Development and psychometric evaluation of the paternal support scale of breastfeeding☆

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ABSTRACT

Background: Social support positively affects the adaptation process of the woman to the maternal role during pregnancy and the postpartum period and increases her sensitivity to her baby. It is known that the support provided by fathers to their wives during this process positively affects their decision to breastfeed and continue.
Purpose: The aim of this study is to contribute to the literature by the Paternal Support Scale of Breastfeeding, testing its validity, reliability and psychometric properties.
Methods: The study, which included 203 fathers with babies 0–6 months of age who were actively breastfed between January and June 2022, was completed in a Medical Faculty Hospital at Konya in Turkey. The psychometric properties of the scale were evaluated with exploratory factor analysis and confirmatory factor analysis. In addition, number/percentage, *t*-test for dependent and independent groups and correlation analysis were used in the evaluation of the data.
Results: Total item correlation coefficient of this scale was found to vary between 0.63 and 0.81. According to the confirmatory factor analysis results the goodness-of-fit index values of the scale indicated that the model has an acceptable fitness, and the 21-item one-dimensional scale has confirmed validity.
Conclusion: Our findings showed that this scale is a good reliable measurement tool that can be used to evaluate levels of paternal support in breastfeeding. The scale can be adapted to different cultures, and cross-cultural comparisons can be planned in future studies.
Practice implications.
Spouse and family support increases breastfeeding success. Due to their active role in the decisions made within the family, fathers positively influence mothers' breastfeeding decisions and increase mothers' motivation to continue breastfeeding. This measurement tool, developed to measure partner support in breastfeeding, helps nurses, to determine fathers' support levels in breastfeeding. In this way, nurses can contribute to increasing the duration of breastfeeding by making effective interventions for the solution of partner support problems related to breastfeeding.

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Introduction

Breast milk stands out as the optimal nourishment for promoting and sustaining a baby's health, a fact supported by research (Von der Ohe, 2018). Its dynamic composition tailored to the specific needs of infants contributes significantly to the development of their neurological system, ensuring they progress in alignment with essential growth and developmental milestones (Brown, 2017). Additionally,

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breastfeeding fosters a strong mother-infant attachment, fortifying the emotional bond between them (Bar et al., 2016). Despite a wealth of evidence affirming the myriad benefits of breastfeeding for both infants and mothers, global and national breastfeeding rates, as evidenced by the Turkey Population and Health Survey in 2019, indicate that they have yet to reach the desired levels (Turkey Population & Health Survey, 2019). As of 2021, the World Health Organization (WHO) reported a global exclusive breastfeeding rate of 48% for the first 5 months of life (WHO, 2022). In Turkey, it is noteworthy that this figure is slightly lower at 41%, falling below the global average (Turkey Population & Health Survey, 2019). Several key factors contribute to the challenge of achieving higher breastfeeding rates. These include a lack of awareness regarding the significance of breast milk and breastfeeding, instances where babies are born prematurely, postnatal treatments for infants, and a deficiency in social support systems for breastfeeding (Balogun et al., 2016; Meedya et al., 2017).

New mothers often require support to improve their breastfeeding skills and seek answers to their questions (Arora et al., 2000). Breastfeeding is a skill that evolves over time for both the infant and the mother (WHO, 2013). On one hand, mothers are expected to feed their babies correctly and effectively, while on the other, they are simultaneously expected to manage household tasks and care for other children without interruption (Srisopa & Lucas, 2021; Wang et al., 2018). Managing these responsibilities alone can lead to concerns about the adequacy of breast milk and self-doubt for the mother. It is essential to acknowledge that the emotional well-being of the mother significantly influences the breastfeeding process (Awaliyah et al., 2019; Gümüşsoy et al., 2020). Supportive or inhibitory factors can play a pivotal role in the mother's perception of successful or unsuccessful breastfeeding.

Fathers emerge as crucial figures who can profoundly impact maternal performance in breastfeeding (Metin & Altınkaynak, 2020). Recognizing the support of fathers in the decision-making process enhances the mother's self-confidence in the breastfeeding journey and contributes to its sustained effectiveness (Ouyang & Nasrin, 2021). Research consistently demonstrates that mothers who receive support from their husbands are more successful in breastfeeding (Arora et al., 2000; Rempel et al., 2017; Wallenborn et al., 2019). However, theoretical perspectives suggest that fathers engaged in mutual parenting tasks may sometimes struggle to provide sufficient support and resources for breastfeeding (DeMontigny et al., 2018; Ng et al., 2019). Interestingly, the literature reflects a growing interest in studying fathers, particularly in recent years (Çiftçi, 2022; Dennis et al., 2018; Kucukoglu et al., 2023; Metin & Altınkaynak, 2020; Wang et al., 2018). The significance of paternal support is highlighted, with studies indicating that high levels of support from fathers significantly influence how the baby is fed and the duration of breastfeeding (Adugna et al., 2017; DeMontigny et al., 2018; Dennis et al., 2018; Kucukoglu et al., 2023). Positivity and active support from fathers towards breastfeeding have been associated with increased determination in mothers to initiate and sustain breastfeeding (DeMontigny et al., 2018; Gözükara, 2014).

