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Research paper

The reversed Birth Satisfaction Scale: Translation, adaptation and validation for a Greek sample

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ABSTRACT

INTRODUCTION The Birth Satisfaction Scale (BSS) is an important screening instrument that is used with mothers during the postpartum period for the identification of postnatal birth satisfaction. The purpose of this study was to validate and adapt the Greek version of the BSS to test its sensitivity, specificity and predictive values.

METHODS Childbearing women (n=310) were recruited from the perinatal care registers of the Maternity Departments of 3 Hospitals of Athens municipality (public Maternity Departments) in 2014. Inclusion criteria included fluency in spoken and written Greek language, within 1-4 postpartum days, and delivery of a healthy infant. Exploratory Factor Analysis (EFA) on the 30-items on the BSS revealed 7 orthogonal factors (KMO measure of sampling adequacy=0.856 and Bartlett's test of sphericity=2999.806, df=435, p<0.0005). A Receiver Operating Characteristic (ROC) analysis was conducted to evaluate global functioning of the scale. Within this context the scoring of the BSS was reversed from the original, to indicate that a lower score was a worse outcome.

RESULTS The Greek BSS showed high overall internal consistency (Cronbach's alpha value: 0.876, p<0.0001). The internal consistency characteristics of the Greek BSS showed good reliability: Cronbach's alpha was 0.876 for the total scale (Items 1-30), Standardized alpha 0.859 and Guttman split-half 0.864, Spearman-Brown 0.866. Our findings confirm the multidimensionality of BSS, demonstrating a seven-factor structure that contained subscales, reflecting the postnatal birth satisfaction. Exploratory Factor Analysis (EFA) demonstrated that the 7-factor model offered a very good fit to our data. The area under the minor satisfaction ROC curve is 0.796 (SD=0.025, Asymp. Sig.=0.0005; CI=0.748-0.845), sensitivity=73.8%, and specificity=70%.

CONCLUSIONS Our data confirm the validity of the Greek version of the BSS at identifying postnatal birth satisfaction. Hence, the Greek BSS could be used as a useful instrument in both clinical practice and research.

List of abbreviations used
BSS: Birth Satisfaction Scale
ROC: Receiver Operating Characteristic
AUC: Area Under Curve
KMO: Kaiser-Meyer-Olkin

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INTRODUCTION

Birth satisfaction is important in terms of both 'cost' and 'quality'[1]. In this respect, healthcare cannot be high quality unless the woman is satisfied with the care she has received[2], within a prescribed system and budget. Since every woman creates childbirth expectations differently and appreciation varies[3,4], it is important that women's birth experiences are evaluated. In terms of quantitative research, a woman's satisfaction with intrapartum care can only be considered high quality when gratification is high in relation to the care she has received[2]. A plethora of research has highlighted the wide spectrum of satisfaction with maternity care, however only a small number of validated scales has examined specifically satisfaction with intrapartum care[5,6].

Meaningful measurement of birth satisfaction can only be achieved using a rigorous, valid and reliable psychometric instrument, and

for this purpose Hollins Martin and Fleming[7] developed a 30-item psychometric scale (Birth Satisfaction Scale, BSS) to assess women's levels of birth satisfaction. The BSS was developed to facilitate researchers, maternity care staff and consumers to construct a meaningful picture of what in fact constitutes a woman's like or dislike of her birth experience[7]. To date, the scale has been validated in Scotland (UK)[8], USA[9], and Greece (Athens)[10]. In the Greek validation study[10], the sample of participants was considered to be small (n=162) and conducted via Internet, and therefore the purpose of the present study was to further validate (evaluate also the sensitivity and specificity) of the BSS for use within a population of Greek women between 1-4 postpartum days.

The aim of the present study was to determine the factor structure, validity and reliability of the Greek version of the BSS, and to consider creating a short-form version of the tool. Thus, the objectives of this study were to:

1. Test a Greek version of the BSS and assess its reliability and validity at measuring postnatal women's birth satisfaction in a sample of new mothers.

