

Psychometric properties of the Slovak version of the Birth Satisfaction Scale (BSS) and Birth Satisfaction Scale-Revised (BSS-R)

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ABSTRACT

Objective: This study is focused on assessing psychometric properties of the Slovak version of the 30-item Birth Satisfaction Scale (BSS) and revised 10-item BSS-R.

Study design: Quantitative cross-sectional study design was used, with the primary goal of examining factor structure, internal consistency, and both divergent and known-groups validity of the Slovak version of BSS and BSS-R.

Setting: Four public hospital sites in central Slovakia

Participants: A 30-item BSS questionnaire was administered to 506 women 2–4 days after birth (mean age 29.9 years, SD = 5.1).

Results: The mean BSS score was 112 (SD 13.6, score range 30–150), and BSS-R 27.3 (SD 5.4, score range 0–40). Significantly higher birth satisfaction was found among women after physiological birth, multiparas, women with supporting person at birth, with pain relief, and with university education. Both Slovak version of BSS and BSS-R have been shown to have good reliability, as well as good divergent and known-group validity. The results of confirmatory factor revealed that three-factor model of the BSS-R offers a good fit to the Slovak data (χ^2 , df_{32}) = 79.40, $p < 0.001$, CFI = 0.96 and RMSEA = 0.05).

Key conclusions: The Slovak version of the 10-item BSS-R has been found to have excellent psychometric properties and can be used as a valid outcome measure of birth satisfaction in Slovak hospital settings.

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Introduction

Evaluation of subjective women's satisfaction with birth experience has been increasingly considered as an essential outcome measure in midwifery care. Experiences during childbirth and overall satisfaction with birth can have a number of health-related effects both for women and new-born child. Results of a systematic review by Bell and Anderson (2016) revealed that a negative birth experience contributes to the higher risk of developing the postnatal depression, increased risk of impaired psychosocial, and physical development of a child, as well as the worse quality of life of a mother. Posttraumatic stress disorder after childbirth is also strongly associated with the level of childbirth satisfaction: in fact, women's subjective experiences of childbirth have been shown as the most important risk factor in the development of postpartum posttraumatic stress disorder (Patterson et al., 2018). Traumatic birth experience and low birth satisfaction in-

creased the risk of severe childbirth-related fear incidence among multiparas, with its negative consequences for future reproductive health (Nilsson et al., 2012). On the other hand, high levels of birth satisfaction have been found associated with higher breastfeeding self-efficacy and lower perceived stress levels among postpartum women (Hinic, 2017). The sense of coherence, an important salutogenetic factor linked with a number of positive childbearing health-related outcomes, was significantly influenced by a degree of satisfaction with the childbirth as well (Fergusson et al., 2016).

Birth satisfaction is a multidimensional construct, with a variety of predicting factors. Objective factors such as mode of delivery (forceps/vacuum or emergency caesarean section) or obstetrics interventions (such as unplanned interventions due to the delay of birth) might have a significant effect on the level of birth satisfaction. However, the high importance of subjective perception and self-evaluation in women's childbirth experience has been emphasized in several studies (Handelzalts et al., 2017; Carquillat et al., 2016). Level of perceived control during birth and quality of interaction with the health care professionals seems to be the highly essential factors affecting the levels of childbirth

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satisfaction (Meyer, 2013; Fair and Morrison, 2012; Patterson et al., 2018; Hinic, 2017).

Systematic reviews of measuring instruments aimed at birth satisfaction have found a wide range of currently used questionnaires assessing women's childbirth satisfaction (Nilvér et al., 2017; Alfaro Blazquez et al., 2017; Sawyer et al., 2013). Some of the critical points raised by systematic critical evaluation of existing measuring instruments include the fact that some measures are designed for use only in specific populations of childbearing women. Also, a certain ambiguity exists in the terminology in this area, as some of the measures are focused on closely related concepts such as childbirth experience, perception of birth/care, control during childbirth, support during birth, fear of childbirth, childbirth trauma, birth memories or childbirth schema. Another problem is that many instruments are not based on current theoretical models of patient's satisfaction and that most studies provide only limited evidence of validation procedures and psychometric properties (Nilvér et al., 2017 and Alfaro Blazquez et al., 2017; Sawyer et al., 2013). Birth satisfaction scale (BSS) developed in the UK by Hollins Martin and Fleming (2011) attempts to resolve some of the mentioned methodological limitations. BSS can be used as a measuring instrument appropriate for use in the whole population of childbearing women, regardless of the type of delivery. The short version of the scale (BSS-R) has been validated in 2014 on a UK/Scotland sample of childbearing women (Hollins Martin and Martin, 2014) and has shown very good psychometric properties. Currently, a validation process of the scale has been completed in Spain (Romero-Gonzales et al., 2019), Turkey (Goncu Serhatlioglu et al., 2018), Australia (Jefford et al., 2018), Greece (Vardavaki et al., 2015), and USA (Barbosa-Leiker et al., 2015). Based on an extensive literature review, authors of the BSS have derived three domains/subscales of the BSS: 1) Stress experienced during birth, 2) Women's attributes, and 3) Quality of care. Validity of these domains has been supported by the results of confirmatory factor analysis on original UK sample (Hollins Martin and Martin, 2014), as well as by results of other validation studies (Romero-Gonzales et al., 2019; Goncu Serhatlioglu et al., 2018; Jefford et al., 2018; Vardavaki et al., 2015; Barbosa-Leiker et al., 2015). The 10-item Birth Satisfaction Scale-Revised (BSS-R) has been recently recommended as the birth satisfaction outcome measure of choice by the panel of experts and patients (The International Consortium for Health Outcome Measurement, 2016).

