JBACHS
Journal of Basic and Clinical Health Sciences

J Basic Clin Health Sci 2025: 9; 121-130
https://doi.org/10.30621/jbachs.1528826
RESEARCH ARTICLE

BIRTH-RELATED PSYCHOLOGICAL TRAUMA PERCEPTION SCALE DEVELOPMENT AND PSYCHOMETRIC PROPERTIES: A METHODOLOGICAL STUDY

Ozlem Koc[1*], Hava Ozkan[2]

[1] Tarsus University, Faculty of Health Sciences, Department of Midwifery, Mersin/Turkey
[2] Atatürk University, Faculty of Health Sciences, Department of Midwifery, Erzurum/Turkey
ORCID: O.K. 0000-0002-6751-1206; H.O. 0000-0001-7314-0934

Corresponding author: Özlem Koç, **E-mail:** ozlemkoc@tarsus.edu.tr
Received: 06.09.2024; **Accepted:** 25.12.2024; **Available Online Date:** 31.01.2025

Cite this article as: Koç O,Ozkan H. Birth-Related Psychological Trauma Perception Scale Development and Psychometric Properties: A Methodological Study. J Basic Clin Health Sci 2025; 9: 121-130.

ABSTRACT

Purpose: The purpose of this study was to develop a valid and reliable measurement tool for assessing mothers' psychological trauma perception regarding birth**.**

Materials and methods: This is a methodologically type study. This study was conducted with 430 mother who had normal delivery. Personel information form and Birth-related psychological trauma perception scale draft form were used to data curation.

Results: The statistics show that the sample is sufficient for factor analysis (Kaiser-Meyer Olkin measure = 0.858) and that the correlation between the questions is appropriate (Bartlett's test of sphericity, $\chi 2$ = 9211.281, p = 0.001). The total explained variance of the scale is 28.309%. It was determined that the scale consists of 39 items and a single sub-dimension. The internal consistency coefficient of the total scale was calculated as 0.92. The scale's invariance over time shows that its reliability is high (r = 0.83, p< 0.001).

Conclusion: Results showed that the developed scale is a valid and reliable tool for measuring the perception of traumatic birth. This scale can be used to determine whether women are susceptible to psychological trauma from the first postpartum month to a year later.

Key words: Birth, perception, psychological, scale, trauma.

INTRODUCTION

Traumatic childbirth is defined as an event occurring during the labor and birth process that involves actual or threatened serious injury or death to the mother's or infant's physical or emotional integrity (1-6). Women who experienced traumatic childbirth depict the moment of birth as a moment of helplessness, loss of control, intense fear, and horror (7). Besides, these women may also exhibit symptoms of posttraumatic stress such as a strong recall of childbirth, dreams about the event and recurrent memories (1,2,7,8). Studies have revealed that 3-4% of the women in the postnatal period and 15-19% of the women who experienced high-risk, complicated, or preterm deliveries exhibited post-traumatic stress disorder symptoms (9,10).

In the literature, there are measurement tools that evaluate the childbirth experience from different aspects and measure the attitudes of women towards pregnancy and childbirth (9,11-16). Some of these were developed in Turkish, while Turkish validity and reliability studies were performed for some of them, on the other hand (13-19).

There are scales developed regarding birth trauma in the literature. One of these scales is a scale

developed in Turkish that can be applied to both women with and without birth experience. The primary goal here is to measure women's perceptions of birth-related trauma, which they acquire through environmental and cultural factors, rather than their subjective experiences. Additionally, the items of this scale are evaluated with a visual analog scale (0-10 points). With this type of evaluation, women are expected to express their feelings of trauma, which is a psychological perception, with quantitative data. This may negatively affect the reliability of the application (16). Another scale is the City Birth Trauma scale, published by Ayers et al. (2018). This scale is mostly aimed at evaluating the symptoms and diagnostic criteria of postpartum post-traumatic stress disorder. For this reason, it was thought to be inadequate in measuring women's perception of birth-related trauma. These limitations in scales made us think about the need for a new scale. After a comprehensive literature review, including DSM-V (Diagnostic and Statistical Manual of Mental Disorders) criteria, it is understood that the situation whose perception is to be measured must be experienced by individuals (20). The perception of traumatic birth can only occur in women who have experienced birth. The scale developed in this study is only for the sample of women who have given birth. The aim of this study is to develop the birth-related psychological trauma perception scale and determine its psychometric properties.

