ORIGINAL ARTICLE

Psychometric properties of the Iranian version of Birth Satisfaction Scale-Revised

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Background: The precise measurement of childbirth satisfaction demands a reliable tool specifically designed for maternal care and birth satisfaction. It was designed to measure the degree of women's satisfaction with childbirth. The purpose of the present study was to translate and analyze the psychometric properties of the Birth Satisfaction Scale-Revised (BSS-R) in Iranian women. **Materials and Methods:** This is a methodological cross-sectional study. Five health centers in various regions of Kashan were affiliated to Kashan University of Medical Sciences, Kashan, Iran. Two hundred and twelve mothers who were referred to the health centers and had childbirth during the last year were included. The face and content validity were obtained after backward–forward translation of the Iranian version of BSS-R by 12 faculty board members in midwifery and reproductive health fields. The construct validity of the tool was determined using confirmatory factor analysis on 212 women in the postpartum period. The internal consistency and reliability of the tool was evaluated by Cronbach's alpha coefficient and intraclass correlation coefficient (ICC). The collected data were analyzed in SPSS (version 16.0) and EQS 6.1. **Results:** The result of face and content validity was minor modifications in some words. Confirmatory analysis results indicated that there was an acceptable fit with a three-factor model. Cronbach's alpha was estimated for the whole tool 0.74, and the alpha of the three subscales ranged from 0.698 to 0.801. ICC for determining reliability was 0.77. **Conclusion:** The Iranian version of BSS-R was a reliable and valid tool for assessing the women's satisfaction with their childbirth care.

Key words: Childbirth, intrapartum care, patient satisfaction, psychometrics

How to cite this article: Nasiri S, Kariman N, Ozgoli G. Psychometric properties of the Iranian version of Birth Satisfaction Scale-Revised. J Res Med Sci 2020;25:90.

INTRODUCTION

Patient satisfaction means reporting the quality of health care and the mutual relationship between patients and service providers.[1] Women's satisfaction with childbirth experience is an important index of mother care quality from the viewpoint of health-care providers, policymakers, and health-care system officials.[2-4]

The satisfaction indicates the female consent of childbirth experience during labor, delivery, and immediately after the childbirth, which can be evaluated according to the mother's understanding of care, the degree of personal control and support as well as medical interventions.[5] Women's satisfaction with childbirth experience can affect their physical and mental health as well as relationship with infant. The lack of satisfaction with childbirth leads to the selection of cesarean section in later childbirth, thereby increasing the maternal and infant risk and imposing heavy expenses on people and the government. On the other hand, maternal satisfaction with childbirth augments self-esteem, positive maternal expectations for future childbirth, and good relationships with infants.[6,7] Women who are dissatisfied with the childbirth experience remember the childbirth only with pain, fear, or grief, leading to complications such as postpartum anxiety and

Access this article online

Quick Response Code:

Website: www.jmsjournal.net

DOI: 10.4103/jrms.JRMS_248_19

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Submitted: 20-May-2019; **Revised:** 19-Jan-2020; **Accepted:** 08-Jun-2020; **Published:** 30-Sep-2020

depression, lower ability to breastfeed, and abortion in later pregnancies.[8,9]

The exact measurement of childbirth satisfaction requires a valid tool, which should be specifically designed within the framework of maternal health care and childbirth satisfaction.[10] To assess birth satisfaction, several tools have been used with varying degrees of validity and reliability, a number of which have some limitations. The Six Simple Questions questionnaire uses a general score for satisfaction, and thus, the satisfaction cannot be investigated from specific aspects of care. A number of indices lack the psychometric evidence; for instance, the 38-item Labor and Delivery Satisfaction Index has low reliability and unclear factor structure; the 39-item questionnaire to assess customer satisfaction (CliSQ) has sufficient internal consistency, but there is no information about how items are produced and the items are reviewed only by health-care providers for face and content validity.[11] The Mackey Childbirth Satisfaction is a common tool in Iran, with a rating scale including 34 items and 6 subscales.[12] The scale measures several dimensions of satisfaction, including satisfaction with the husband and midwife, both of which may not be available at many centers (i.e., centers without midwives or not permitting spouse's attendance during the delivery). Therefore, all subscale items should be summed up to obtain the total satisfaction score, so that the Mackey scale cannot be used at all centers;[12] psychometric properties of its content are not evaluated for cesarean women and are used only for measurement of satisfaction from vaginal delivery.[13]