2. Examine the factor structure of the Greek BSS.

3. Evaluate the sensitivity, specificity and predictive values of the Greek BSS over a range of cut-off scores.

4. Potentially adapt the BSS score so that it reflects a simpler way of scoring.

METHOD

Translation and pilot study

The 30-item BSS was translated by 2 independent bilingual translators. One other native English speaker, who did not have knowledge of the original instrument, then back- translated the reconciliated Greek version. The backward translation was sent to a group of English experts (health professionals with specialization in perinatal psychology) for comments. The translated questionnaire was culturally adapted through a cognitive debriefing process that was used to identify any language problems and to assess the degree of respondents' understanding of the item content that was meant to be elicited[11]. In a pilot study, the new Greek version of the BSS was tested with 8 mothers. As part of the cultural-adaptation process, in-depth interviews were conducted to test respondents' understanding of scale items. Participants gave their views about the clarity of each item, the relevance of the content to their situation, the comprehensiveness of the instructions, and their ability to complete the Greek version BSS on their own.

Data collection

After receiving ethical approval (from the Ethical Boards of the two Hospitals), validation activities were initiated March-November 2014. Following correspondence by email and subsequent written informed consent, the mothers completed the BSS in the presence of the midwives in their homes or the postnatal ward. A cover letter explained the purpose of the study, provided the researchers' affiliation and contact information, and guaranteed confidentiality and anonymity. In addition to standard demographic questions, mothers completed the BSS questionnaire in the presence of a midwife during their stay at the postnatal ward. The order of completion of the two questionnaires was counterbalanced. Mothers were encouraged to discuss any concerns they might have and were told that the chief midwife would be informed of their responses to the screening.

Participants

The study was conducted in the two largest maternity public hospitals (Alexandra and Elena) in Greece that serve the population of Athens, as well as women from the rural areas of Greece. Childbearing women (n=310; 92.3%) were recruited from the perinatal care registers of the Maternity Departments of 2 Hospitals of Athens municipality (public Maternity Departments). To enhance the representativeness of the study sample, one researcher (VV), created a calendar to ensure balance across shifts and days of week. More specifically, the women were recruited at a steady rate, one day each week (i.e. first on Monday, the following week on Tuesday, the week following on Wednesday, etc.), to avoid bias associated with day of week delivered. Each recruitment day was split into three shifts (8 a.m., 4 p.m., 12 a.m.), with the first four women who had given birth after 8 a.m. approached one week, and the first four women who gave birth after 4 p.m. approached the following week, etc., to reduce possible bias regarding mode of delivery related to the time of delivery and to avoid over selection of caesarean-section women. Women were eligible for participation if they were: (1) aged between 18 and 45 years, (2) between 1-4 postpartum days after the delivery of a healthy infant, (3) fluent in spoken and written Greek, and (4) able to provide informed written consent. The women were screened for eligibility criteria by the midwife-researchers that visited them during their stay in the postnatal ward. A total of 310 women were recruited from the perinatal-care registers of the Maternity Departments of 2 Hospitals of Athens municipality (public Maternity Departments).

INSTRUMENTS

The BSS is a 30-item self-report scale that consists of statements that represent birth satisfaction[8,12]. Each item is scored on a 5-point Likert scale ranging from 0–4, with response options that range from 0 (totally satisfied) to 4 (not at all satisfied), and a total score is calculated (0-120). Items that measure negative statements are reverse-scored. With a lower score indicating more positive maternal birth experience. The 30-item scale includes the following core subscales:

1) Quality of care provision: (a) Home assessment[12,26]; (b) Birth environment[14,28]; (c) Sufficient support[10,24]; (d) Relationships with health care professionals[13,27].

2) Women's personal attributes: (a) Ability to cope during labour[1,15]; (b)Feeling in control[2,16]; (c)Preparation for childbirth[3,17]; (d)Relationship with baby[11,25].

3) Stress experienced during labour: (a) Distress experienced during labour[4,18]; (b)Obstetric injuries[5,19]; (c)Perception of having received sufficient medical care 7,21; (d)Receipt of an obstetric intervention[8,22]; (e)Pain experienced[29,30]; (f)Long labour[9, 23]; (g)Health of baby[6,20].

Within the context of the Greek setting, it was noted that this 'negative scoring', i.e. that a lower score was actually a better outcome, was not easily understood within Greek clinical practice and hence within the current approach the BSS scoring was reversed so that a lower score would mean a lower birth-satisfaction, while a higher score would mean better satisfaction.

Data analysis

Statistical analysis was performed using IBM SPSS Statistics Version[19]. Descriptive characteristics (including means, standard deviations, frequencies and percentages) were calculated for the socio-demographic variables. Assumptions of normality, homogeneity and independent cases of the sample were checked. Two independent

samples t-tests were carried out to compare BSS scores in the groups of satisfied and not-satisfied women, according to the gold-standard question (Did you have a satisfying birth experience?). Women were divided into 2 groups: satisfied (YES) and not-satisfied (NO).