MATERIALS AND METHODS

Design and setting

This methodological study was carried out in the Gynecology and Pediatrics Hospital affiliated with a City Hospital and Family Health Centers in Turkey between May 2019 and September 2019.

Participants and sample

The sample size of this study consists of 430 women who meeting the inclusion criteria. When calculating the sample size in scale development studies, it is generally recommended to select individuals 5 to 10 times the number of items in the draft scale, taking into account the number of items in the draft scale (21). Women aged 18-40 who gave birth at term and vaginally, were at least the 4th week of the postpartum period, whose baby and themselves were healthy, and who had given birth without any problems before (for multiparous women) were included in the study. Mothers with low cognitive and communication levels and diagnosed psychiatric diseases were not included in the study. Additionally, women who experienced serious birth trauma were not included in the sample.

Data collection

Data were collected in a separate interview room, taking care of privacy, and the interview duration was approximately 10-15 minutes. Personel information form and Birth-related psychological trauma perception scale draft form were used to data collection.

Personel information form: This form consisted of a total of 11 questions regarding the sociodemographic (age, education, marital status, etc) and obstetric characteristics (mode of delivery, interventions at birth, etc.) of women.

Birth-related psychological trauma perception scale (BRPTPS): The scale was developed by the researchers to determine the perception of psychological trauma related to birth. Before preparing the scale draft, factors associated with traumatic birth were explored in a comprehensive literature review (22-24). After to develop scale a 46-item pool was created in line with the literature information and the knowledge and experience of the researchers (4,10,16,19,25-30). To assess the content validity of the BRPTPS draft form, 12 experts were consulted, the 12 experts whose opinions were obtained were working in the field of obstetrics and women’s health nursing. The study calculated the Content Validity Index (CVI) values for the scale items using Lawshe's content validity testing technique. Experts was sent information on the purpose of the BRPTPS and instructions about how to evaluate content validity. According to expert evaluations, the CVI values of the scale items ranged between 0.33 and 1.00. Since the number of experts was 12, items with a CVI value of 0.56 and above were included in the scale (31). By removing four items from the draft form, CVI was calculated as 0.83 for the 42-item scale. To test face validity, a pilot study was conducted with 30 mothers (15 primiparous and 15 multiparous) who had similarities with the characteristics of the sample group to check whether the expressions of the scale items were clear. No changes were made to the scale items after the pilot study.

As a result of all validity and reliability analyses, BRPTPS, which aims to measure women's