The childbirth satisfaction measurement can only be achieved using a psychometric and trusted tool for both normal and problematic cases, which can cover any type of delivery to a wider extent and also in the postpartum period. Martin and Fleming designed a 30-item tool to assess the level of women's satisfaction with childbirth. The tool was intended to facilitate the work of researchers and nursing staff to construct a meaningful picture of what constitutes like or dislike of the experience of mothers.[14] The Birth Satisfaction Scale (BSS) is designed as a multidimensional measure including three dimensions, namely (i) stress, (ii) quality of care, and (iii) women's characteristics. A short form (10 items) version was developed in a similar structure (i.e., three correlated subscales) by Hollins Martin and Martin.[15] This BSS-Revised (BSS-R) uses the same form of Likert scale like BSS; hence, BSS-R scores can be derived from both 10- and 30-question versions. The creditability of this tool has been approved in Scotland, Australia, the United States, and Greece.[13,14,16-18] The reliability and validity of BSS-R were approved based on vaginal and abnormal deliveries (e.g., delivery with forceps and vacuums and breech delivery), and divergent validity was confirmed by maternal age for postnatal mothers in West Scotland.[15]

Since the satisfaction with service is influenced by local culture, the psychometric properties of BSS-R should be checked in each country, and the translated version should match the original English version to allow for comparison of significant values between populations.[19] Therefore, the researcher sought to undertake the translation and analysis of psychometric properties of BSS-R in Iran.

METHODS

Participants

This was a methodological[20] cross-sectional study on BSS-R, which was conducted in 2018 on 212 mothers referred to comprehensive health centers within 1 year after childbirth. Five centers in various regions of Kashan city were selected by a random cluster method. Martin C.R, Martin C.J.H research showed a minimum sample size of 175 for a BSS-R validation study;[21] two hundred participants were considered to avoid type 1 error and have high study power, and also, the tool designer suggested 200 samples to the researcher. Finally, 212 women were studied. The research units were selected by the convenience sampling method.

The inclusion criteria were as follows: women aged 15–45, speaking Farsi, and giving birth to live and healthy infants. The researchers have considered childbirth over the past year due to the following reasons: birth is considered a sentimental event, research has confirmed that mothers can recall their birth experience even 20 years later with incredible accuracy,[22] and there is a greater access to women in comprehensive health centers. Women were asked to fill out a demographic questionnaire (mother's age, mother's education and job, type of housing, and place of childbirth) and the Persian version of BSS-R tool. The time needed to fill out the questionnaire varied from 10 to 15 min.

Instrument

The questionnaire contained 10 items with a score range of 0–40. Each item was scored on a Likert scale from totally agree (score 4) to totally disagree (score 0). Items 2, 4, 7, and 8 were scored in an inverse manner.

The scale consisted of three subscales [Table 1].

The English version of BSS-R has very good internal consistency with an alpha of 0.89. Subscales have alphas that ranged from 0.74 to 0.85. Known-groups analysis using Mann–Whitney U-tests for vaginal vs. cesarean deliveries resulted in lower values on the total BSS-R ($U = 3963.00$, $P < 0.001$). Discriminant analysis indicated that mother's age at delivery was not related to the total BSS-R ($r = -0.15$,

Table 1: Subscales and scores for questionnaire of BSS-R

Subscales	Subscriber items	Score range
Experience of stress during labor	1-2-7-9	0–16
Women's personal attitudes	4-8	0–8
Quality of care	3-5-6-10	0–16

$P = 0.07$), stress subscale ($r = -0.01$, $P = 0.95$), or women's attributes subscales ($r = -0.15$, $P = 0.06$), but older mothers reported lower quality of care ($r = -0.24$, $P = 0.002$).[13]

Translation of questionnaire

The permission to prepare the Iranian version was first obtained from the tool designer. The standard backward–forward method[23,24] was used as an intercultural adaptation guide for health-related questionnaires. This approach included the following steps: translation, reverse translation, expert review, and pilot study. The above steps were also followed in the present study. The questionnaire was initially translated into Persian by two fluent translators in Persian and English (Farsi speaking), and a final Persian version was developed according to the viewpoint of translation team. Subsequently, this version was translated by an English expert, the second edition of translation was prepared by the research team, which was then approved by designers, and the final Persian version was obtained from this tool. To determine face validity, 10 postpartum women (not included in the study analysis) were asked to read the questionnaire items and answer whether they understood the items.