Studies aimed at birth satisfaction are lacking in Slovakia, as well as valid and short measuring instrument of birth satisfaction. Thus aims of the present study were as follows:

- 1) Statistical examination of the structural model of the 30-item Slovak version of the Birth satisfaction scale and 10-item Birth satisfaction scale-revised (both three-dimensional measurement model, as well as the alternative one-dimensional model).
- 2) Evaluation of the internal consistency of the Slovak version of the BSS and the BSS-R.
- 3) Evaluation of the known-groups discriminant validity and convergence validity of the Slovak version of the BSS and the BSS-R.

Method

Design

The quantitative cross-sectional design was employed in this study, with the primary objective of assessing the psychometric properties of the Slovak version of the Birth Satisfaction Scale. With completing the 30-item BSS, all participants also completed a short version of this measuring instrument (BSS-R), comprising of 10 items.

Participants and data collection

Study participants were 506 postpartum women receiving care in university hospital birth centre, and four regional birth centres located in central region of Slovakia (mean age 29.9, SD = 5.1, age range 17–42). The convenience sampling method was used, exclusion criteria were severe chronic physical or psychiatric disorder in anamnesis. Data collection was carried out on third-fourth day post-partum (in Slovakia, a typical duration of a hospital stay after a non-complicated birth is four days, although recently in some birth centers a two-day stay is becoming a standard).

BSS in the form of a paper-and-pencil questionnaire was administered by midwives employed in a given birth center. Data collection began in 2017 and was completed in 2018. All participants received information about study aims, and each participant signed the informed consent letter before administering the questionnaire. A high response rate of 92.7% was achieved: 546 postpartum women were initially invited to participate in a research project, and 506 women filled out the questionnaire.

Ethical approval

Ethical approval was gained from the Ethical committee of University Hospital in Martin, as well as from local ethical committees in other hospital birth centers where data collection was carried out.

Measuring instrument

All participants filled out the Slovak version of the Birth Satisfaction Scale (BSS). This self-measuring instrument was designed by Hollins-Martin and Fleming (2011) and comprises 30-items. Answers are scored on a 5-point Likert scale, from 1 representing lowest satisfaction and 5 representing highest satisfaction. Questions 4, 8, 12, 15, 16, 17, 19, 20, 21, 23, 25, 29 are reversely scored. The range of BSS scores is 30–150, with a higher score representing higher satisfaction with the birth experience. Three subscales of the BSS has been generated based on a literature review: 1. *Quality of Care Provision* (this subscale includes themes of home assessment, birth environment, sufficient support, relationships with health professionals), 2. *Women's Personal Attributes* (covers the following topics: the ability to cope in labor, feeling in control during birth, preparation for childbirth, relationship with the baby), and 3. *Stress Experienced during Labor* (includes: distress during labor, obstetric injuries, the perception of sufficient medical care and obstetric intervention, pain experienced during labor, perception of the length of the labor, the health of the baby).

The short version of the scale (BSS-R) consists of 10 items has been validated by Hollins-Martin and Martin (2014), and has shown good psychometric properties. This shortened version of the scale is scored along a 0–4 Likert scale instead of a 1–5 Likert scale in order to produce a zero point; thus the range of the total score of BSS-R is 0–40, with a higher score representing higher birth satisfaction. Permission to use the BSS, as well as the copy of the scale, was obtained from authors of the instruments.

Translation process into the Slovak language

The back-translation process performed by two independent translators was used in the process of adaptation of the BSS into the Slovak language. Discrepancies between original and translated versions were assessed by a language professional: English native speaker. Final adaptation of the Slovak version was performed by a midwife working in practice, and academic-psychologist fluent in oral and written English.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 25.0; and statistical software R, version 3.5.0. Student's *t*-test for independent samples, ANOVA with Sheffe's post-Hoc tests and correlation analysis (Pearson correlation) were used in the process of testing divergent and known-groups validity of the BSS scale. For the analysis of the reliability of the BSS, the Cronbach's alpha and Spearman-Brown coefficient were employed. Individual items distributional characteristics of the both BSS and BSS-R scales were examined in detail and evaluated to determine deviation from assumed normality. The criteria for acceptable skew and kurtosis characteristics of the items were absolute skew values equal to, or greater than 3 and absolute kurtosis values of equal to, or greater than 10, based on the non-normality cut-off criteria proposed by Kline (2011), applied also in original UK study by Hollins Martin and Martin (2014).