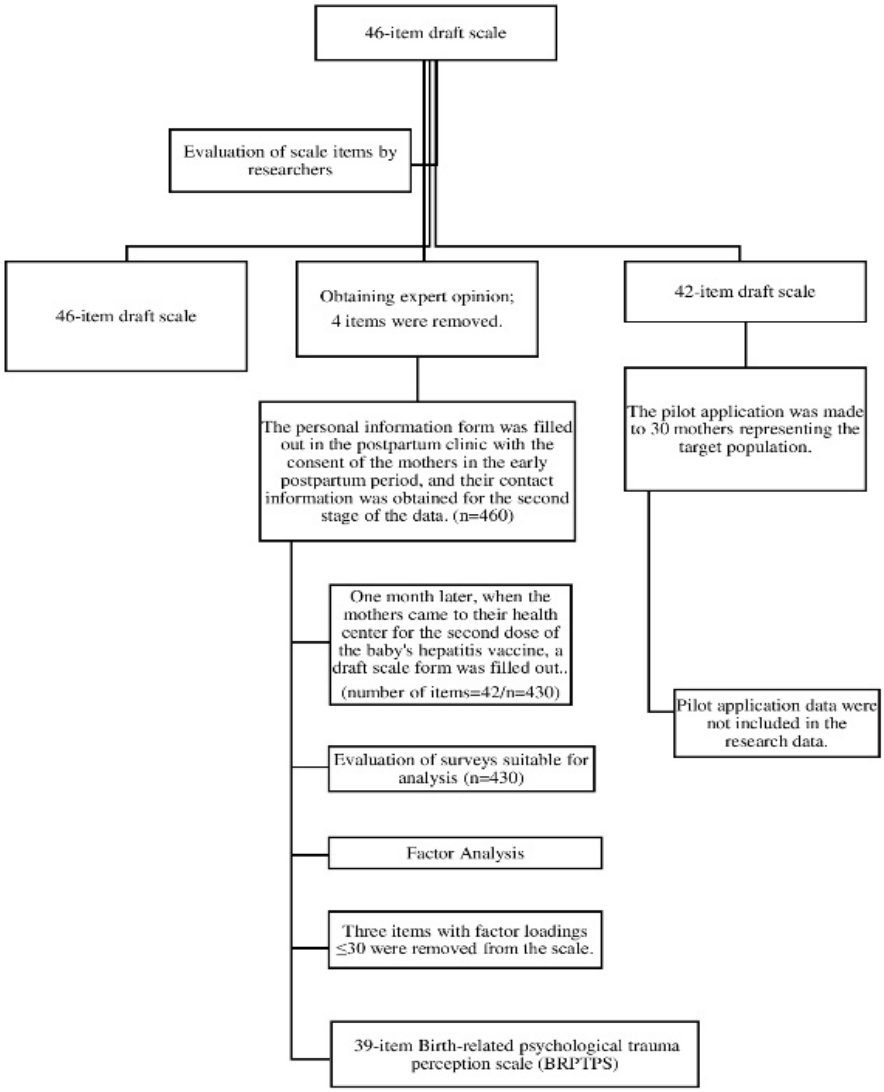

Figure1. Flow diagram for development and validation of *BRPTPS*

Table 1. Sociodemographic and obstetric characteristics of the mothers

Characteristics		**n**	**%**
Age (year)	18-24	127	29.5
	25-29	122	28.4
	30-34	121	28.1
	35 and above	60	14.0
Educational status	Primary school	36	8.4
	Middle school	62	14.4
	High school	215	50.0
	University and above	117	27.2
Duration of marriage (year)	1	50	11.7
	2-4	150	34.9
	5-9	121	28.1
	10 and above	109	25.3
Number of birth	Primiparous	196	45.6
	Multiparous	234	54.4

perception of psychological trauma regarding birth, consists of 39 items and a single dimension. BRPTPS can be used from the first month to one year postpartum. The scale is a five-point Likert model. For the negative items in the rating scale, 1 was taken as "strongly disagree", 2 as "disagree", 3 as "undecided", 4 as "agree", and 5 as "strongly agree". Positive items are answered in the opposite way. There are 11 items (4, 5, 11, 13, 15, 17, 18, 29, 30, 31, 36) that need to be reversed in calculating the total scale score. Total scale scores range between 39-195. An increase in the score obtained from the scale indicates that the woman's perception of trauma is high.

Data Anlaysis

Data analysis was performed by using SPSS version (22; SPSS Inc., Chicago, IL) and Lisrel 8.0 software (Scientific Software International, Inc., Lincolnwood, IL) Number, percentages, mean, and standard deviations were utilized for the statistical analysis. The analysis and techniques used to conduct validity and reliability analyses are presented below.

Validity analysis

To assess the construct validity of the scale, an exploratory and confirmatory factor analysis was conducted. Prior to factor analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett tests were used to assess the sample size of the scale and its suitability for factor analysis. The lowest value of the KMO index is given as 0.50 and is used to determine the adequacy of the sample size (24,32,33). The significance of the Bartlett test indicates the suitability of the data set for factor analysis. Principal components analysis were used in exploratory factor analysis (EFA) and examined using the varimax rotation method. After EFA, confirmatory factor analysis was performed for structural equation modeling.