An examination of breastfeeding studies reveals a predominant focus on the father's role from the perspective of breastfeeding (Kumral, 2021; Ouyang & Nasrin, 2021; Wang et al., 2018). Breastfeeding is a long process, and fathers and mothers need to support each other under all circumstances during breastfeeding (DeMontigny et al., 2018; Rempel et al., 2017). Research assessing fathers' knowledge about breastfeeding and its impact on the mother's breastfeeding experience indicates that fathers with a higher level of knowledge tend to provide increased support, positively influencing mothers' breastfeeding rates (Agrawal et al., 2022).

The emotions experienced by fathers at the outset of the breastfeeding journey are complex, with some expressing difficulty in establishing a sufficient bond with their babies during this period, while others feel excluded (Al Namir et al., 2017; Gözükara, 2014). Studies also suggest that fathers often lack adequate information on how to assist their spouses with breastfeeding challenges due to these emotional complexities (Al Namir et al., 2017; Tomori et al., 2022). Acknowledging that fathers need to be actively involved in baby care and breastfeeding education from the moment they embrace the idea of having a child is crucial (Lundquist et al., 2022). This active participation in the breastfeeding adventure not only helps fathers form healthier bonds with their babies but also facilitates their adjustment to parenting roles (Bellù & Condò, 2017; Gümüşsoy et al., 2020). Therefore, determining fathers' support for breastfeeding is of utmost importance (Agrawal et al., 2022; Al Namir et al., 2017).

Despite various tools gauging the support perceived by mothers from their husbands during the breastfeeding process, there is a notable absence of a developed measurement tool assessing how fathers evaluate and perceive themselves while providing support in this context. Limited existing measurement tools for fathers further highlight the need for comprehensive instruments in this area (Dennis et al., 2018; Rempel et al., 2017).

While numerous studies in the literature underscore the substantial influence of fathers on the initiation and sustained practice of breastfeeding, there is a noticeable inadequacy in the available measurement tools assessing paternal support in this context (Meedya et al., 2017; Wang et al., 2018). This study seeks to address this gap by focusing on the development and psychometric evaluation of the Paternal Support Scale of Breastfeeding (PSSB).

Methods

Study design and participants

The present research, designed as a methodological study, aimed to develop the Paternal Support Scale of Breastfeeding and assess its psychometric properties. The sample of the study consisted of fathers with infants who were actively breastfed between 0 and 6 months during the research period. Spouses of mothers experiencing separation, issues impacting the breastfeeding process, and those with infants facing congenital anomalies were not included in the study. In the literature, a minimum of 3, 5, or 10 individuals per scale item is recommended in validity and reliability studies (Tavşancıl, 2019). Thus, the study aim was to incorporate at least 5–10 fathers per item for the 21-item PSSB developed by the researchers, resulting in a targeted sample size of 210 fathers. Ultimately, the study reached completion with the participation of 203 fathers. The study carried out in a Medical Faculty Hospital's pediatric health and diseases polyclinics at Konya in Turkey between January and June 2022.

Scale development

The study initiated with an extensive literature review, exploring research on the influence of spouses on breastfeeding. Subsequently, interviews were conducted with both fathers and mothers of infants actively breastfed for 0–6 months. Additionally, semi-structured interviews were undertaken with three experienced midwives working as breastfeeding consultants. After all these preliminary studies, a draft item pool was created.

In the literature search, the databases of Web of Science, Google Scholar, Pubmed, and CINAHL were queried using keywords such as "breastfeeding, spousal support, paternal support, support". Then, in-depth interviews were held with five parents (both mothers and fathers) to gain insights into their perspectives on breastfeeding support. Employing a semi-structured interview format, both mothers and fathers were individually assessed on their desires for spousal support in breastfeeding. Additionally, the feedback from the interviews with three breastfeeding-experienced midwives contributed to shaping a draft scale comprising 21 items.

After the item pool was created, the surface validity of the items in the question pool was scrutinized to ascertain if they effectively

measured fathers' perceptions of supporting mothers during breastfeeding. Face validity assesses whether the items in the pool are suitable for the target audience (DeVellis, 2003; Şencan, 2005). For this purpose, researchers and two pediatric nursing experts examined the items in the item pool in terms of intelligibility, length, and ease of response. As a result of the evaluation, all the items were retained in the item pool as they were deemed appropriate, aligning with specified criteria (DeVellis, 2003; Şencan, 2005).

Pilot study

In the pilot study, the 21-item draft scale was applied to 20 fathers to assess readability, comprehensibility and response time. Through this process, the scale was refined and finalized. Notably, fathers provided positive feedback, reporting no issues with the readability or comprehensibility of the scale. Furthermore, the fathers efficiently completed the form, with an average response time of 6 min. It is crucial to highlight that the data collected during the pilot application were excluded from the main sample utilized in the subsequent validity and reliability study.