Statistical evaluation of a structural model of a BSS scale was conducted using Confirmatory Factor Analysis (CFA). Structural Equation Modelling (SEM) approach was employed in order to perform the CFA, using the statistical software R, version 3.5.0, including the lavaan and semPlot statistical packages. Two multidimensional CFA models were examined, representing an assumed three-factor structure of the BSS. These three factors (Quality of Care, Women's Personal Attributes and Stress Experienced) are consistent with the domains identified in the original English language study by Hollins Martin and Fleming (2011). First multidimensional model evaluated the factors structure of the full 30-item version of the scale and the second model examined the 10-item shortened version. As a second step, the two uni-dimensional models representing a single factor structure of the full 30-item version of the BSS and the 10-item shortened version were examined.

The primary aim of the CFA in this study was to identify the structural model which represents the best statistical fit to the collected data. A maximum-likelihood (ML) approach to model estimation was adopted (Brown, 2015; Kline, 2011). Multiple goodness of fit tests were used to evaluate the models: the Comparative Fit Index (CFI; Bentler, 1990) greater than 0.90 was employed as an indicator of an acceptable fit to the data, and a CFI equal to or greater than 0.95 indicated a good fit to the data. The root mean squared error of approximation (RMSEA; Steiger and Lind, 1980) with values of less than 0.08 was a threshold for an acceptable fit to the data, and RMSEA values of less than 0.05 indicated a good fit to the data.

Divergent and discriminant (known-groups) validity

Divergent validity of the BSS was assessed based on the correlation of both 30-item and 10-item total scores with duration of pregnancy (a gestational week at the time of delivery) and age of the mother. The underlying assumption for divergent validity of the scale was that no significant relationship between BSS scores and both age of mother and duration of pregnancy would be found. Known-groups validity was evaluated by testing for differences in mean BSS scores among women with different types of delivery. It was predicted that BSS total scores and Stress Experienced subscale scores would be significantly higher in a group of women after normal (physiological) delivery compared to non-normal delivery (emergency or planned C-section and instrumental birth). Simultaneously, it was also predicted that there would be no difference in scores as a function of birth type on Quality of Care and Women's Personal Attributes sub-scales

Table 1
Basic characteristics of research sample.

Basic characteristic	Total sample <i>n</i> = 506	BSS mean (SD)	<i>p</i> -level
Age	29.9 (±5.1) Mean (SD)	-	-
Duration of pregnancy (weeks)	39.5 (±1.9) Mean (SD)	-	-
Duration of labor (hours)	6.9 (±6.9) 0.5–48 h Mean (SD), Range	-	-
Education	Primary 20 (3.9%) Secondary 231 (45.7%) Tertiary 254 (50.3%) Missing data 1	103.6 (±13.5) 110.5 (±13.4) 113.9 (±13.5)	≤0.01
Parity	Primipara 242 (48.0%) Multipara 262 (51.9%) Missing data 2	110.3 (±13.8) 113.6 (±13.3)	≤0.05
Preterm birth	Yes 47 (9.4%) No 455 (90.7%) Missing data 4	109.7 (±13.8) 112.1 (±13.6)	≥0.05
Type of delivery	Physiological 397 (78.6%) Non-physiological 108 (21.4%) Missing data 1	114.2 (±12.9) 102.4 (±12.3)	≤0.001
Pain relief	Yes 228 (50.6%) No 207 (45.9%) Don't know 16 (3.6%) Missing data 55	114.1 (±13.8) 110.9 (±13.5) 112.8 (±9.5)	≤0.05
Support person	Yes 310 (63.2%) No 181 (36.9%) Missing data 15	114.2 (±13.1) 108.2 (±13.6)	≤0.001

Reliability

Reliability of the scale was assessed based on internal consistency analysis (Cronbach's alpha), and analysis of split-half reliability (Spearman-Brown coefficient).

A criterion of 0.70 was considered as the minimum acceptable level regarding both reliability coefficients.

Results

Basic characteristics of a research sample

Total of 506 postpartum women participated in the research study, with 242 (48%) of women being primigravidas. Most of the women in our study had physiological birth, 397 (78.6%). The average duration of labor was 6.9 h (± 6.9). Together 228 women (50.6%) received pain medication, and 310 (63.1%) participants had a support person during their birth present. Average duration of pregnancy 39.5(±1.9) weeks; in most cases (90.6%) pregnancies were full-term. The average age in a research group was 29.9 years (±5.1), and most of the women had a tertiary education (50.3%) or middle education (45.7%). As shown in Table 1, a higher level of satisfaction with birth was found among women after physiological birth and multiparas, women with supporting person at birth and women with university education.

Average scores of the BSS and BSS-R, and multivariate normality of the data

Average total score of the Slovak version of the 30-item BSS in a present study was 112 (±13.6), and for the Slovak version of shortened 10-item BSS-R total score it was 27.3 (±5.4). Scores for BSS and BSS-R subscales are presented in Table 2.

The item-distributional characteristics of the 30-item Slovak version of the BSS showed no significant evidence for the significant skewness or kurtosis of the data distribution; thus an assumption about the normality of the data can be accepted (Table 3).

Table 2
Mean values for BSS, BSS-R and subscales.