Ethical consideration

Ethical considerations were respected with the permission from Shahid Beheshti University of Medical Sciences (study project number: 14879, Code of Ethics: IR.SBMU.REC.1397.081). At the beginning of the study, the research objectives and confidentiality of information were described for participants and their informed written consent was obtained.

Data analysis

Face and content validity

In the present study, the qualitative method was employed to examine the face and content validity. Taghizadeh *et al*. stated that in designing tools, we need to calculate the content and face validity by quantitative method (calculation of content validity index–content validity ratio [CVI–CVR]). However, if the instrument is translated, there is no need to calculate CVI and CVR.[25] To determine the validity through the content, 12 experts in fields of midwifery and reproductive health were asked to provide their written correctional views on the grammar, use of words in right places, and proper scoring after exact review of the tool.[26] Commenting on items of the tool in terms of content is edited according to recommendations of experts. For determine qualitative face validity, face-to-face interviews were held by the main researcher with 10 members of the target group (i.e., postpartum women). The participants were questioned about the level of difficulty, fit and ambiguity of items as well as the need to remove or merge items of the tool, and the items were then edited according to their recommendations. The term "labor" was unfamiliar to the target group, and thus, it was deleted and the "stages of childbirth" were used instead.

Construct validity

The construct validity of the questionnaire was also evaluated using confirmatory factor analysis in EQS 6.1 based on the estimates of the maximum likelihood. CFA was performed on the covariance matrix of the BSS-R items. The ratio of Chi-square to degree of freedom was used (Chi-square/df). Chi-square index is a sample size-dependent index, and the ratio of Chi-square to degree of freedom <2 indicates the acceptability of goodness of fit.[27,28] Other fit indices are Root Mean Square Error of Approximation (RMSEA) (acceptable goodness of fit <0.08, good goodness of fit <0.05, and poor goodness of fit >0.1), Standardized Root Mean Square Residual (SRMR) (acceptable value ≤0.06 and unacceptable value >0.1),[27,28] Goodness of Fit Index (GFI) and Comparative Fit Index (CFI) and Normed Fit Index (acceptable value >0.9), and Adjusted GFI (AGFI) (acceptable value >0.85).[26,29,30] On the other hand, if CFI, GFI, and AGFI were >0.9, but RMSEA and SRMR were <0.05, then there was a very good fit and > 0.1 value indicated a good fit.[31]

Reliability

Cronbach's alpha coefficient was calculated to examine internal consistency of the tool for each item and the entire questionnaire (acceptable: $\alpha = 0.7$ and high internal consistency: $\alpha = 0.8$).[32] To evaluate reliability of the tool, the tool was completed by 20 mothers in postpartum period for two times (test–retest) with a 14-day interval (time interval of 2–3 weeks is recommended).[32] Intraclass correlation coefficient (ICC) values above 0.75 indicate good reliability.[33]

The mean and variance of each question were examined to evaluate the utility of questions. The analysis of research findings was done by SPSS PC version 16.0 computer software program for Windows (SPSS, Chicago, IL, USA) EQS for windows version 6.1 (Multivariate Software Inc, USA) Descriptive statistics (mean, standard deviation [SD], number, and percentage) were calculated for demographic variables.

RESULTS

Characteristics of participants

The research participants were 16–45 years old and mean (±SD) of their age was 28.94 ± 5.64 and 48% of participants were

primigravida. Table 2 shows the frequency distribution and demographic characteristics of research units.

The output model for the BSS-R in EQS 6.1 was showed [Figure 1]. Results of the confirmatory factor analysis indicated that the three-factor model was appropriate and significant. In our model, df = 32, $\chi^2 = 47.484$, and thus, $\chi^2/df = 1.483$. The ratio of Chi-square to degree of freedom was <2 and according to standard value has acceptable goodness. According to the output of EQS, the model had quite good fit indices. Table 3 presents the fit of a three-factor model of BSS-R.

As shown in Figure 1, all items loaded on the relevant factors have coefficients >0.40 and indicate that they are representative of the relevant factors. Table 4 presents the factor loadings of BSS-R.

As shown in Table 4, all factor loadings were appropriate. The smallest factor loading belonged to question 2 with a value of 0.582 from the "experience of stress during labor" component, but the largest factor loading was related to question 5 with a value of 0.843 from the "quality of care" component.

Cronbach's alpha coefficient for the total scale was 0.740 and that of its aspects ranged from 0.698 to 0.801. Table 5 presents the mean, SD, and Cronbach's alpha for each component of BSS-R. As shown, the Cronbach's alpha of the subscale of women's personal attitude was near of 0.7 (0.698), and it can be said that, in general, the value indicated the suitability of internal consistency in the Iranian sample.