Data collection tools

Data for the study were gathered using the "Personal Information Form," designed to collect introductory details about the participating fathers, and the "Paternal Support Scale of Breastfeeding".

Personal information form

Following the researchers' literature review, a "Personal Information Form" was developed, consisting of 10 questions on the following socio-demographic characteristics of the fathers: fathers' age, education level, income level, number of children, profession, place of residence, gender of the baby, pregnancy planning status, and participation in breastfeeding education (Arora et al., 2000; Başer, 2018; Çiftçi, 2022; Kucukoglu et al., 2023; Kumral, 2021; Metin & Altınkaynak, 2020; Santana et al., 2018).

Paternal support scale of breastfeeding

The primary objective of the scale is to assess fathers' support for their spouses during the breastfeeding process. The outcome of the validity-reliability analysis aligns with a one-dimensional structure, encompassing 21 items. The final version is formatted as a 5-point Likert scale. Notably, there are no reverse-coded items in the scale, and respondents are required to indicate their agreement on a gradual scale from 1 = strongly disagree to 5 = strongly agree for each item. Scores on the scale range between a minimum of 21 and a maximum of 105 points. The absence of a cut-off point implies that there is no predefined threshold for the scale. A higher total score indicates a greater level of support that fathers provide to their spouses during the breastfeeding journey.

Data collection

The data collection process involved fathers attending routine examinations at the neonatal and pediatric outpatient clinics of a university hospital and who agreed to participate in the study. Following the completion of routine examination procedures, the researcher informed participants about the study, and fathers who expressed interest provided informed consent by signing consent forms. Subsequently, fathers were directed to a room where physical measurements of infants (weight, height, and head circumference) and vital sign checks (fever, respiration, oxygen saturation, heart rate) were conducted. Each participant was attended to individually.

Upon entering the room, fathers were presented with a Personal Information Form and the Paternal Support Scale of Breastfeeding, which they completed individually. If mothers were not present, the researcher ensured the well-being of infants while fathers filled out the data collection forms. On average, the data collection process for each father took approximately 6 min. The total number of participants was 203.

Statistical analysis

The SPSS 25 package program was used for data analysis. In evaluating the suitability of the data for factor analysis, it is essential that the item-total correlation coefficients should be >0.30. In addition, the Kaiser-Meyer-Olkin (KMO) criterion, derived from correlation and partial correlation coefficients, is employed to evaluate the appropriateness of the dataset for factor analysis. If the KMO value is >0.5, the dataset is considered suitable for factor analysis (Cerny & Kaiser, 1977). In this study, the principal components method was employed to derive factors, followed by confirmatory factor analysis to assess whether the data obtained from exploratory factor analysis aligns with the hypothetical or theoretical factor structures. Confirmatory factor analysis, on the other hand, is used to confirm the structure obtained through exploratory factor analysis or validating a predetermined the theoretical factor structure (Brown, 2015). SPSS and Amos (Version 24.0) package programs were utilized for exploratory factor analysis and confirmatory factor analysis, in which the appropriate number of factors to define the basic structure was revealed based on the data matrix. For descriptive analysis of the independent variables in the study, various statistical measures were employed, including the number, percentage (%), mean ± standard deviation, median (M), and minimum (min) and maximum (max) values. These statistics provide a comprehensive overview of the characteristics of the variables under consideration. The normality assumption, a prerequisite for parametric tests, was assessed with the Shapiro-Wilk test. Comparative analyses of scale scores for variables with two categories were conducted using independent sample t-test, while variables with more than two categories were subjected to Analysis of Variance. In questionnaire-based studies, kurtosis and skewness coefficients within the range of (-1) to ($+1$) are typically deemed acceptable for normality. In the present study, the skewness coefficient of the scale score was found to be 0.171 units, and the kurtosis coefficient was 0.823. Furthermore, the result of the Shapiro-Wilk test indicated that the scale score exhibited a normal distribution ($p > 0.05$). For this reason, parametric tests were deemed appropriate and were accordingly employed in the study.

In cases where analysis of variance yielded significance, the Bonferroni test was applied for multiple comparisons. Exploring positive or negative relationships between numerical variables was accomplished through the Spearman correlation coefficient. The predetermined significance level for all analyses was set at $p < 0.05$.

Ethical considerations

This research complies with the principles outlined in the Declaration of Helsinki. The study received ethical approval, with a decision from the ethics committee of KTO Karatay University Non-Interventional Clinical Research Ethics Committee. Additionally, permissions (Numbered: E-14567952-900-129,005) were secured from the hospital where the study was conducted.

Results

Table 1 shows that the average age of the participating fathers in the research is 31.25 ± 5.27. A majority of them have attained an undergraduate or higher education level (47.3%). Additionally, a significant portion of the participants reported having only one child (51.7%) and being employed in the public sector (52.2%). The majority of fathers

Table 1
Demographic characteristics of fathers.