	BSS	BSS1	BSS2	BSS3	BSS-R	BSS-R1	BSS-R2	BSS-R3
Mean (SD)	112 (±13.6)	31.2 (±3.9)	29.6 (±4.2)	51.5 (±7.6)	27.3 (±5.4)	13.2 (±2.2)	4.8 (±1.7)	9.3 (±3.0)
Min	69	19	16	28	10	4	0	1
Max	146	40	40	70	40	16	8	16
Median	113	31	30	52	27	13	5	9
Modus	110	31	31	53	27	12	6	10
Kurtosis	-0.1	0.1	0.1	-0.1	-0.1	0.8	-0.1	-0.1
Skewness	-0.2	-0.4	-0.1	-0.3	-0.1	-0.8	-0.4	-0.2
N	433	455	481	474	479	489	500	491
Missing data	76	54	28	35	30	20	9	18

BSS1, BSS-R1: Quality of care.

BSS2, BSS-R2: Woman's personal attributes.

BSS3, BSS-R3: Stress experienced.

Table 3
Individual item distributional characteristics of the Birth Satisfaction Scale (BSS).

Item no.	Mean	SD	Median	Mode	Skewness	Kurtosis
1	4.1	0.6	4	4	-0.6	1.2
2	3.9	0.9	4	4	-0.6	-0.1
3	3.7	0.9	4	4	-0.5	-0.2
4	3.2	1.1	3	4	-0.2	-0.9
5	3.3	1.2	4	4	-0.4	-0.9
6	4.6	0.7	5	5	-2.1	5.6
7	4.5	0.7	5	5	-1.4	2.6
8	3.6	1.3	4	4	-0.6	-0.8
9	3.4	1.2	4	4	-0.5	-0.6
10	4.1	1.2	5	5	-1.2	0.4
11	4.0	1.0	4	4	-1.1	0.4
12	2.8	1.1	3	2	0.0	-0.1
13	3.9	1.1	4	4	-0.9	-0.2
14	4.0	0.8	4	4	-0.9	1.1
15	3.5	1.0	4	4	-0.5	-0.4
16	3.3	1.0	3	4	-0.4	-0.6
17	3.6	1.1	4	4	-0.6	-0.4
18	2.9	1.0	3	2	0.2	-0.8
19	4.0	0.8	4	4	-0.1	1.9
20	4.5	0.8	5	5	-2.2	6.2
21	4.3	1.0	5	5	-1.8	2.9
22	3.6	1.3	4	4	-0.8	-0.5
23	3.9	1.0	4	4	-0.9	0.3
24	4.3	0.8	5	5	-1.5	0.7
25	3.5	1.2	4	4	-0.5	-0.8
26	3.0	1.0	3	3	-0.2	-0.4
27	4.34	0.7	4	5	-1.4	3.3
28	4.6	0.5	5	5	-0.9	0.5
29	2.8	1.0	3	2	0.1	-0.8
30	2.7	1.0	3	2	0.3	-0.6

Testing for normality of data (Kolmogorov-Smirnov test) for BSS also showed normal distribution: $Z = 1.05$, $p = 0.21$.

All three sub-scales of the Slovak version of BSS were found to be highly correlated with the total BSS score. Subscales of the BSS-R Slovak version were observed to be moderately to highly correlated with the total BSS-R score. The relationship between revised version and full-length form of the BSS total and subscales scores can be found in [Table 4](#).

Results of the CFA-statistical evaluation of predicted models

First step in the CFA was the evaluation of two multidimensional structural models: three factor model of the Slovak version of the BSS, and three factor model of the Slovak version of the revised BSS-R. As shown in [Fig. 1](#), the structure of the multidimensional three-factor model of the 30-item BSS was found to be poor (χ^2 , df_{402}) = 2320.36, $p < 0.001$, CFI and RMSEA values did not meet the threshold for the acceptable fit to the data (CFI = 0.53,

Table 4
Correlation coefficients for BSS and BSS-R subscale scores.

	BSS	BSS1	BSS2	BSS3	BSS-R	BSS-R1	BSS-R2	BSS-R3
BSS	0.8	0.8	0.9	0.9	0.6	0.6	0.8	
BSS1		0.6	0.6	0.7	0.7	0.4	0.5	
BSS2			0.7	0.7	0.5	0.7	0.6	
BSS3				0.8	0.4	0.6	0.9	
BSS-R					0.7	0.8	0.9	
BSS-R1						0.3	0.3	
BSS-R2							0.6	
BSS-R3								

All correlations are significant at $p \leq 0.001$.

BSS1, BSS-R1: Quality of care.

BSS2, BSS-R2: Woman's personal attributes.

BSS3, BSS-R3: Stress experienced.