The ICC with agreement between first- and second-time assessment occasions was obtained 0.77 ($P < 0.05$) for the whole tool and 0.80, 0.86, and 0.71 for subscales of quality of care, experience of stress during labor, and women's personal attitude, respectively. ICC values indicate good reliability.

DISCUSSION

The present study examined the psychometric properties of BSS-R in Persian in accordance with the Iranian culture and circumstances. Results of confirmatory factor analysis indicated that all factor loadings were appropriate and significant. Based on EQS output, the model had good fit indices, and it can be argued that the three-factor construct of BSS-R in the Iranian sample had good fit indices, indicating the confirmation of the tool among the Iranian sample.

Table 2: Frequency distribution of demographic characteristics

Variable	*n* (%)
Woman's education	
Elementary school	21 (9)
Secondary school	24 (11)
High school diploma	92 (43)
Associate degree	16 (7)
Bachelor	54 (25)
Master	5 (2)
Woman's job	
Homemaker	179 (84)
Student	8 (3)
Employed	5 (11)
Type of housing	
Personal	126 (59)
Rented	60 (28)
Others	26 (12)
Place of childbirth	
Governmental hospital	195 (92)
Private hospital	17 (8)
Age	28.00±5.00*

*Mean±SD. SD=Standard deviation

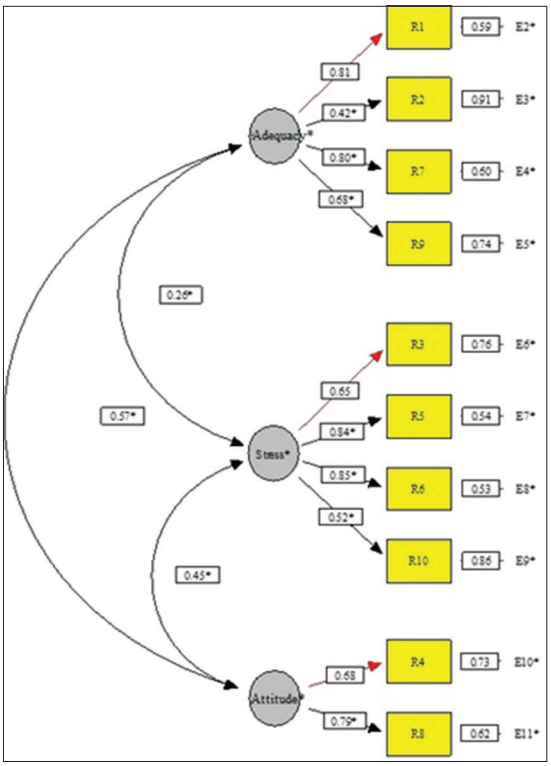

Figure 1: The output Model for Birth Satisfaction Scale-Revised in EQS 6.1

Table 3: Fit indices of a three-factor model of Birth Satisfaction Scale-Revised

Model	χ^{2*}	CFI	IFI	NFI	RMSEA	RMR	SRMR	GFI	AGFI
Confirmatory factor analysis	47.484	0.978	0.978	0.935	0.048	0.059	0.047	0.957	0.926

*Chi-square by MLE. MLE=Maximum likelihood estimation; CFI=Comparative Fit Index; IFI=Incremental Fit Index; NFI=Normed Fit Index; RMSEA=Root Mean Square Error of Approximation; RMR=Root Mean Square Residual; SRMR=Standardized Root Mean Square Residual; GFI=Goodness of Fit Index; AGFI=Adjusted Goodness of Fit Index

Table 4: Factor loadings of Birth Satisfaction Scale-Revised (*n*=212)

Item	Quality of care	Experience of stress during labor	Women's personal attitudes
The delivery room staff provided full support for me during labor	0.843	-	-
The staff established positive relationship and communication with me during labor	0.842	-	-
The delivery room staff encouraged me to decide on the type of labor	0.719	-	-
The delivery room was thoroughly clean and hygienic	0.702	-	-
I underwent the experience of childbirth almost unscathed	-	0.864	-
Giving birth was a very distressing experience for me	-	0.763	-
I felt no distress and anxiety during labor	-	0.745	-
I thought my labor was too long	-	0.582	-
I felt like I have lost my control during labor	-	-	0.820
I felt very anxious and agitated during labor	-	-	0.799

Table 5: Mean, standard deviation, and alpha coefficient for Birth Satisfaction Scale-Revised