	Statistics
Age	
Mean ± SD	31.25 ± 5.27
M (min-max)	31 (20–45)
Education	
Primary education	30 (%14.8)
High school	77 (%37.9)
>Bachelor	96 (%47.3)
Working status (a day)	
All day long	95 (%46.8)
Night	33 (16.3)
Mixed	75 (%36.9)
Perception of income	
Low Income	46 (%22.7)
Middle Income	98 (%48.3)
Upper Income	59 (%29.1)
Number of children	
1	105 (%51.7)
>2	98 (%48.3)
Working status	
Unemployed	10 (%4.9)
Self-employment	78 (%38.5)
Official	115 (%54.6)
Residence place	
City	124 (%61.1)
Town	66 (%32.5)
Rural	13 (%6.4)
Infant's gender	
Female	102 (%50.2)
Male	101 (%49.8)
Planning status of pregnancy	
Planned	130 (%64)
Unplanned	73 (%36)
Infant age (months)	
Mean ± SD	4.36 ± 5.81
min-max	1–6
Breastfeeding education	
Yes	54 (%26.6)
No	149 (%73.4)

Summary statistics are given as mean ± standard deviation and Median (minimum, maximum) for numerical data and Number (Percentage) for categorical data.

Table 2
Validity and reliability results of the PSSB.

Items	Item No.	Factor Loads	Total Correlation	Explained Variance %	Cronbach Alpha
Item	1	0.777	0.746		
Item	2	0.819	0.790		
Item	3	0.805	0.779		
Item	4	0.777	0.749		
Item	5	0.741	0.711		
Item	6	0.663	0.632		
Item	7	0.834	0.809		
Item	8	0.839	0.816		
Item	9	0.811	0.786		
Item	10	0.744	0.712		
Item	11	0.668	0.639	57.85	0.963
Item	12	0.680	0.647		
Item	13	0.764	0.735		
Item	14	0.815	0.788		
Item	15	0.803	0.779		
Item	16	0.802	0.774		
Item	17	0.789	0.764		
Item	18	0.719	0.688		
Item	19	0.683	0.652		
Item	20	0.675	0.644		
Item	21	0.720	0.692		

$KMO = 0.942$ $Df = 210$ $\chi^2 = 3674.597$ $p < 0.001$
KMO: Kaiser–Meyer–Olkin; Df: Degrees of Freedom.

Construct validity

When Table 3 is examined, it is seen that 21 items in the scale were formulated in a 5-point Likert type. The mean item score of the scale ranged from a minimum of 0.63 to a maximum of 0.81, with an overall average of 3.65 ± 0.72 points. When Table 4 is examined, in the model obtained as a result of the factor analysis explained ($\chi2 = 347,526$ df = 159), there is only one dimension of the scale of father support in breastfeeding. Fit indices indicated that the model achieved an acceptable level of adequacy. Confirmatory factor analysis was then applied to the PSSB, which consists of 21 items and one dimension. When Table 4 is examined, it is seen that 11 items constituting the PSSB have a statistically significant effect on the total score ($p < 0.05$). Among these items, items 7 and 8 demonstrated the most substantial impact, whereas item 11 had the lowest impact (Table 4).

Internal validity and reliability

The reliability of the PSSB was assessed using both Cronbach's alpha reliability coefficient (α) and the split-half reliability method. The internal consistency of the scale, as indicated by the Cronbach's alpha coefficient, was notably high, with a value of 0.963 (Table 2). This robust score strongly suggests that the scale adheres to the reliability criteria.

Split-half reliability

An additional method employed to assess the reliability of the scale involved the split-half technique. The 21-item scale was divided into two halves: one comprising 11 items from odd-numbered questions and the other consisting of 10 items from even-numbered questions. The Cronbach's Alpha value for the first half of the scale was 0.933, while the second half demonstrated a Cronbach's Alpha value of 0.922. The Guttman Cronbach's Alpha value was determined to be 0.963. These results indicate that the reliability of the scale is at a very good level.

Table 5 reveals a positive and moderate relationship between the PSSB and education level and income level, and a negative and weak relationship between the number of children, achieving statistical significance. Table 5 shows a statistically significant effect on the PSSB score in breastfeeding ($p < 0.05$). Notably, fathers employed in the public sector

(61.1%) resided in the city center and it was observed that the gender of the children for 50.2% of the fathers was female. Notably, while a considerable proportion of fathers (64%) stated that the pregnancy was planned, only 26% of them attended training on breastfeeding.

Content validity

Opinions were received from ten experts who have studies on breastfeeding on the content and conceptual adequacy of the items to assess whether the newly created scale effectively measures fathers' support for breastfeeding. One of these experts is a midwife who provides active breastfeeding counseling, and nine of them work as an academician in pediatric health and diseases nursing, specializing in breastfeeding. The scale, initially comprising 21 items, underwent no alterations based on the recommendations provided by these experts. The Content Validity Index (CVI), utilized to gauge expert opinions, revealed an item-based coverage ratio ranging from 0.80 to 1.00, with an overall scale-based content validity index of 0.914.