RMSEA = 0.10). As expected, the three-factor model of the 10-item BSS-R (shown in [Fig. 2](#)) based on model reported by [Hollins Martin and Martin \(2014\)](#) clearly showed better fit to the Slovak data (χ^2 , df_{32}) = 79.40, $p < 0.001$, CFI = 0.96 and RMSEA = 0.05). As a second step in CFA, the alternative unidimensional models of both 30-item BSS and 10-item BSS-R were evaluated. A single-factor model of the Slovak version of BSS was revealed to have a poor fit to the data (χ^2 , df_{405}) = 2429.63, $p < 0.001$, CFI = 0.50 and RMSEA = 0.11). Similarly, the 10-item BSS-R single-factor model did not reveal an acceptable fit to the data (χ^2 , df_{35}) = 477.20, $p < 0.001$, CFI = 0.64 and RMSEA = 0.16).

Divergent validity

No significant correlation was found between BSS total score and age of the participants ($r = 0.19$, $p = 0.076$), or duration of pregnancy ($r = 0.03$, $p = 0.556$). Woman's Personal Attributes subscale of BSS showed a weak positive correlation with age ($r = 0.12$, $p = 0.008$) and duration of pregnancy ($r = 0.10$, $p = 0.024$), while BSS Stress Experienced subscale did not show significant associations neither with age ($r = 0.09$, $p = 0.620$) nor the duration of pregnancy ($r = -0.003$, $p = 0.518$). BSS Quality of Care subscale showed weak positive correlation with duration of pregnancy ($r = 0.09$, $p = 0.046$), but not with the age ($r = 0.09$, $p = 0.62$).

BSS-R scores did not correlate significantly with age of the participants ($r = 0.08$, $p = 0.076$), or duration of pregnancy ($r = -0.05$, $p = 0.291$). Woman's Personal Attributes subscale of BSS-R showed a weak positive correlation with age ($r = 0.10$, $p = 0.030$) and no significant correlation with the duration of pregnancy ($r = -0.07$, $p = 0.116$). The BSS-R Quality of Care subscale and BSS-R Stress Experienced subscale did not show significant associations neither with age ($r = 0.06$, $p = 0.195$; resp. $r = 0.06$, $p = 0.201$) nor the duration of pregnancy ($r = 0.02$, $p = 0.691$, resp. $r = -0.05$, $p = 0.235$).

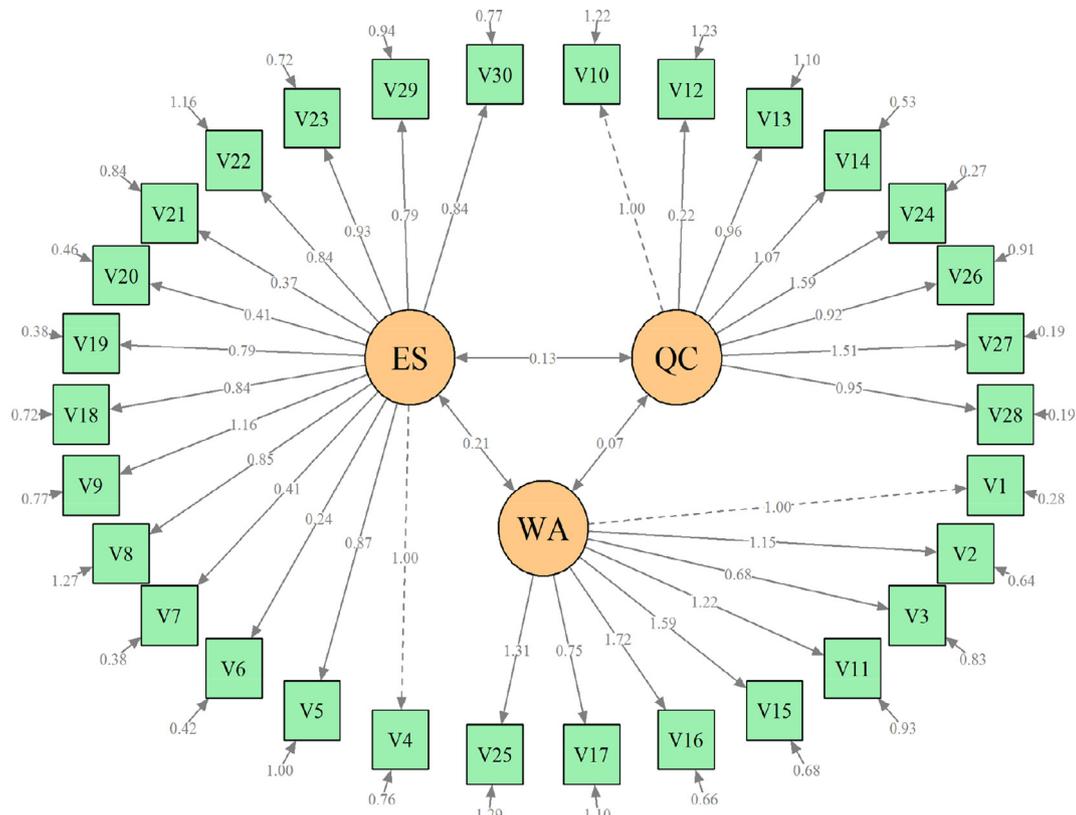


Fig. 1. Multidimensional structural model of a full-length 30 item Slovak Version of the BSS.

Notes: ES - Experienced stress subscale; WA - Women's attributes subscale; QC - Quality of care subscale.