Reliability

Reliability coefficients measured by Cronbach's alpha were calculated to assess reproducibility and consistency of the instrument; the internal consistency of the Greek BSS was also tested using Guttman split-half coefficients.

Factor structure

The underlying dimensions of the scale were checked with an Explanatory Factor Analysis (EFA) using a varimax rotation and Principal Components Method, as is the usual descriptive method for analysing grouped data[13]. Principal Component Analysis with varimax rotation was conducted to determine the dimensional structure using: (a) eigenvalue >114, (b) variables load > 0.50 on only one factor and on other factors less than 0.40, (c) interpretation of factor structure is meaningful, (d) Scree plot is accurate with means of Communalities above 0.6015. Computations were based on a covariance matrix, as all variables were receiving values from the same measurement scale[16]; during factor analysis, a Bartlett's test of sphericity ($p<0.05$) and a Kaiser-Meyer-Olkin (KMO) measured sampling adequacy of 0.856, were also implemented. A factor was considered important if its eigenvalue exceeded 114, with factor analysis identifying 7 independent subscales. Subsequent Cronbach's alpha was carried out on each subscale, to highlight how items grouped together.

Face and content validity

The research midwife investigated the meaning and acceptability of BSS items during the administration of the scale.

Criterion validity

Validity of the Greek-BSS (as a screening tool) was investigated by considering answers to the question ('I was not satisfied at all during my labour'), as a validated measure for classifying satisfied and not-satisfied mothers. As a result, the status satisfied was measured as 0 (non-disease) and the status not-satisfied (disease) was measured as 1. The diagnostic performance of BSS, or the accuracy of BSS to discriminate 'diseased cases' (not- satisfied) from 'normal cases' (satisfied) was evaluated using Receiver Operating Characteristic (ROC) curve analysis. It is important to note that within this context the BSS scale was reversed from the original BSS scale to reflect this approach.

Sensitivity and specificity

The sensitivity, specificity, and positive/negative predictive values were calculated at several cut-off scores. A Receiver Operating Characteristic (ROC) analysis displayed pairs of sensitivity and specificity values, as the threshold changed from low to high scores (by plotting the true-positive rate [sensitivity] on the vertical axis and the false-positive rate [one minus specificity] on the horizontal axis). The area under the ROC curve (AUC) is a quantitative indicator of the information content of a test and it may be interpreted as an estimate of the probability that a satisfied mother chosen at random will, at each threshold, have a higher test score than a not-satisfied mother.

RESULTS

Sample characteristics

The response rate (90%) was high, with sample demographic and

Table 1. Characteristics of sample

		According to BSS
	Frequency (n)	**4 (8.1%)**
Age		
<25	26	8,5
26-35	213	69,6
36-45	67	21,9
Nationality		
Greek	276	89,9
Other	31	10,1
Educational Status		
High School	22	7,1
Lyceum	117	37,7
University	133	42,9
MSc/PhD	38	12,3
Work Status		
Housewife	47	15,2
Unemployed	61	19,7
Student	4	1,3
Private Servant	46	14,8
Private Employee	108	34,8
Independent	32	10,3
Other	12	3,9
Family income per month (euros)		
500-1000	133	44
1000 -2000	94	31,1
2000-3000	35	11,6
>3000	40	13,2
Psychological Problem		
No	253	82,1
Yes	55	17,9
Family Status		
Married	105	33,9
Single	195	62,9
Divorced	1	0,3
Partner	9	2,9
Other Children		
Primigravida	159	51,3
Multigravida	151	48,7
Any Miscarriage		
No	251	81
Yes	59	19
Any Abortion		
No	265	85,8
Yes	44	14,2

Pregnancy		
Random	126	40,6
Scheduled	184	59,4
Duration of Gestation		
<37 weeks	93	30
37-42 weeks	206	66,5
>42 weeks	11	3,5
Delivery		
Normal Childbirth	132	42,6
Caesarean Section	175	56,5
Forceps	3	1
Epidural		
No	57	32,9
Yes	116	67,1
Episiotomy		
No	144	83,2
Yes	29	16,8
Place of Labour		
Hospital	259	97,7
House	6	2,3
Acting Childbirth		
Doctor	257	97
Midwife	8	3
Enema		
No	38	14,3
Yes	227	85,7
Urination during Labour		
Catheters	173	65,3
Bedpan	74	27,9
WC	18	6,8
Liquid consumption during Labour		
No	243	91,7
Yes	22	8,3
Mobility and Change of Position		
No	150	56,6
Yes	115	43,4
Newborn Nutrition		
Breastfeeding	107	65,2
More frequently breastfeeding	41	25
More frequently formula milk	8	2,6
Formula milk	8	2,6
Apgar test = 10		
No	9	5,4
Yes	157	94,6