To ensure linguistic accuracy, the draft form was subjected to evaluation by a Turkish language expert, who assessed it in terms of language proficiency and Turkish grammar. Following expert feedback, it was determined that the 21-item draft scale was well-suited for pilot application. The PSSB encompasses 21 questions within a singular dimension, explaining 57.85% of the total variance. Additionally, the scale demonstrates high reliability, with Cronbach's Alpha coefficients reaching 0.963 (Table 2).

Table 3
Distribution of construct validity of the questions on the PSSB.

Items	Item No.	Average	Frequency (n = 203)				
			1	2	3	4	5
Item	1	3.61 ± 0.90	0 (%0)	24 (%11.8)	65 (%32)	81 (%39.9)	33 (%16.3)
Item	2	3.75 ± 0.94	0 (%0)	23 (%11.3)	53 (%26.1)	79 (%38.9)	48 (%23.6)
Item	3	3.75 ± 0.89	0 (%0)	18 (%8.9)	58 (%28.6)	83 (%40.9)	44 (%21.7)
Item	4	3.77 ± 1.08	6 (%3)	20 (%9.9)	51 (%25.1)	64 (%31.5)	62 (%30.5)
Item	5	3.59 ± 1.01	5 (%2.5)	25 (%12.3)	57 (%28.1)	77 (%37.9)	39 (%19.2)
Item	6	3.49 ± 0.96	4 (%2)	28 (%13.8)	64 (%31.5)	79 (%38.9)	28 (%13.8)
Item	7	3.73 ± 0.98	3 (%1.5)	18 (%8.9)	59 (%29.1)	73 (%36)	50 (%24.6)
Item	8	3.46 ± 0.98	1 (%0.5)	37 (%18.2)	63 (%31)	71 (%35)	31 (%15.3)
Item	9	3.59 ± 0.96	4 (%2)	25 (%12.3)	54 (%26.6)	88 (%43.3)	32 (%15.8)
Item	10	3.75 ± 1.00	4 (%2)	14 (%6.9)	66 (%32.5)	64 (%31.5)	55 (%27.1)
Item	11	3.41 ± 0.94	1 (%0.5)	36 (%17.7)	71 (%35)	69 (%34)	26 (%12.8)
Item	12	3.62 ± 0.96	0 (%0)	25 (%12.3)	71 (%35)	63 (%31)	44 (%21.7)
Item	13	3.72 ± 0.97	0 (%0)	25 (%12.3)	57 (%28.1)	71 (%35)	50 (%24.6)
Item	14	3.70 ± 0.97	1 (%0.5)	25 (%12.3)	53 (%26.1)	78 (%38.4)	46 (%22.7)
Item	15	3.67 ± 0.91	0 (%0)	22 (%10.8)	61 (%30)	81 (%39.9)	39 (%19.2)
Item	16	3.76 ± 0.89	0 (%0)	17 (%8.4)	60 (%29.6)	81 (%39.9)	45 (%22.2)
Item	17	3.67 ± 0.95	0 (%0)	25 (%12.3)	60 (%29.6)	75 (%36.9)	43 (%21.2)
Item	18	3.67 ± 0.87	1 (%0.5)	17 (%8.4)	64 (%31.5)	87 (%42.9)	34 (%16.7)
Item	19	3.65 ± 0.93	1 (%0.5)	25 (%12.3)	55 (%27.1)	85 (%41.9)	37 (%18.2)
Item	20	3.60 ± 0.93	1 (%0.5)	23 (%11.3)	69 (%34)	73 (%36)	37 (%18.2)
Item	21	3.72 ± 0.96	1 (%0.5)	16 (%7.9)	74 (%36.5)	59 (%29.1)	53 (%26.1)
Total					3.65 ± 0.72		

Summary statistics are given as mean ± standard deviation for numerical data and as Number (Percentage) value for categorical data.

exhibited significantly higher item score averages for support levels. The mean item score of the PSSB also attained statistical significance, indicative of its robust performance (p < 0.05).

Discussion

The breastfeeding journey is a long process in which both the mother and the father have roles. The active and supportive participation of fathers in this process creates positive effects for their spouses and babies and increases breastfeeding rates to a great extent. Spousal support has more influence on mothers than other people in the social circle. Throughout the active breastfeeding period, mothers typically anticipate their spouses to assume responsibility, contribute to decision-making, and provide emotional support. However, there is a scarcity of measurement tools in Turkey specifically designed to assess fathers' support in the breastfeeding process. Therefore, in this study, the validity and reliability of the PSSB measurement tool was tested. In this part of the study, a discussion on the descriptive characteristics of fathers and the validity and reliability of the scale are presented.

