A Systematic Review of Psychometric Properties of Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF)

Masumeh Ghazanfarpour[1], Malihe Afiat[2] , *Masaudeh Babakhanian[3], Faezeh Sadat Akrami[4], Leila Kargarfard[5], Fatemeh Rajab Dizavandi[6], Talat Khadivzadeh[7]

[1]Department of Midwifery, Razi School of Nursing and Midwifery, Kerman University of Medical Sciences, Kerman, Iran. [2]Assistant Professor, Infertility Fellowship, Women's Health Research Center, Obstetrics and Gynecology Department of Obstetrics and Gynecology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. [3]Student Research Committee, Psychiatry and Behavioral Research Centre, Mazandaran University of Medical Sciences, Sari, Mazandaran, Iran. [4]Department of Clinical Psychology, School of Humanities and Social Sciences, Islamic Azad University, Science and Research Branch, Tehran, Iran. [5]Instructor of Fatemeh School Nursing and Midwifery, Shiraz University of Medical Sciences, Iran. [6]Department of Medical Education, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. [7]Evidence-Based Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.

Abstract

Background: The breastfeeding self-efficacy is one of the psychological factors affecting the duration of breastfeeding; the Breastfeeding self-efficacy measured by the breastfeeding self-efficacy scale-short form (BSES-SF). It was validated and reliable in several studies. The current systematic review aimed to comprehensively review the validity and reliability of the BSES-SF in various versions to give comprehensive information for authorities in this field.

Materials and Methods: We searched English databases, including Medline (via PubMed), Scopus, Cochran library and Web of Science since inception to May 2018 to find all previously published reports the psychometric dimensions of the Breastfeeding Self-Efficacy. Two reviewers read independently extracted data assessed. The quality of the studies was carried out by the Consensus-based standards for the selection of health status Measurement instruments (COSMIN) checklist.

Results: In this systematic review, reliability was measured using Cronbach's alpha; inter coefficient of correlation (ICC) as well as an analysis of the item-total correlation. Cronbach's alpha of breast-feeding self-efficacy for whole scale ranged from 0.76 to 0.95 considered moderate to excellent. Only two studies assessed test-retest reliability. One study reported correlation between two time intervals that was high (r=0.94) and another study measured test-retest reliability using ICC. It was ranged from 0.69 to 0.78 that consider suitable. Item-total correlation ranged from 0.23 to 0.85. Construct validity was tested using factor analysis. Original one- factor structure was confirmed in Spanish, Chinese, American, Canadian, Brazilian and Creation version. Some studies reported four and six –factor structure. Confirmatory factor analysis (CFA) confirmed one-factor structure.

Conclusion: Original one- factor structure was confirmed in Spanish, Chinese, American, Canadian, Swedish, and Japanese, creation, Turkish, Portuguese, Brazilian and Creation; version six and four-factor need to further test in future studies. This study provides evidence also that the modified BSES-SF may be a valid and reliable measure of breastfeeding self-efficacy.

Key Words: Breastfeeding self-efficacy, BSES-SF, Psychometric properties, Systematic review.

*Corresponding Author:

Masaudeh Babakhanian, Psychiatry and Behavioral Research Centre, Mazandaran University of Medical Sciences, Sari, Mazandaran, Iran.

Email: babakhanian.m@gmail.com

1- INTRODUCTION

Breast milk is the most suitable feed for infant and is the most important and effective way to maintain and sustain the health of infants. The World Health Organization and the United Nations Children's Fund have recommended that each child should have exclusive breastfeeding up to six months and continue by two years of old or more (1). Nutrition value of breast milk and its role have been proven in reducing infant mortality and increasing intelligence quotient, as well as providing the best pattern of growth and development of children and their health in adulthood (2-4). One of ways to reach to the goals of global nutritional policies, increase the level of lactation, is to assess factors effecting on breastfeeding.

Factors like socioeconomic status are less variables and healthcare providers for improving the outcome need to consider variable parameters such as maternal knowledge of the benefits of lactation, supportive systems and breastfeeding self-efficacy (5-9). The breastfeeding self-efficacy is one of the psychological factors affecting the duration of breastfeeding. The breastfeeding self-efficacy is defined as the mother's confidence in her ability to breast-feed her new infant, which is one of the factors influencing breastfeeding during the six months after delivery (2).

This self-efficacy is influenced by several factors such as mother's education, social support, type of delivery, satisfaction with childbirth analgesia, satisfaction with postpartum care, mother's understanding of lactation, the method of mother for feeding and mother's anxiety. Additionally, the psychosocial status of the mother, the support of the woman by her mother, lactation at the first hours of birth, the employment status and parity of the mother are also other items effective in breastfeeding self-efficacy (5).