obstetric characteristics shown in Table 1. Of the women, (n=159; 51.3%) were primaparae and (n=151; 48.7%) were multiparae. Mean BSS score was 38.15 (SD 14.319, Skewness 205.031, Std Error of Skewness 0.033, Kurtosis 0.138, Std Error of Kurtosis 0.030). Mean scores of individual questions had a range of 0.25-2.48, with questions 6 and 15 having the minimum and maximum mean score, respectively. To view the descriptive statistics see Table 4. The satisfied mothers based on the gold-standard question were (n=150; 48.40%); the mean BSS score was 30.62 (Std. Error 0.976, SD 11.951, CI 95% 17.357 to -11.840) for the satisfied mothers; and 45.22 (Std. Error 1.003, SD 12.682, CI 95% -17.352 to -11.846) for the not-satisfied. Levene's Test for equality of variances homogeneity gave (F=0.221) (t=-10.415 df=308, Sig. [2-tailed]=0.0005).

Psychometric characteristics of Greek BSS

Reliability

The Greek-BSS showed a very high overall internal consistency (Cronbach's alpha value: 0.876, p<0.0001). The internal consistency characteristics showed good reliability (Cronbach's alpha was 0.876 for the total scale [Items 1-30], Standardized alpha 0.859 and Guttman split-half 0.864, Spearman-Brown 0.866).

Factor Structure

Exploratory factor analysis

The exploratory factor analysis on the 30-item Greek-BSS revealed 7 orthogonal factors (KMO measure of sampling adequacy=0.856 and Bartlett's test of sphericity=2999.806, df=435, p<0.0005). Communalities for Greek BSS questions are presented in Table 2. The Scree plot (Figure 1) and Component plot in Rotated Space (Figure 2) indicate that there are 7 factors in the model, with these factors explaining 56.250% of the data (Table 2). The first factor (F1) includes the following items: 27 (Relationships with health-care professionals), 24 (Sufficient support), 14 and 28 (Birth environment), 7 and 21 (Perception of having received sufficient medical care) and 2 (Feeling in control). These are sufficient staff attitudes for pregnant women; therefore, we named this subscale 'Quality of care'. The second factor (F2) is composed of items 30 and 29 (Pain experienced), 4 and 18 (Distress experienced during labour), 26 (Home assessment), 23 and 9 (Long labour). Therefore, F2 represents 'Pain and Stress management'. The third factor (F3) includes the following items: 17 and 3 (Preparation for childbirth), 16 (Feeling in control), 15 (Ability to cope during labour), 12 (Home assessment), 10 (Sufficient support). Therefore, F3 represents 'Feelings and Support during labour'. The fourth factor (F4) is composed of items 22 and 8 (Receipt of an obstetric intervention) and was named 'Medicalization'. The fifth factor (F5) consists of items 20 (Health of baby) and 19 (Obstetric injuries); therefore, we named this subscale 'Birth Experience'. The sixth factor (F6) includes the following items: 6 (Health of baby) and 5 (Obstetric injuries). Therefore, the F6 represents 'Healthy Mother and Baby'. Finally, the seventh factor (F7) is composed of items 25 and 11 (Relationship with baby) and was named 'Skin-to-Skin'.

Validity

Face and content validity

The Greek-BSS was well accepted by the mothers. It was easily and very quickly completed (approximately 10 minutes). The questions appeared to be relevant, reasonable, unambiguous and clear.

Table 2. Exploratory factors and Explained Variance after rotation for the Greek BSS