Relationship of the PSSB with demographic variables

In numerous studies exploring fathers' involvement in infant care, factors such as age, education level, occupation, and working hours have been consistently identified as having a substantial impact. While this study did not find a statistical difference between fathers' age and breastfeeding support, it revealed that education level, income, number of children, occupation, work style, place of residence, whether the baby was desired, and the status of receiving breastfeeding education significantly influenced fathers' breastfeeding support. Consistent with other research, higher education levels were associated with increased support for spouses, and a higher rate of exclusive breastfeeding in the first six months (Ahmeduzzaman & Roopnarine, 1992; Canbay, 2018; Gözükara, 2014; Tekgöçen, 2018; Tezergil, 2007; Wang et al., 2018).

Considering that education level often reflects socio-economic status, it can be inferred that fathers with higher economic status tend to provide greater support to their spouses. Although existing literature primarily focuses on the relationship between marital status and breastfeeding in mothers (Adugna et al., 2017; Rempel et al., 2017;

Santana et al., 2018), some studies on fathers, including this one, found no significant impact of marital status on spouses' breastfeeding practices (Tekgöçen, 2018). In line with earlier findings, higher-income fathers were reported to offer more support to their spouses (Ahmeduzzaman & Roopnarine, 1992; Coverman & Sheley, 1986). Moreover, the number of children was identified as a factor influencing the father-infant relationship (Srisopa & Lucas, 2021; Ustunsoz et al., 2010).

When the studies in the national literature are examined, it is reported that spousal support increases the breastfeeding success of mothers. However, in Turkey, fathers often lack sufficient knowledge about breastfeeding, emphasizing the need for further studies to enhance fathers' understanding and involvement in this crucial aspect of infant care (Çiftçi, 2022; Kumral, 2021; Metin & Altınkaynak, 2020; Ustunsoz et al., 2010).

Reliability analysis

The reliability coefficient of a scale serves as an indicator of its ability to effectively measure the intended concept, and a value close to 1 is generally desired. In this context, a reliability coefficient falling within the range of 0.60–0.79 suggests that the scale is reliable, while a value between 0.80 and 1.00 indicates a high level of reliability (Akgül, 2005). In the present study, the reliability coefficient for the scale was determined to be 0.96, signifying that the scale is exceptionally reliable for measuring paternal support.

Item score analysis

One of the crucial reliability analyses employed in studies involving the development or adaptation of a measurement tool is the item score analysis test, which assesses the relationship between individual items and the overall scale. In this analysis, a correlation coefficient value is assigned to each item within the PSSB. A robust correlation coefficient implies a favorable relationship between the items and the subject under investigation, indicating a high measurement capacity for the items (Şencan, 2005). If the item correlation coefficients surpass 0.40 for each item, it can be interpreted as "very good," signifying excellent discrimination and reliability simultaneously (Gozum & Aksayan, 2002; Tavşancıl, 2019). In the analysis conducted for the items of the

Table 4
Evaluation of the effects between scale items, total score and PSSB' model fit scores.

			$z\beta$	β	SE	t	p
I 1	←	Total Score	0.741	0.893	0.049	**18.344**	**<0.001**
I 2	←	Total Score	0.790	1.000	–	–	–
I 3	←	Total Score	0.759	0.902	0.051	**17.551**	**<0.001**
I 4	←	Total Score	0.772	1.097	0.090	**12.196**	**<0.001**
I 5	←	Total Score	0.680	0.920	0.088	**10.456**	**<0.001**
I 6	←	Total Score	0.654	0.846	0.085	**9.984**	**<0.001**
I 7	←	Total Score	0.834	1.098	0.080	**13.677**	**<0.001**
I 8	←	Total Score	0.834	1.098	0.081	**13.585**	**<0.001**
I 9	←	Total Score	0.830	1.075	0.079	**13.526**	**<0.001**
I 10	←	Total Score	0.733	0.983	0.085	**11.511**	**<0.001**
I 11	←	Total Score	0.647	0.820	0.090	**9.134**	**<0.001**
I 12	←	Total Score	0.658	0.853	0.085	**10.082**	**<0.001**
I 13	←	Total Score	0.727	0.950	0.083	**11.406**	**<0.001**
I 14	←	Total Score	0.774	1.007	0.082	**12.322**	**<0.001**
I 15	←	Total Score	0.759	0.929	0.077	**12.047**	**<0.001**
I 16	←	Total Score	0.808	0.970	0.074	**13.027**	**<0.001**
I 17	←	Total Score	0.791	1.006	0.079	**12.672**	**<0.001**
I 18	←	Total Score	0.704	0.823	0.075	**10.962**	**<0.001**
I 19	←	Total Score	0.670	0.830	0.081	**10.233**	**<0.001**
I 20	←	Total Score	0.653	0.816	0.082	**9.993**	**<0.001**
I 21	←	Total Score	0.703	0.899	0.082	**10.945**	**<0.001**

Measurement	Good Fit	Acceptable Fit	Fit Index Values of the Model
(χ^2/sd)	≤3	≤4–5	2.186 **
RMSEA	≤0.05	0.06–0.08	0.077 *
SRMR	≤0.05	0.06–0.08	0.044 **
IFI	≥0.95	0.94–0.90	0.949 *
CFI	≥0.95	0.94–0.90	0.948 *
GFI	≥0.90	0.89–0.85	0.869 *
TLI	≥0.95	0.94–0.90	0.931 *

β: Regression coefficient, se: Standard error, $z\beta$: Standardized regression coefficient. The parts determined in bold are statistically significant ($p < 0.05$). * Acceptable fit; ** Upper fit.