Estimates are not standardized.

The arrows leading from the factor in the circle to each item in the box represents the coefficient weight of the factor on the individual item. The value below each BSS item shows the variance estimate of the factor. The doubleheaded arrows between the factors shows the covariances between factors.

Table 5

Known groups validity- mean BSS and BSS-R sub-scale scores as a function of delivery type (standard deviations in parentheses).

	Type of delivery	Mean (SD)	t
BSS total	physiological	114.2 (±12.9)	7.6***
	non- physiological	102.8 (±12.9)	
BSS Quality of care	physiological	31.5 (±3.7)	5.3***
	non- physiological	29.2 (±3.9)	
BSS Woman's personal attributes	physiological	30.1 (±4.1)	6.1***
	non- physiological	27.3 (±3.9)	
BSS Stress Experienced	physiological	52.7 (±7.2)	7.7***
	non- physiological	46.3 (±7.6)	
BSS-R total	physiological	27.8 (±5.3)	4.7***
	non- physiological	25.0 (±5.1)	
	physiological	13.3 (±2.2)	
BSS-R Quality of care	non- physiological	12.7 (±2.1)	2.4*
	physiological	4.9 (±1.6)	
BSS-R Woman's personal attributes	non- physiological	4.2 (±1.8)	3.4**
	physiological	9.6 (±2.9)	
BSS-R Stress experienced	non- physiological	7.9 (±3.1)	4.6***
	physiological		

*** $p \leq 0.001$.

Known-groups discriminant validity

The mean scores of the Slovak version of both full-length 30-item BSS and revised 10-item BSS-R as a function of delivery type are shown in Table 5, as well as mean scores of the three subscales (Quality of Care, Women's Personal Attributes, and Stress Experienced) of both BSS and BSS-R. As expected, the group of women after physiological birth differed significantly compared to women after non-physiological birth in total scores of both full-length BSS

($t = 7.6, p < 0.001$) and revised BSS-R ($t = 4.7, p < 0.001$). In both cases, women after physiological birth reported significantly higher levels of birth satisfaction. Similar pattern, consistent with expectations, was observed on BSS and BSS-R subscale Stress Experienced ($t = 7.7, p < 0.001$; $t = 4.6, p < 0.001$, respectively). Against prediction, significant differences were found on both BSS and BSS-R subscales Quality of Care ($t = 5.3, p < 0.001$; $t = 2.4, p < 0.05$, respectively) and Women's Personal Attributes ($t = 6.1, p < 0.001$; $t = 3.4, p < 0.01$, respectively). In each subscale, women after physiological birth reported significantly higher levels of birth satisfaction compared to women after non-physiological birth (emergency or planned C-section and instrumental birth).

Internal consistency

Cronbach's alpha for BSS (0.87) and BSS-R (0.78) in our study showed good internal consistency of the both original and revised version of the scale in Slovak language mutation. Similarly, split half reliability has been shown as satisfactory: Spearman-Brown coefficient for BSS was 0.89, and for BSS-R it was 0.76. Cronbach's alpha for BSS subscales were as follows: 0.61 for BSS Quality of Care subscale, 0.64 for BSS Woman's Personal Attributes subscale, and 0.81 for BSS Stress Experienced subscale. The revised version of the scale BSS-R showed good internal consistency (0.74) for Quality of Care subscale, and less satisfactory reliability of the Woman's Personal Attributes subscale (0.65), and Stress Experienced subscale (0.64). Internal consistency coefficients in different validation studies of BSS-R, including present study are shown in Table 6.