Factors		*Rotation Sums of Squared Loadings*					
		Rescaled Loadings	**Eigen values**	**% of Variance**	**Cumulative Variance**	**Cronbach's alpha**	**Standardised alpha**
Factor I (Quality of care)	Question 27	0.725	7.008	23.361	23.361	0.801	0.801
	Question 24	0.708					
	Question 14	0.657					
	Question 7	0.622					
	Question 28	0.620					
	Question 21	0.615					
	Question 2	0.568					
Factor II (Pain and Stress management)	Question 30	0.775	2.872	9.574	32.935	0.802	0.802
	Question 4	0.705					
	Question 26	0.606					
	Question 29	0.596					
	Question 23	0.565					
	Question 9	0.543					
	Question 18	0.430					
Factor III (Feelings and Support during labour)	Question 17	0.735	1.984	6.614	39.549	0.659	0.665
	Question 3	0.589					
	Question 16	0.540					
	Question 15	0.490					
	Question 12	0.453					
	Question 10	0.452					
Factor IV (Medicalization)	Question 22	0.882	1.434	4.781	44.330	0.846	0.846
	Question 8	0.881					
Factor V (Birth Experience)	Question 20	0.750	1.305	4.351	48.681	0.706	0.711
	Question 19	0.552					
Factor VI (Healthy Mother and Baby)	Question 6	0.745	1.162	3.873	52.554	0.537	0.564
	Question 5	0.507					
Factor VII (Skin-to-Skin)	Question 25	0.754	1.109	3.695	56.250	0.530	0.531
	Question 11	0.529					

Table 3. Sensitivity, specificity of different cut-off scores of the Greek BSS for identifying positive or negative maternal birth experience

Threshold scores	Sensitivity (%)	Specificity (%)
31	85	52.7
34	80.6	58.7
35	80	62.7
36	78.8	66.7
37	73.8	70
38	70.6	70.7
39	66.9	73.3
40	62.5	76.7
41	59.4	80
43	55	84.7

Therefore, face validity was considered to be good. The content of Greek-BSS, with the reversed scoring, includes in a balanced way the full scope of the characteristics of postnatal birth satisfaction that it is intended to measure.

Criterion validity

The overall accuracy of the Greek-BSS as a screening instrument can be described as the area under its ROC curve. The curve was plotted considering, for the BSS scores, a range between 1 and 81 (the maximum score reached by one satisfied subject in our sample). The area under the minor satisfaction ROC curve is 0.796 (SD=0.025, Asymp. Sig.=0.0005; CI=0.748-0.845). Analysing the scale sensitivity in the detection of satisfied women at the 37 cut-off score, the sensitivity was 73,8 % and specificity 70 % (Table 3 & Figure 3).

Figure 4 shows the accuracy of the Greek-BSS in screening the mothers that participated in this study for postnatal birth satisfaction. The plot of the curves offers an excellent visual comparison of model performance, and the area-under-the-curve table gives evidence to back up conclusions.

Table 4. Descriptive Statistics of Questions of BSS

Question	Mean Range	St.Deviation	Skewness/Std Error of Skewness	Kurtosis/Std Error of Kurtosis
1	0,67	0,720	0,518/0,997	0,138/1,351
2	0,87	0,951	0,905/1,062	0,138/0,679
3	1,44	1,074	1,154/0,372	0,138/-0,587
4	1,92	1,132	1,282/-0,022	0,138/-0,747
5	0,65	0,743	0,551/1,139	0,138/1,561
6	0,25	0,499	0,249/1,972	0,138/4,072
7	0,43	0,664	0,440/2,082	0,138/6,862
8	2,43	1,545	2,388/-0,547	0,138/-1,273
9	1,14	1,135	1,287/0,856	0,138/-0,054
10	0,87	1,079	1,164/1,433	0,138/1,609
11	1,02	1,107	1,226/0,961	0,138/0,035
12	2,44	1,162	1,351/-0,366	0,139/-0,849
13	1,32	1,171	1,371/0,591	0,138/-0,664
14	0,91	0,854	0,730/0,864	0,138/0,619
15	2,48	1,232	1,519/-0,407	0,138/-0,946
16	1,42	1,165	1,358/0,658	0,138/-0,447
17	1,28	1,180	1,393/0,831	0,138/-0,204
18	1,69	1,237	1,530/0,303	0,138/-0,882
19	0,94	0,941	0,886/1,177	0,138/1,587
20	0,67	0,814	0,663/1,404	0,138/2,565
21	0,59	0,752	0,566/1,616	0,138/3,561
22	2,36	1,526	2,329/-0,324	0,138/-1,453
23	1,59	1,273	1,621/0,457	0,138/-0,932
24	0,60	0,669	0,448/1,064	0,138/1,903
25	1,28	1,189	1,413/0,746	0,138/-0,390
26	1,78	1,145	1,311/0,243	0,138/-0,717
27	0,71	0,766	0,587/1,148	0,138/1,883
28	0,70	0,691	0,477/0,532	0,139/-0,565
29	1,87	1,309	1,714/0,203	0,138/-1,127
30	1,84	1,164	1,355/0,250	0,138/-0,774