PSSB, it was observed that the item-total score correlation values for the 21-item scale ranged between 0.63 and 0.81 for each item, with all values being statistically significant. These findings underscore the scale's items' exceptional discriminatory power, indicative of their ability to effectively measure the construct under scrutiny.

Consistency analysis

The results of the scale's split-half analysis surpassed the values recommended in the literature, affirming that the scale exhibits a high level of reliability.

Content validity

The content validity index of the PSSB was assessed by 10 experts. It is generally considered ideal for the content validity index value to exceed 0.80 for each item (Gozum & Aksayan, 2002; Şencan, 2005).

Upon examination of the values, it has been established that the PSSB scale demonstrates validity in terms of its scope. The scale, as evaluated and agreed upon by the experts, received its final form and was initially administered to 10 fathers possessing the same characteristics as the pre-application sample. As there was no undesirable feedback regarding the clarity and comprehensibility of the scale after the pre-application, the scale was subsequently applied to the entire sample.

Construct validity

Construct validity analysis is conducted to assess whether the items can be categorized under distinct subgroups, thereby identifying common factors through this categorization. It is generally recommended to conduct exploratory factor analysis in the initial stages of scale development studies (Şimsek, 2007; Tavşancıl, 2019). The results of the exploratory factor analysis for the PSSB yielded a Kaiser Meyer-Olkin coefficient of 0.942 with Df = 210 and $\chi2$ = 3674.597, $p < 0.001$.

Table 5
Relationships and comparisons between PSSB and demographic characteristics.

Characteristics			Paternal Support Scale of Breastfeeding	
Age			$rho = -0.080\ p = 0.258$	
Education			**$rho = 0.452\ p < 0.001$**	
Perception of income			**$rho = 0.266\ p < 0.001$**	
Number of children			**$rho = -0.162\ p = 0.021$**	
Infant's age (months)			$rho = -0.076\ p = 0.281$	
	Paternal Support Scale of Breastfeeding		Test	(p)
	Mean ± SD	M (min-max)		
Working status			$F = 20.197$	**$p < 0.001$**
Unemployed	3.44 ± 0.75 [b]	3.2 (2.6–4.7)		
Self-employment	3.30 ± 0.69 [b]	3.1 (2–4.9)		
Official	3.91 ± 0.64 [a]	4 (2.3–5)		
Working status (a day)			$F = 3.091$	**$p = 0.048$**
All day long	3.78 ± 0.69 [a]	4 (2.5–5)		
Night	3.51 ± 0.67 [b]	3.6 (2.3–4.7)		
Mixed	3.54 ± 0.76 [b]	3.6 (2–5)		
Residence place			$F = 5.580$	**$p = 0.004$**
City	3.77 ± 0.74 [a]	3.9 (2–5)		
Town	3.52 ± 0.68 [ab]	3.6 (2.3–4.9)		
Rural	3.19 ± 0.53 [b]	3.1 (2.4–4.1)		
Infant's gender			$F = 0.255$	$p = 0.799$
Female	3.66 ± 0.73	3.8 (2–5)		
Male	3.64 ± 0.71	3.7 (2–5)		
Planning status of pregnancy			$F = 5.639$	**$p < 0.001$**
Yes	3.85 ± 0.70 [a]	4 (2–5)		
No	3.30 ± 0.62 [b]	3.1 (2.3–4.6)		
Breastfeeding education			$F = 4.900$	**$p < 0.001$**
Yes	4.04 ± 0.68 [a]	4.2 (2–5)		
No	3.51 ± 0.69 [b]	3.6 (2.3–4.9)		

Student's t-Test (t); ANOVA (F); Summary statistics are given as mean ± standard deviation and Median (minimum, maximum) value. a > b: Different letters or letter combinations on the same line represent statistically significant difference (p < 0.05), rho: Pearson correlation coefficient, sections determined as bold are statistically significant (p < 0.05).

Based on these results, it was determined that the sample size was sufficiently large for factor analysis, the data distribution was homogeneous, and the scale explained 57.85% of the total variance, confirming its single-factor structure.

In the literature, it is generally accepted that factor loadings should explain the total variance within the range of 40–60% (Şencan, 2005). The lower limits of factor loadings for items can be determined based on the sample size, and a factor loading of 0.36 is recommended for 200 people. Moreover, factor loadings of 0.60 and above for each item are considered highly valid (Gozum & Aksayan, 2002; Nunnally & Bernstein, 2010; Tavşancıl, 2019). In this study, the factor loadings for the items ranged from 0.66 to 0.83, affirming that the scale exhibits construct validity.