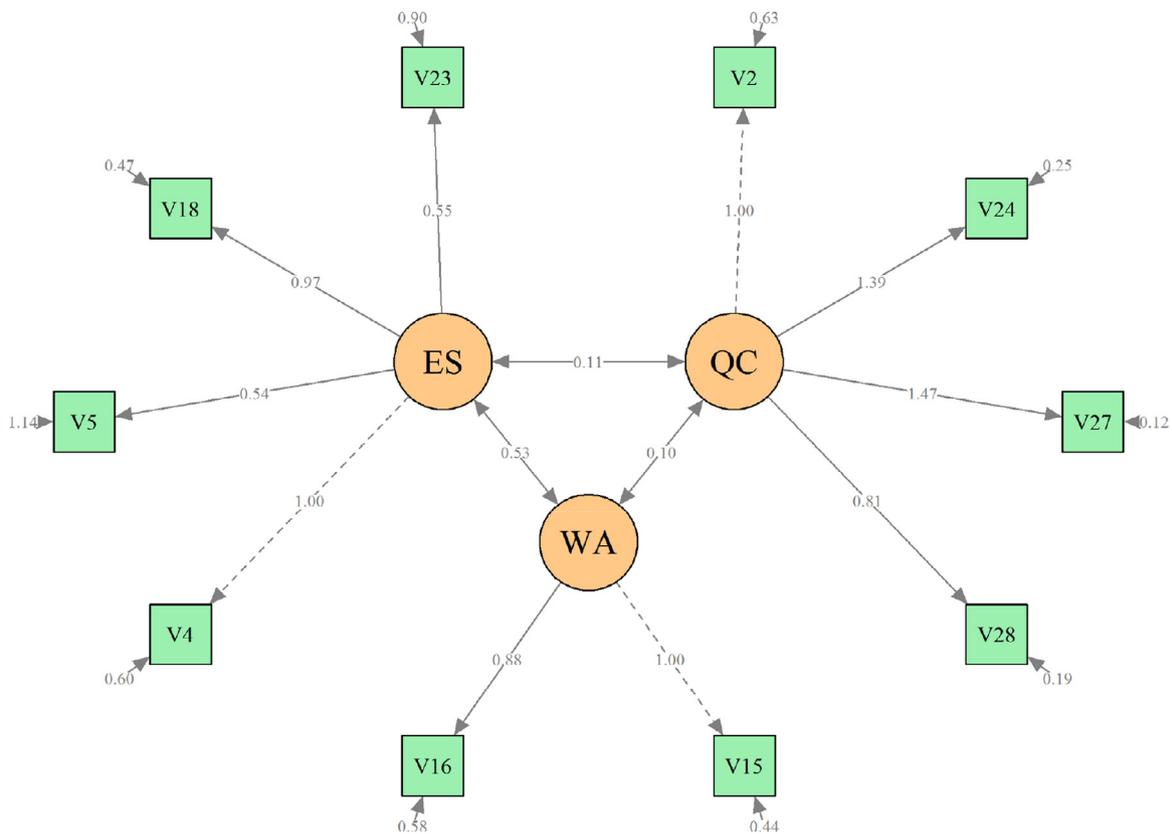


Fig. 2. Multidimensional structural model of the 10-item Revised version of the Birth Satisfaction Scale (BSS-R)- Slovak version.

Notes: ES - Experienced stress subscale; WA - Women's attributes subscale; QC - Quality of care subscale.

Estimates are not standardized.

The arrows leading from the factor in the circle to each item in the box represents the coefficient weight of the factor on the individual item. The value below each BSS item shows the variance estimate of the factor. The doubleheaded arrows between the factors shows the covariances between factors.

Table 6

Internal consistency coefficients in different validation studies of BSS-R, including present study.

Validation study	BSS-R total	Experienced stress subscale	Woman's attributes subscale	Quality of care subscale
UK (Hollins Martin and Martin, 2014)	0.79	0.71	0.64	0.74
Spain (Romero-Gonzales et al., 2019)	0.77	0.7	0.57	0.55
Greece (Vardavaki et al., 2015)	0.78	0.76	0.51	0.56
Turkey (Goncu Serhatlioglu et al., 2018)	0.71	0.55	0.44	0.74
Australia (Jefford et al., 2018)	0.81	0.74	0.66	0.81
Slovakia (present study)	0.78	0.64	0.65	0.74

Discussion

Results of this study focused on psychometric properties of the Slovak version of the BSS, and the BSS-R are generally in line with those reported by [Holins Martin and Martin \(2014\)](#) in validation study on UK sample. The three-factor structural model of the BSS and BSS-R showed a good fit to the data, which is consistent with results of original validation study on UK sample as well as with findings of other BSS-R psychometric studies ([Romero-Gonzales et al., 2019](#); [Goncu Serhatlioglu et al., 2018](#); [Jefford et al., 2018](#); [Vardavaki et al., 2015](#); [Barbosa-Leiker et al., 2015](#)). Similarly to the previous studies, a uni-dimensional model of the BSS and BSS-R on Slovak sample were shown as less satisfactory and offered a poor fit to the data. These results support the validity of the postulated thematically derived three-factor structure of the Birth Satisfaction Scale, comprising of Quality of Care Provision, Women's Personal Attributes, and Stress Experienced during Labor dimensions.

Divergent validity testing of the both Slovak versions of the BSS and BSS-R revealed no significant correlation between birth satisfaction and age of the participants or duration of pregnancy, with the exception of the Woman's Personal Attributes subscale in both BSS and BSS-R, which showed weak positive association with both age of the participants and duration of pregnancy. This unexpected finding differs from the result of original UK and also other validation studies, with the exception of Australian study ([Jefford et al., 2018](#)), where the similar pattern was found. We are not able to provide a rationale for this result at the moment, and this pattern may warrant future investigation and search for possible implications of this result if persisting.

As expected based on theoretical background and original UK validation study results, the known- group validity examination of the Slovak version of the BSS showed statistically significant differences in the birth satisfaction levels depending on the birth mode; women after physiological birth showed significantly higher birth satisfaction compared to women after non-physiological birth.