Reliability analysis

For reliability analysis, item-total score analysis (Pearson correlation test), and Cronbach alpha, the Split-Half method, Spearman-Brown Correlation Coefficient, and Guttman Split Half Correlation test were used. The 27% subgroup and upper group discrimination analysis was also used for reliability analysis. To determine the invariance of the scale over time, a test-retest analysis was performed. The duration suggested by the test-retest method generally varies between two and six weeks. Therefore, the scale was re-administered to 30 mothers 15 days after the first application. To determine the correlation between two test-retest reliability measures, Pearson's product-moment correlation coefficient was used. The calculated correlation coefficient must be at least 0.70 (34,35).

Ethical Approval: The ethics committee approval was obtained from the Ethics Committee of Ataturk University, Faculty of Health Sciences before conducting the study (Date: 22/11/2018, Decision No: 05/01). Permission was obtained from the institution where the research was conducted. Additionally, verbal consent was obtained from each of the participants. This study was carried out by the ethical standards of the Declaration of Helsinki.

RESULTS

Characteristics of the participants

It was determined that 29.5% of the mothers participating in the research were between the ages of 18-24, and 50% of them had high school education. Additionally, 34.9% of the mothers have been married for 2-4 years and 54.4% are multiparous (Table 1). In the literature, it has been suggested that the floor and ceiling effect should be below 15%. The values obtained from the group in which the research was conducted (0.4%-5.6%) meet this criterion.

Findings of validity

Before the principal components analysis, the KMO and Bartlett's tests were carried. In the analysis conducted, the KMO value was found to be 0.85. Similarly, as a result of Bartlett's test, it was found that $\chi 2 = 9927.444$, $P = 0.000$. A KMO value of 0.850 indicates that the scale is suitable for principal component analysis and the sample size is sufficient. Likewise, Bartlett test results show that the data are related to each other and are suitable for factor analysis.

Exploratory factor analysis (EFA)

The factor structure of the scale was revealed by using the principal components analysis and varimax rotation method. The factor loads of items ranged from 0.305 to 0.789, and the factor load of each item except for three items was higher than 0.30. 28.30% of the total variance was explained. Therefore, these three items with factor loads below 0.30 were removed from the scale and were again submitted to an examination in one-factor structure (Table 2).

Table 2. Factor Analysis Findings of Birth-Related Psychological Trauma Perception Scale (Single Factor Structure, 39 items)

	Items	Factor Loadings		Items	Factor Loadings
1	I could not control my pain at birth.	0.318	**21**	I was not allowed to have someone I wanted at birth.	0.394
2	Midwives (health professionals) did not support me enough at birth.	0.566	**22**	I was very uncomfortable that I was not allowed to eat or drink during labor.	0.338
3	For me, birth is a painful event.	0.418	**23**	Health professionals did not listen to me at birth.	0.753
4	The behavior of midwives (health professionals) at birth made me feel comfortable.*	0.746	**24**	I was not informed about the progress of the birth at birth.	0.758
5	It was comforting to me that the midwives (health professionals) provided information about what I had to do during the birth.*	0.789	**25**	The behavior of other pregnant women in the delivery room frightened me.	0.388
6	I felt bad during the vaginal examinations in the delivery room.	0.305	**26**	The physical conditions of the delivery room were not good.	0.439
7	Midwives (health professionals) asked my permission before doing a vaginal examination.	0.462	**27**	Too much medical intervention (artificial pain, episiotomy) at birth bothered me.	0.387
8	I felt like I was going to die while I was push on at birth.	0.555	**28**	Hearing my baby's voice at birth relieved me.*	0.406
9	I was afraid of harming my baby while I was push on at birth.	0.405	**29**	As a mother, I feel happy.*	0.537
10	I was afraid that something would happen to my baby during the birth.	0.359	**30**	As a mother, I feel successful and strong.*	0.578
11	I was extremely positive at birth.*	0.586	**31**	I feel happy when I think of my birth.*	0.382
12	I felt very lonely at birth.	0.603	**32**	I don't want to remember my birth.	0.459
13	I felt so strong during the birth pains.*	0.550	**33**	I have bad dreams about my birth.	0.463
14	I felt scared during the birth.	0.547	**34**	I feel disconnected from my baby.	0.599
15	I felt safe at birth.*	0.601	**35**	I'm trying to avoid things that remind me of my birth.	0.553
16	I was extremely panicked at birth.	0.552	**36**	I wanted to breastfeed my baby after birth.*	0.303
17	I did not lose physical control at birth.*	0.619	**37**	I didn't want to see my baby after the birth.	0.494
18	I was afraid that I would die at birth.	0.595	**38**	I feel incapable of taking care of my baby.	0.721
19	I was afraid of getting a cesarean.	0.385	**39**	I don't want to talk about my birth.	0.586
20	I felt helpless at birth.	0.608			
	Described variance (%)				**28.309**