Figure 1. Scree plot

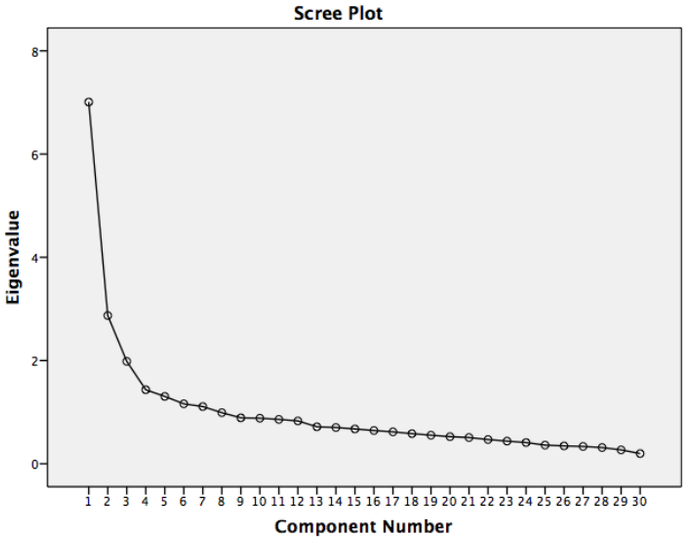
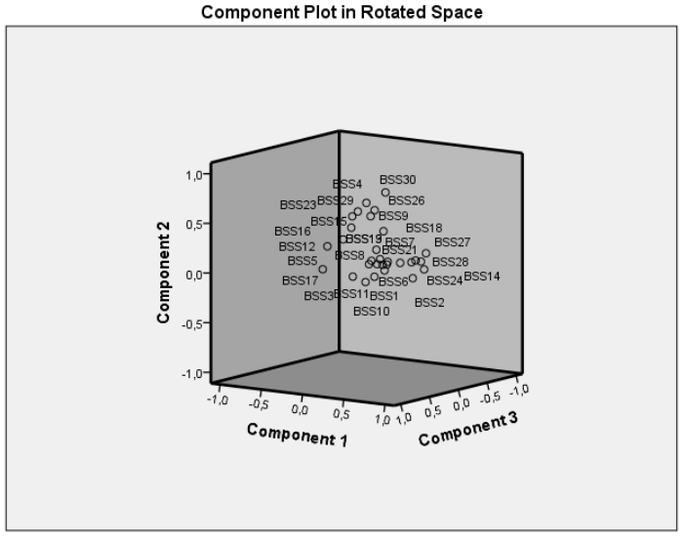


Figure 2. Component plot in Rotated Space



Construct validity

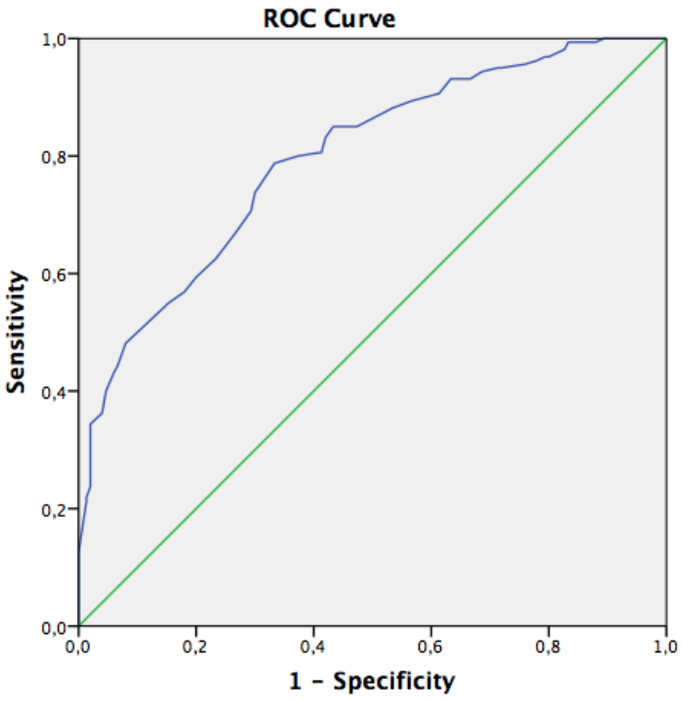
Convergent validity: for the Greek-BSS (Mean=38.15, SD=0.813), normal distribution, linearity and homoscedacity were checked. Moreover, according to factor analysis 7 subscales have been revealed within the BSS. Cronbach's alpha was 0.801 for the first subscale, 0.802 for the second, 0.659 for the third, 0.846 for the fourth, 0.706 for the fifth, 0.537 for the sixth, and 0.530 for the seventh.