However, statistically significant differences were found not only in total scores of the BSS and BSS-R, and the Stress Experienced dimensions as predicted but also in Women's Personal Attributes subscale and Quality of Care subscale. Differences found in these two subscales are in contradiction with both theoretical hypothesis and results of validation studies in the UK (Holins Martin and Martin, 2014) and Australia (Jefford et al., 2018). On the other hand, Vardavaki et al. (2015) in their validation study on Greek sample similarly reported a significant difference in the Women's Personal Attributes subscale and Quality of Care subscales. It might be suggested, that especially Quality of Care subscale represents the culturally sensitive self-perception of the particular aspects of the birth experience rather than being representative of the absolute quality of care, and thus might be significantly influenced by women's experiences during non-physiological birth. Also, differences in experiences of quality of care within different health care systems might be the cause of these discrepancies across validation samples. An example of cultural differences might be shown in the culturally different perception of the issue of control during birth in the post-totalitarian countries compared to countries without long-term historical experience of the totalitarian government system. Results of the study aimed on birth satisfaction-related factors in Czech Republic (Takács et al., 2015) showed, that participation in decision making, which has been repeatedly shown to be a strong predictor of childbirth satisfaction (Meyer 2013; Fair and Morrison, 2012), was not shown as important for Czech women's satisfaction with health care during birth. Studies on birth satisfaction lack in Slovakia, still the Czech Republic is culturally very similar to Slovakia due to a common historical, and sociocultural past thus is possible to expect a similar pattern in the perception of health care among Slovak childbearing women. Many aspects of the historically based health care system, in which the birth is seen as a process controlled primary by an obstetrician, not a birthing woman, are still predominant within the health care system in Slovakia. With a significant contribution of patient's and women's organizations, a patient-centered model of health care is becoming more frequently applied in the birth centers in Slovakia.

Regardless of the small discrepancies in the differences across BSS subscales in different studies, a significant differences were identified in the total score of a birth satisfaction measured by the BSS as a function of a delivery type in all BSS-R validation studies (Romero-Gonzales et al., 2019; Goncu Serhatlioglu et al., 2018; Jefford et al., 2018; Vardavaki et al., 2015; Barbosa-Leiker et al., 2015; Holins Martin and Martin, 2014) as well as large exploratory studies using BSS (Burduli et al., 2017; Martin et al., 2017; Fleming et al., 2016). These results not only support the known- group validity of the Birth Satisfaction Scale as a measuring tool, but also reflect the importance of the mode of delivery on birth satisfaction levels among women. As shown in previous studies, negative birth experience is linked to worsened psychosocial adaptation among postpartum women, including the higher risk of postnatal depression and posttraumatic stress disorder, and is also linked to higher risk of impaired psychosocial and physical development of child (Patterson et al., 2018; Bell and Anderson, 2016). Given these facts, a further investigation of causal mechanisms linked to the influence of delivery type on psychological well-being among postpartum women would be beneficial.

Internal consistency estimations showed good overall reliability of both BSS and BSS-R in the Slovak language, however, the Stress Experienced and Women's Personal Attributes subscales of the BSS-R did not reach threshold levels of acceptable consistency. Given that the Women's Personal Attributes sub-scale is comprised of just two items, the result might not be surprising. However, 4-item Stress Experienced subscale was expected to perform well, mainly based on good reliability of this subscale found in studies of Hollins Martin and Martin (2014), Romero-Gonzales et al. (2019),

Jefford et al. (2018) and Varadaki et al. (2015). It is of note that similarly to our results, in the Turkish version of the BSS-R (Goncu Serhatlioglu et al., 2018), the low internal consistency of the Stress Experienced subscale was found. On the other hand, in Greek (Varadaki et al., 2015) and Spanish (Romero-Gonzales et al., 2019) validation study, Quality of Care subscale performed sub-optimally, while in other validation studies including the present study, the good internal consistency of this subscale was found. A possible influence of translation process on the perceived meaning of BSS subscale items in different cultural backgrounds might be an explanation of these disruptions in otherwise good psychometric properties and consistent factor structure BSS-R results across different validation samples.

Limitations

Some of the methodological limitations of the present study should be pointed out. Representativeness of the research sample is limited by the fact that data collection was carried out only in central region of Slovakia. In further research, it would be beneficial to include more representative sample. Also, ethnicity might be of interest in this regard. In Slovakia, a single large ethnic minority of Roma (7–8% of the population) in otherwise ethnically homogeneous population might differ significantly in terms of birthing experience from the majority population. Furthermore, data on the family situation, employment, and socioeconomic status were not collected in our study. Together with psychological variables, including anxiety/depression disorders and severe fear of childbirth in prenatal history, these factors could have a significant influence on the levels of birth satisfaction among women.

Conclusion

Both Slovak version of BSS and BSS-R have been found to have good reliability, as well as good divergent and known-group validity. Consistent with results of previous validation studies, a theoretically derived three-factor model of the BSS-R offers an excellent fit to the Slovak data. Results of the present study have shown, that Slovak version of the 10-item BSS-R has been found to have good psychometric properties and can be used as a valid outcome measure of birth satisfaction in Slovak hospital settings.

Future research endeavors should focus on explaining potential linking mechanisms between birth satisfaction levels and mode of the delivery, socioeconomic and ethnic factors as well as psychological variables, including anxiety/depression disorders and severe fear of childbirth in prenatal history. Such future findings will help develop the evidence-based model of maternal services that could be applied in the health care system in Slovakia.

Ethical approval

Ethical approval was gained from the Ethical committee of the University Hospital in Martin, Slovakia.

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Declaration of Competing Interest

None.

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