*Inverted items

Table 3. Determined Adjustment Index Values, Normal and Acceptable Values of Birth-Related Psychological Trauma Perception Scale

Index	Normal value	Acceptable value	Determined value
x^2/SD	≤2	≤5	8.72
GFI	≥0.95	≥0.90	0.90
AGFI	≥0.95	≥0.90	0.91
CFI	≥0.95	≥0.90	0.90
RMSEA	≤0.05	≤0.08	0.079
SRMR	≤0.05	≤0.08	0.08

Confirmatory factor analysis (CFA)

Confirmatory factor analysis was conducted to verify the harmony between the explanatory factors and that the factor structure was preserved. Many indices were used to examine the model fit of the BRPTPS. Among them, the values were found as follows: x2/SD=8.72, goodness of fit index (GFI) 0.90, djusted goodness of fit index (AGFI) .91, comparative fit index (CFI) 0.90, root mean square error of approximation (RMSEA) 0.079, and standardized root mean square residual (SRMR) 0.08 (36,37). It was determined that all relevant fit index values were within the range of reference values (Table 3).

Findings of reliability analysis

Item analysis was performed on the 39 items and the results are presented in Table 2. The item total score correlation values were between 0.25 and 0.71. Cronbach's alpha level which reflects internal consistency was calculated as 0.92. In addition, there was no item in which the Cronbach alpha coefficient increased if it was removed from the scale (Table 4). Therefore, no item was removed from the scale. We also applied the Split-Half method, Spearman-Brown Correlation Coefficient, and Guttman Split Half Correlation for reliability analysis. The Split-Half value for the first half of the scale (20 items) was calculated as 0.79, and the Split-Half value for the second half (19 items) was calculated as 0.88. As a result of the analysis, Spearman-Brown Correlation Coefficient (0.82) and Guttman Partition Coefficient (0.81) were calculated. Split-Half value > 0.70, Spearman-Brown Correlation Coefficient > 0.70 and Guttman Split Halves Correlation Coefficient > 0.70 indicate that the scale has high reliability [38]. Another method in reliability analysis is to compare the lower 27% and upper 27% groups according to total scores. The lower and upper 27% slices of the total scale scores were calculated, and the significance of the difference between them was tested with the t-test. According to the total scale score, the significance of between the 27% slices was found as p< 0.001.

In the test-retest reliability analysis, it was determined that there was a positively high (r = 0.83) correlation between the first and second application scores and the correlation between two measurements was statistically significant (P < 0.001).

DISCUSSION

The study developed a birth trauma perception scale. The developed scale is a measurement tool that helps measure mothers' experiences, feelings and thoughts in the postpartum period and allows mothers to evaluate how they perceive the experience of childbirth, which has a very important place in their lives. The scale items were designed so that mothers could easily express their feelings and thoughts. This scale is believed to facilitate the identification of individuals vulnerable to birth trauma. The present study examined content and construct validity to examine the validity of the scale. The scale was administered to 12 experts in the item list to determine its content validity. According to DeVellis (2012) in the study of adaptation and development of the scale, the number of specialists consulted varies from three to 20. To confirm the content validity with numerical values, the Lawshe technique was used and the CVI of the scale was determined to be 0, 83 set. Karakoc & Donmez (2014) stated that the CVI score should be 0.80 or higher in content importance, assessed using the Lawshe technique. The scale is therefore satisfactory in terms of content validity. In order to evaluate the characteristics measured with the prepared scale and to interpret the results of the people on whom the scale was used, the construct validity of the scale is assessed. The factor analysis method is often used to measure construct validity by collecting related variables in a given set. Explanatory factor analysis is used to determine the number of subscales in a particular case. The use of this large-scale analysis method is tied to a specific sample size (39). To understand the adequacy of the sample size, KMO analysis was performed. To examine the significance of the relationship between variances, Bartlett analysis was performed. A KMO test result above 0.50 indicates that the sample size is sufficient for validity analysis (34,39).