DISCUSSION

Measuring women's satisfaction with their birth experience has been problematic. Every woman's perception of birth is important, which within this study is conceptualised as 'birth satisfaction'[5,6,8,10]. It has been also validated in Scotland (UK) and has shown remarkable stability and comparability, and similarly in Greece[5,8,10,12].

In our study, the Greek-BSS showed high overall internal consistency (Cronbach's alpha value: 0.876, p<0.0001) and good reliability.

Figure 3. ROC curve for Greek BSS



The Exploratory Factor Analysis (EFA) on the 30-item Greek-BSS revealed 7 orthogonal factors (KMO measure of sampling adequacy=0.856 and Bartlett's test of sphericity=2999.806, df=435, p<0.0005), whereas in the Scotland validation study a three-factor model comprising correlated factors of quality-of-care provision (4-items), women's personal attributes (2-items), and stress experienced during labour (4-items), resulting in a 10-item scale, was found to offer an adequate fit to the data (x2[df¼432]=70.47, x2/df=2.20, p<0.001, CFI¼0.93, RMSEA=0.08, RMR=0.05 and SRMR¼0.07). Our findings confirm the multidimensionality of BSS, demonstrating a seven-factor structure (F1: 'Quality of care', F2: 'Pain and Stress management', F3: 'Feelings and Support during labour', F4: 'Medicalization', F5: 'Birth Experience', F6: 'Healthy Mother and Baby', F7: 'Skin-to-Skin')[5,8,10,12].

Moreover, a Bartlett's test of sphericity with (p<0.05) and a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.856 were used in performing this factor analysis. A factor was considered important if its eigenvalue exceeded 114. As factor analysis found 7 independent subscales, subsequent Cronbach's alphas were separately carried out for each subscale, to highlight how the items group together. According to factor analysis 7 subscales have been revealed within the Greek-BSS. Cronbach's alpha was 0.801 for the first subscale, 0.802 for the second, 0.659 for the third, 0.846 for the fourth, 0.706 for the fifth, 0.537 for the sixth, and 0.530 for the seventh.

In the Scotland validation study the original additional 20 items on the BSS did not demonstrate satisfactory levels of statistical validity and so were removed, which trimmed the questionnaire from a 30- to a 10-item questionnaire, with a possible range of scores lying between 0 and 40 (0 representing least satisfaction and 40 most), using a 0–4 scaling per item 5,8,10,12. On the other hand, according to the Greek-BSS validation study, 2 of 30 items were excluded from the analysis,

which were not important for Greek women[5,6,8,10]. These items were: (1) 'I coped well during my birth', and (13) 'I had the same midwife throughout the entire process of labour and delivery'[5,8,10,12]. These items were also not included in the Scotland validation study, for different reasons[5,8,10,12].

The 10 items of the Scotland validation study are the following: (Q1) 'I came through childbirth virtually unscathed', which is included in the F6 (Healthy Mother and Baby) of the Greek validation study[5,8,10,12], whereas in the Scotland study it is included in the factor 'Stress experienced during labour'[5,8,10,12]. Having an instrumental intervention or caesarean section is inextricably linked to receiving an obstetric injury[17,18,19,20] with depressed scores on the Edinburgh Postnatal Depression Scale from some of those in reception of an operative childbirth and higher weighted scores for obstetric procedures[21]. Induced labour is also associated with more pain and ultimately less birth satisfaction[22, 23]. (Q2) 'I thought my labour was excessively long', (Q7) 'I found giving birth a distressing experience', and (Q9) 'I was not distressed at all during labour', are included in the same factor in the two studies and this is called 'Pain and Stress Management'. (Q3) 'The delivery-room staff encouraged me to make decisions about how I wanted my birth to progress', (Q5) 'I felt well-supported by staff during my labour and birth', (Q6) 'The staff communicated well with me during labour', and (Q10) 'The delivery room was clean and hygienic', are also included in the same factor of the two studies, and this is called 'Quality of care'. (Q4) 'I felt anxious during my labour and birth' and (Q8) 'I felt out of control during my birth experience', are included in the F7 ('Feelings and Support during labour') of the Greek study, whereas in the Scotland study these are included in the factor 'Women's attributes'[5,8,10,12].