Variable	Mean±SD	Alpha coefficient
Quality of care	5.82±3.69	0.762
Experience of stress during labor	12.42±3.04	0.801
Women's personal attitude	3.99±2.20	0.698

SD=Standard deviation

The research results indicated that the BSS-R tool had proper validity and reliability to assess the childbirth satisfaction of women in postpartum period. According to the findings, three components of the questionnaire had acceptable levels of internal consistency. Barbosa-Leiker *et al*. found that Cronbach's alpha coefficient of subscales and the total scale had desired validity for women in the United States (stress = 0.75, quality of care = 0.85, women's personal attitudes = 0.74, and the total score of tool = 0.89).[13] A research by Vivilaki *et al*. in Greece (alpha coefficient = 0.87)[34] and Martin C.H, Martin C in Scotland (alpha coefficient = 0.79)[35] also confirmed the high internal consistency and favorable reliability of the questionnaire (alpha coefficient = 0.87).

No question was removed in any translated versions in Greece, Australia, Spain, and Turkey, and the three factors of the present study were approved.[17,26,34,36] Vivilaki *et al*. provided the psychometric version with 30 items in Greece. In their study, seven factors were extracted instead of three factors, including the quality of care, pain and stress management, emotions and support during labor, medical interventions, labor experience, maternal and child health, and skin-to-skin contact, the last four factors of which covered two questions.[34] In item 1 of the original version in the UK, the word "unscathed" was used, which was changed to "unharmed" by Barbosa-Leiker *et al*. in the United States because of the misunderstanding of women.[13] In the Persian version of the questionnaire, "uninjured" was used as the synonym of "unscathed." Barbosa-Leiker *et al*. changed the "Labour" to "Labor."[13] In the current study, this term was translated into stages of childbirth to be understandable for women participating in the study.

According to the confirmatory factor analysis, the quality of model was confirmed to accrue 10 items to 3 factors. The CFI was >0.96 and acceptable. Furthermore, SRMR was <0.07, indicating the good fit of the model. In a research by Barbosa-Leiker in the United States, the model also showed a good fit ($\chi^2 = 37.72$, CFI = 0.99, and SRMA = 0.04).[13] The Spanish and Australian versions of the questionnaire also indicated a good fit and confirmed the three-factor nature.[17,26]

The factor loadings of items were between 0.582 and 0.843, which was > 0.3 and significant. In the present study, the same three factors introduced by the main tool were obtained with acceptable factor loadings. The three factors were confirmed in studies in Greece,[34] Spain,[26] Turkey,[36] and Australia.[17]

In the present research, the sample size was equal to 212, which was an acceptable number of samples for the factor analysis. Martin C.R, Martin C.J.H found that a sample size smaller than 175 was inadequate and did not provide all qualitative criteria for the model fit, and hence, the interpretation should be carefully done in smaller samples.[21]

Findings of the present investigation are important because of the high prevalence of cesarean section in Iran (48%)[37] and that the quality of care is a factor affecting such high prevalence. The Iranian Health Reform Plan emphasizes the reduction of cesarean section rate as well as improvement of the vaginal delivery quality.[38] Given the correlation between quality of health personnel performance and

women's satisfaction, the satisfaction of women should be reviewed by accurate instruments according to the culture and language of Iran. The care provided by maternity ward staff and the degree of stress in women during the hospitalization period can affect their attitude and performance in later births, which can positively or negatively affect other women's beliefs and performance. Therefore, such a tool is necessary to identify the factors affecting women's satisfaction and leading to the elective cesarean section.

Our research samples were obtained from a single city of Iran and were restricted in number. Nevertheless, since Kashan is an industrial city with a variety of occupations as well as immigrants from other cities and provinces with a diverse cultural context,[39] we sought to complete questionnaires in most regions of city to have a combination of cultures in order to achieve the desired results. One of the limitations of the present study was that more than 80% of the participants were homemakers; therefore, the results of the study cannot be generalized to all women. In this study, convergent and divergent validity were not performed; it is suggested that future studies compared BSS-R instrument with similar questionnaires used in Iran.

Acknowledgments

This study was extracted from a research project (Code of Ethics: IR.SBMU. REC.1397.081) approved by Vice-Chancellor's Office of Research at Shahid Beheshti University of Medical Sciences. We would like to express our deepest gratitude to all participants who helped us conduct this study. We also thank the designers of the tool (Hollins Martin CJ and Martin CR) for allowing us to translate and use it in Iran.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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