Table 4. Item-Total Correlations and Cronbach α Coefficients of the Birth-Related Psychological Trauma Perception Scale

Items	Arithmetic mean	Standard deviation	Item total correlation	Item deleted α	Items	Arithmetic mean	Standard deviation	Item total correlation	Item deleted α
Item 1	3.48	1.32	0.303	0.927	**Item 21**	2.96	1.56	0.362	0.927
Item 2	2.36	1.44	0.510	0.925	**Item 22**	2.51	1.49	0.322	0.927
Item 3	4.12	1.14	0.397	0.926	**Item 23**	2.36	1.49	0.709	0.923
Item4*	2.18	1.32	0.696	0.923	**Item 24**	2.19	1.45	0.717	0.923
Item 5*	2.13	1.39	0.737	0.923	**Item 25**	3.42	1.58	0.360	0.927
Item 6	3.98	1.23	0.296	0.927	**Item 26**	2.30	1.51	0.402	0.926
Item 7	3.04	1.59	0.411	0.926	**Item 27**	3.57	1.50	0.364	0.927
Item 8	3.75	1.31	0.529	0.925	**Item 28***	1.67	1.15	0.345	0.927
Item 9	3.67	1.35	0.384	0.927	**Item 29***	1.77	1.27	0.491	0.925
Item 10	3.96	1.26	0.347	0.927	**Item 30***	1.73	1.25	0.530	0.925
Item 11*	3.31	1.32	0.548	0.925	**Item 31***	3.22	1.52	0.361	0.927
Item 12	2.67	1.38	0.573	0.925	**Item 32**	2.95	1.45	0.430	0.926
Item 13*	2.75	1.44	0.491	0.925	**Item 33**	1.83	1.20	0.423	0.926
Item 14	3.59	1.42	0.512	0.925	**Item 34**	1.67	1.07	0.564	0.925
Item 15*	3.23	1.35	0.561	0.925	**Item 35**	2.38	1.50	0.510	0.925
Item 16	3.51	1.45	0.519	0.925	**Item 36***	2.05	1.31	0.251	0.928
Item 17*	3.05	1.51	0.582	0.924	**Item 37**	2.06	1.32	0.450	0.926
Item 18	3.25	1.39	0.568	0.925	**Item 38**	2.09	1.41	0.678	0.924
Item 19	3.30	1.50	0.363	0.927	**Item 39**	2.86	1.46	0.548	0.925
Item 20	3.18	1.37	0.582	0.925					
*Inverted items									**0.927**

As a result of the explanatory factor analysis, the KMO value of 0.85 indicates that the sample is suitable for factor analysis, while the Bartlett test, which is at a highly significant level (p=0000), shows that the matrix of item correlation is suitable Suitable for factor analysis. A different number of subscales were tested in the studies, with the items being combined into a single subscale according to the theoretical structure. After examining the one-factor structure, it was found that the factor loading

coefficients of all items except items 17, 33, and 42 were greater than 0.30. The single-factor structure of the scale shows that trauma cannot be examined under a stereotyped structure, that it is multifactorial, and that birth trauma is a reflection of each woman's own feelings, thoughts, experiences and subjective responses. In addition, the fact that the items determined in the scale affect each other may explain the single-factor structure of the scale. In the confirmatory factor analysis performed to test whether the single-factor structure obtained was confirmed or not, the fit indices of the model were examined and it was seen that the fit index values were sufficient for the fit of the model.