The rate of exclusive breastfeeding at the international level was 56.8% and 27.7% in the fourth month and the sixth month, respectively. This is in the rural areas of Iran, 58% and 29% in the fourth month and in the sixth month, respectively (1). One-third of Canadian women have breastfeeding and their children can be ablactated eight weeks after childbirth (2). Regarding the global importance of exclusive breastfeeding and statistics, and given that the breastfeeding self-efficacy is one of the factors affecting the continuation of lactation, and both descriptive and interventional studies are ongoing in this field and are in seeking a way to promote breastfeeding.

There is a need to a question to assess breastfeeding self-efficacy in mothers. The breastfeeding self-efficacy scale-short form (BSES-SF) is self-report instrument with 33 items. It designed and developed by Dennis and Faux (10) in 1999 to evaluate mother's confidence in breastfeeding. All items are preceded by the phrase "I can always". It scored on a 5-point Likert scale showing from 1 = not at all confident to 5 = always confident. All items are positively word and total score ranged from 33 to 165 (11). Due to the consistently high of Cronbach's alpha values, it was decided to redundant items. In order to address to this concern, Dennis et al. in 2003 decreased items 33 to 14 (11). Short form of BSES was validated in different versions including Portuguese (12), Polish (13), Japanese (14), Spanish (15), Swedish (15),Turkish (16), and Chinese (17), and Persian. The current systematic review aimed to comprehensively review the validity and reliability of the breastfeeding self-efficacy questionnaire in various versions to give comprehensive information for authorities in this field.

2- MATERIALS AND METHODS

2-1. Method

We searched English databases, including Medline (via PubMed), Scopus, Cochran library and Web of Science since inception to May 2018 to find all previously published reports on studying the psychometric dimensions of the Breastfeeding Self-Efficacy using the keywords of (Breastfeeding Self-Efficacy Scale-Short Form or BSES-SF OR Breastfeeding) AND (Reliability OR validity OR Psychometrics OR Validity OR reliability OR Factor Analysis OR exploratory factor analysis OR confirmatory factor analysis OR CFA OR EFA OR Cronbach's alpha OR Test-Retest Reliability). In our review, there was no language or date restriction. We also checked the bibliographies of related articles to detect any studies not retrieved via the above mentioned electronic databases.

2-2. Data extraction

Two reviewers read independently the abstract and titles of all obtained articles, and then this selected articles to be read in details. They also separately extracted the following data using standardized data extraction form. These was including the first author of articles, area of study, age, year, sample size, study population, type of studies, timing administration of test, type of factorial structure, type of reliability and main result.

2-3. Quality of study

The quality assessment of the studies were carried out by the COSMIN checklist (18), involving internal consistency, reliability, measurement error, content validity, structure validity, and hypothesis testing, cross cultural, criterion, responsiveness, interpretability and generalizability. Within this checklist, aspects of construct validity measured by seven questions and aspects of internal consistency assessed using 11questions (questions are shown in below **Table.1 and 2**) (*please se the tables in the end of paper*).

3- RESULTS

In total 1,413 of articles were identified through database searching. One article was identified through other sources; 774 articles remained after removal of duplicate articles; 755 articles out of 774 articles were excluded after reading title and abstract; 19 articles were assessed in detail; seven articles were excluded due to assess other psychometric properties or being type of long-form of BSES-SF and finally 12 articles were included into systematic review. **Figure.1** showed search strategy of the selection of studies. The some characteristics of 12 studies included into systematic review shown in **Table.3** (*please se the table and figure in the end of paper*).

3-1. Reliablity

In this systematic review, reliability was measured using Cronbach's alpha; inter coefficient of correlation (ICC) as well as an analysis of the item-total correlation. In Canadian version of BSES-SF, Cronbach's alpha in a sample of mothers with preterm infants showed a value of 0.88 for whole of scale. Also, item-total correlation ranged from 0.23 to 0.70 (19). In Portuguese version of BSES-SF, Cronbach's alpha was 0.71 for overall of scale. Lowest value for item-total correlation was 0.54 (12). In Spanish, Japanese, Swedish and Polish version, total Cronbach's alpha of BSES-SF was near 0.90 (13-15, 20). In Swedish version, item-total correlation was in a range 0.34 to 0.74 (20). In Turkish version, total Cronbach's alpha of BSES-SF was 0.86. Item-total correlation ranged from 0.23 to 0.65. Test-retest reliability in a two-week interval were measured using correlation and showed a high correlation (R=0.94)(16). Total Cronbach's alpha of BSES-SF was 0.94 in a sample of

American black women and item-total correlation ranged from 0.49 to 0.85 (21). In Canadian adolescence mothers, Cronbach's alpha was calculated for two time points (antenatal and postnatal). For the antenatal period, total Cronbach's alpha of version of BSES-SF was 0.844 and item-total correlation ranged from 0.34 to 0.67. At one-week post-partum, total Cronbach's alpha was 0.93 and item-total correlation ranged from 0.51 to 0.81(22). In Brazilian version, Cronbach's alpha and the interclass correlation coefficient (ICC) was 0.69 and 0.78, respectively (23). In Croatian version, Cronbach's alpha was 0.86 and all of item-total correlation was positive and felled in normal rang 0.3 to 0.7 (24). In Chinese version, the Cronbach's alpha coefficient was excellent 0.95. All item-correlations were positive and above 0.50 (17).