According to (Q2), 'I thought my labour was excessively long', lengthy labour is a birth satisfaction indicator, with an associated increase in reports of pain and dissatisfaction with the experience[22,23,24]. Having a long labour is potentially compounded by parity, related obstetric factors, anxiety and reduced personal control[20,21,22]. Concerning (Q3), 'The delivery-room staff encouraged me to make decisions about how I wanted my birth to progress', providing choice profoundly affects women's experiences of labour and birth[4,25,26]; which necessitates that maternity-care professionals empower women with knowledge to become constructive decision-makers25 in relation to how they would like their labour to be managed[21,28,29].

Also, in accordance with (Q4), 'I felt anxious during my labour and birth', anxious women have a predisposition towards having negative birth expectations[30], which renders midwives accountable for instilling confidence through delivering effective preparatory education[31]. Preparation for childbirth palpably influences birth satisfaction[3], with engagers more confident and able to cope[31,32]. It also enhances self-efficacy[25], which has been shown to reduce pain experience[24].

The Scotland validation study for (Q5), 'I felt well supported by staff during my labour and birth'[29], meta-analysed 14 trials (n=5020 women) that measured the effects of continuous support from caregivers during labour on childbearing women's labour experience. Continuous support was associated with reduced requests for pain relief. Numbers receiving operative vaginal childbirth and caesarean section were also reduced[31]. In general, women who felt supported viewed their birth experience more favourably (6 trials)[29].

In relation to (Q6), 'The staff communicated well with me during labour', quality of care provision is multifaceted. Aspects of relationships with staff are important[20]; quality relationships include being offered information from which to make choices in plain language, and staff being honest and consistent about what is provided[31,33]. Staff also require to be flexible, informal, interested and friendly[31,33], and at the same time being professional, skilled and knowledgeable[31,33]. In the presence of negative birth perceptions and perceived low-quality relationships with care providers, women's long-term memories of negative experiences can be preserved[31,33,35]. When women feel treated as objects, such disaffirming is significantly correlated with negative birth perceptions[20,31,33]. Negative outcomes are related to disaffirmation expressed through verbal and nonverbal provider interactions, with healing effects reported from supportive interactions[31,33].

According to (Q7), 'I found giving birth a distressing experience', distress experienced during labour affects birth experience[35], with this inextricably linked to receiving an obstetric injury[20,31,33,36], such as caesarean section[31,33,36].

In the Scotland validation study, in accordance with (Q8), 'I felt out of control during my birth experience', feeling in control has been securely linked with women's experiences of birth satisfaction[37,38]. Concerning (Q9), 'I was not distressed at all during labour', the amount and type of pain experienced during labour is a birth satisfaction indicator39, with primigravidas experiencing greater pain than multiparous women[31,33,40].

Finally, for (Q10), 'The delivery room was clean and hygienic', the environment is associated with making birth a more satisfying experience[33]. For most women, cleanliness is an essential feature, with uncontaminated delivery rooms considered safe places where infection risks are minimized[33].

Finally, to the best of our knowledge, this is the first study to compare satisfied and not-satisfied mothers; in analysing the scale sensitivity in the detection of satisfied women at the 37 cut-off score, the sensitivity was 73, 8 % and specificity 70 %. In particular, this study analyses the cut-off score, which validates the interpretation of the results and the associated discussion. Until now the BSS was scored so that higher scores indicate better birth satisfaction, however the authors propose the instrument to be scored in the different direction, as in other screening tools, like EPDS.

As a result, we have scored the status satisfied as 0 (non-disease) and the status not- satisfied (disease) as 1, for the criterion-validity statistical analysis. Future studies with the BSS might also usefully examine alternative measures to assess validity, beyond the factors that were used in the current study, like disappointment with delivery[41] and the results of the 10-item BSS-R, which will be embedded in the BSS scale, particularly as this measure has recently been recommended by ICHOM for global use[42]. This study is a potentially important contribution to the area of birth satisfaction employing this increasingly used Scale.

CONCLUSIONS

The Greek-BSS has shown to be a robust tool for midwives, obstetricians and maternity care managers to measure postnatal women's birth satisfaction. According to the ROC analysis, with the scale sensitivity in the detection of satisfied women at the 37 cut-off score, the sensitivity was 73, 8% and the specificity was 70%. In terms of impact, the BSS can be requested for use by researchers to collect data both nationally and internationally, with results potentially correlated with other measures (e.g. pain and/or depression scales).

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