Confirmatory factor analysis is not only an extension of explanatory factor analysis, but also evaluates the underlying structure of the data. Confirmatory factor analysis tests the factors identified by explanatory factor analysis. In confirmatory factor analysis, the degree of conformity of the model with the theory is decided and the evaluation is carried out based on various fit index results rather than on the result of a single value (40). In this study, according toresults of confirmatory factor analysis; The chi-square value was = 8.72; IGF = 0.90; AGFI=0.91; FCI=0.90; RMSEA=0.079; and SRMR=0.08. Regarding the scale fit indices, the fit of the observed data to the model was considered good. Cronbach's alpha is one of the most commonly used parameters for assessing the internal consistency reliability of scales. Cronbach's alpha reliability coefficient is often used to determine the internal consistency of Likert scales. Sencan (2005) suggests that Nunnelly's alpha value should be greater than 0.70 (40). On the other hand, George and Mallery argued that (2003) an alpha value > 0.90 indicates “perfect” reliability of the scale (41). In our study, the Cronbach alpha value was 0.92, while the scale based on the internal consistency coefficient was very reliable. The alpha value of the Cronbach scale indicates that this scale can be used to determine birth trauma and is a scale that can measure the trauma of any woman who gives birth vaginally. In order to test the distinctiveness of the items of the scale, the 27% with the highest score from each of the items of the scale and the 27% with the lowest score were compared with the t test analysis and it was determined that the results were statistically significant and all items had discrimination. Based on this, we can say that trauma is affected by the subjective responses of individuals, as mentioned in DSM-IV. The distinctiveness of the items in the scale makes the scale more usable in the field of birth trauma. On the other hand, this situation may also form the basis for individualized care given by midwives to two different women who experienced traumatic birth in the clinic. Because every woman's perception of birth and trauma is different and may be based on different reasons. The performance of a prepared scale in a test-retest reliability analysis is evaluated to produce consistent results across applications and to demonstrate invariance over time. If you apply the same scale to the same people at different times, the responses should be similar. This is the sine qua non for a reliable measuring instrument (39,42,43). In this study, it was found that the test-retest comparison results were statistically significant and the relationship between the first and second measurements was high and positive (r = 0.831, p = 0.000). Test-retest analysis indicates that the result would be valid if the scale items measured birth trauma at a time designated for use of the scale. The process of perception, interpretation and acceptance/rejection of the birth experience as traumatic continues in the postpartum period. It is stated that after birth, women care about sharing their birth experiences with health professionals and perceive this as support. However, the majority of women do not ask the health personnel about their feelings about their birth, and when they express their feelings, they do not respond well enough. They stated that they were not understood and ignored. It has been found that providing women with the opportunity to discuss their birth experiences is very useful in coping with postpartum trauma symptoms. The developed scale allows women to express their birth experiences in the postpartum period. In addition, health professionals can provide individualized care in the postpartum period to women with a high perception of traumatic birth as a result of the scale evaluation. The scale has a distinctive feature in identifying individuals who are special in this regard and need care.

Limitations

The results of the study can be generalized to the mothers who constitute the sample group. The developed scale can be applied from the first postnatal week to one year.

CONCLUSIONS

In the end, this 5-point Likert-type scale was developed to measure women’s childbirth

psychological trauma perception. The scale has one subscale and 39 items. The Cronbach's α internal consistency coefficient of the scale, total item correlation and test-retest analysis were found to have high correlations.

Acknowledgements: We would like to thank mothers who participated in this study.
Author Contributions: Conceptualization: ÖK, HÖ; Data curation: ÖK; Formal analysis: ÖK, HÖ; Funding acquisition: ÖK, HÖ; Investigation: ÖK; Methodology: ÖK, HÖ ; Resources: ÖK ; Software: ÖK ; Supervision: HÖ ; Validation: ÖK, HÖ ; Visualization: ÖK,HÖ ; Writing–original draft: ÖK, HÖ ; Writing–review & editing: ÖK, HÖ
Conflict of Interest: The authors have no conflicts of interest to declare.
Ethical Approval: The ethics committee approval of the study was obtained from the Ethics Committee of Ataturk University Faculty of Health Sciences (Date: 22/11/2018, Decision No: 05/01). Additionally, verbal consent was obtained from each of the participants.
Funding: None.
Peer-Review: Externally peer reviewed.

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