth and internal examinations generated the most anxiety followed by the possibility of something being wrong with the baby, money problems, and the possibility of having a miscarriage. When we examine other studies conducted on this topic, Georgsson Öhman et al. (2003) stated that the possibility of something being wrong with the baby and giving birth were the factors that lead to the most anxiety. Green et al. (2003) found that the possibility of something being wrong with the baby, the possibility of having a miscarriage and giving birth were factors that led to the most anxiety. Kitapcioğlu et al. (2008) stated that worries about the health personnel's behaviour during labour, worries about the baby and worries about giving birth were highest. In contrast, Petersen et al. (2009) reported that giving birth and the possibility of something being wrong with the baby were factors that lead to the highest level of anxiety. Gourounti et al. (2012) found that the possibility of something being wrong with the baby, giving birth, money problems, the possibility of having a miscarriage, and housing were factors that lead to the highest level of anxiety in pregnant Greek women. In this study, the possibility of something being wrong with the baby and giving birth were factors that lead to the highest level of anxiety in pregnant women. This result indicates that these types of worries are universal among pregnant women.

# Strengths and limitations of the study

This is the first study of its kind in Turkey. The study was planned to take place in Family Health Centres located in the Yıldırım subprovince of the city of Bursa. Study limitations included pregnant women changing their area of residence, pregnancies ending in miscarriages or premature births, and most participants not answering the open-ended questions in the questionnaires.

### **Conclusions and recommendations**

In the reliability and validity study that aimed to adapt the CWS to the Turkish society, language validity, content validity, internal consistency reliability, and construct validity were tested. In light of these results, it was concluded that the single-factor CWS is suitable for use with Turkish pregnant women and that it can accurately determine pregnant women's worries. The study results show that pregnancy and the process of motherhood increases women's worries. As a result, it was found that the CWS is a valid and reliable instrument that is suitable for Turkish culture, and the items in the CWS have internal consistency and measure the same construct.

In light of these results, recommendations are listed below:

- Women's worries during pregnancy should be determined and evaluated.
- Early interventions should be planned in accordance with these worries
- It should be ensured that the woman goes through a healthy pregnancy
- The CWS should be supported by administering it to a larger population of pregnant women.

### **Conflict of interest**

The authors declare that there is no any conflict of interest for this work. We did not receive funding sources. This study was approved by the local Ethical Board.

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