Additionally, for exploratory factor analysis, a variance value explained within the range of 0.40 to 0.60 is considered suitable (Çokluk & Şekercioğlu, 2014). The obtained explained variance ratio of 57.85 in this study was deemed sufficient. Moreover, in confirmatory factor analysis, CFI represents the degree of variance explained in a covariance matrix, with a value between 0 and 1. A higher CFI value indicates a better fit for the model, and CFI should ideally exceed 0.90 (Hu & Bentler, 1999). In this study, the CFI value was determined to be 0.948, further supporting the construct validity of the scale.

Confirmatory factor analysis

Following the CFA, the chi-square value to degrees of freedom ratio was found to be less than three. Fit indices, including RMSEA, GFI, CFI, TLI, and IFI, demonstrated acceptable values, indicating a good fit (SRMR, χ2/df) (Hooper et al., 2008; Şimsek, 2007). The results of the CFA in this study align with the values commonly reported in the literature. The CFA results indicated that the data were consistent with the model, affirming the structure identified through exploratory factor analysis, and that the items were sufficiently correlated with the concept being measured across the scale. The CFA results provided evidence that the items were successful in measuring paternal support for breastfeeding. This suggests that the PSSB can effectively measure the intended construct in a distinct manner. All these findings collectively support the conclusion that the PSSB is a valid scale. In literature, it is often recommended to revise or eliminate items with an item-total correlation below 0.30 (Şencan, 2005). Additionally, the factor loading of an item should be ≥0.45, demonstrating a high loading value under a single factor (Büyüköztürk, 2010). Given that the factor loading of all items in the scale exceeded 0.30, no items were deemed necessary for removal from the scale.

Response bias of scale

The potential impact of reaction bias on the reliability and validity of the scale is a crucial consideration, especially when responses from the target group are influenced by the scale's application purpose and societal perspective (Şencan, 2005). To assess response bias in the PSSB, the Hotelling T-square test was employed, revealing a statistically significant result with Hotelling $T^2 = 129.784; p < 0.001$. These findings indicate the absence of response bias, affirming the scale's additive nature. Further analysis using the Turkey test confirmed the additivity of the scale, yielding F = 3.095 and p = 0.074. This statistical evaluation reinforces that the PSSB is indeed additive.

Strengths and limitations

The strength of the scale lies in its high reliability coefficient, ensuring a consistent and dependable measure of paternal support. However, it is important to note that the scale, known as PSSB, was developed based on Turkish culture. This suggests that the sociocultural characteristics of the participants may have influenced the scale's design and outcomes. Consequently, it is imperative to conduct validity and reliability studies for the PSSB in other countries and various languages to ensure its applicability and effectiveness in diverse cultural contexts.

Implications for practice

The scale presents a valuable tool for assessing fathers' support in breastfeeding. Health professionals, including nurses and midwives, can effectively utilize this scale to identify fathers with lower levels of breastfeeding support. This information can guide the development of targeted training programs or direct fathers to breastfeeding support classes. Fathers who undergo such support initiatives are more likely to seamlessly embrace their parenting role. The effectiveness of the scale can be further evaluated through randomized controlled trials, longitudinal interventional studies, or cross-cultural assessments. The scale's inclusion of universal items pertaining to paternal support of breastfeeding makes it adaptable to different cultural contexts. Researchers can readily customize and implement this scale in their respective societies, facilitating its seamless integration into relevant studies. By enhancing fathers' conscious support through education, this scale contributes to fostering a supportive environment, reducing feelings of exclusion, and promoting a successful breastfeeding period for mothers.

Conclusions

The findings of this study, conducted to assess paternal support of breastfeeding, revealed that the PSSB is a highly valid and reliable instrument that can be used to measure support during the breastfeeding process. This self-reported measurement tool effectively evaluates the levels of breastfeeding support provided by fathers. The scale, designed for fathers with infants aged 0–6 months, can be employed in various study designs to investigate breastfeeding support levels and the influencing factors. Its adaptability to different cultural contexts allows for cross-cultural comparisons in research. Utilizing this scale in diverse study designs enables the determination of breastfeeding support levels among fathers of infants aged 0–6 months and the identification of influencing factors. The scale's flexibility for cultural adaptation facilitates cross-cultural comparative studies, providing a versatile tool for research across various populations and contexts.

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Ethical statement

KTO Karatay University Non-Interventional Clinical Research Ethics Committee. Written approval, numbered E-14567952-900-129005, was obtained from the chief physician of the hospital where the study was conducted.

CRediT authorship contribution statement

Hilal Kurt Sezer: Writing – review & editing, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Merve Aşkın Ceran:** Writing – original draft, Software, Resources, Project administration, Methodology, Investigation, Conceptualization. **Mert Demirsoz:** Visualization, Validation, Software, Resources, Methodology, Formal analysis, Data curation. **Sibel Kucukoglu:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Funding acquisition, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no conflict of interest and the content has not been published or submitted for publication elsewhere.

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