3-2. Construct validity

3-2-1. Exploratory factor analysis (EFA)

In Canadian version of BSES-SF, Kaiser-Meyer-Olkin (KMO) was tested to measure of sampling adequacy and correlation between variables; the KMO was 0.86. Exploratory factor analysis (EFA) was conducted using principle components analysis (PCA) without rotation. One factor solution (unidimensional structure) was yielded. However, scree plot confirmed the one-factor structure of BSES-SF. This factor had an eigenvalue of 8.85 explained 47.1% of total variance. All factor loadings were above 0.3 (19). In Portuguese version of BSES-SF, EFA was conducted using maximum likelihood factor analysis. EFA identified a 6-factors structure. These factors explained 71.5% of total variance. However, scree plot, maximum likelihood, without rotation confirmed the one- factor structure of BSES-SF. The one-factor solution counted 20% of the variance (12). In Swedish version, the KMO test was 0.9. Bartlett's test of sphericity was significant.

EFA yielded one- factor stricture confirmed by scree plot (20). In Spanish version, EFA using Principal Component Analysis (PCA) showed a one-factor structure. Also, all factors loading Hwere more than 0.3 (15). In Turkish version, KMO was 0.79 and Bartlett's test was significant (p<0.001). EFA conducted using PCA extracted four factors. Because a lots of items had cross loading, authors reported it seem that turkish version should be one factore structure. This structure explaained 30% of total variance (16). In American version, in a sample of American black women, EFA using PCA was performed and showed a single factor structure (eight values more than 1). Factor loading ranged from 0.66 to 0.87 and communality ranged frm 0.36 to 0.82 (21).

In Canadian adolcents sample, KMO was 0.80, EFA using PCA without any rotation showed only one factor accounted 53 % of the variance (eigenvalue of 7.50). Also, screen plot confirmed a one factor structure. Factor loading ranged from 0.61 to o.85 (22). In Brezilian version, KMO was 0.74 and Bartlet's Test of sphericity was significant (p<0.001), EFA using PCA without any rotation showed a four -factor sloution accounted 50% of the variance. In Croatian version, EFA using maximum likelihood with rotation varimax identified one factor solution explained 33 % of variance (24).

3-2-2. Comfirmatory factor analysis (CFA)

Comfirmatory factor analysis (CFA) was conducted on a sample of Chainese mother. According to orginal verision, 14 items loaded on one factor. Because the assumption of normality multivariate was violated, robust maximum likelihood method (MLE) was employ to exmiate parameters. The goodness of fit indices showed that model was resonably good fit to the data.The Chi-square model was 216.6 (df=77 and p<0.001); adjusted

goodness-of-fit index (AGFI=0.99), comparative fit index (CFI=0.98); non-normed fit index (NNFI=0.97), root mean square root of approximation (RMSEA=0.099); and standardized root mean square residual (SRMR=0.05) (17).

4- DISCUSSION

Breast milk is the most complete source of nutrients and also could reduce infant mortality (1-4). It is highly recommended that each child should have exclusive breastfeeding up to six months and continue by two years of old or more (1, 25-27). Regarding the global importance of exclusive breastfeeding and statistics, and given that the breastfeeding self-efficacy is one of the factors affecting the continuation of lactation. The BSES-SF was developed to investigate mothers' confidence in their ability to breastfeed their newborn infants. The short form of BSES-SE is a 14-item (11). The current systematic review aimed to comprehensively review the validity and reliability of the breastfeeding self-efficacy questionnaire in various versions to give comprehensive information for authorities in this field. In this systematic review, reliability was measured using Cronbach's alpha; inter coefficient of correlation (ICC) as well as an analysis of the item-total correlation. Only two studies assessed test-retest reliability. One study reported correlation between two time intervals that was high (r=0.96), and another study measured test-retest reliability using ICC.

ICC ranged from 0.69 to 0.78. Item-total correlation ranged from 0.23 to 0.85. The Cronbach's alpha of breastfeeding self-efficacy for whole scale ranged from 0.76 to 0.95 considered moderate to excellent. The finding of systematic review showed that BSES-SF has excellent reliability Construct validity was evaluated by testing factor structure of BSES-SE. Almost all of studies employed exploratory Factor analysis (EFA) to assess factor structure.

Only one study conducted confirmatory factor analysis (CFA). Original one-structure factor comforted in Spanish, Chinese, American, Canadian, Swedish, and Japanese, creation, Turkish, Portuguese, Brazilian and creation version. CFA confirmed one-factor structure. Difference in factor structures may be reflected from difference in socio-demographic, cultural and as well as methodological difference such as difference in methods of translations and difference in statistical method conducted to extract factors for example (maximum likelihood vs principle component analysis). Breastfeeding self-efficacy showed a significant relationship with maternal age, marital status (having partner or being single), previous experience to breastfeed and previous breastfeeding duration (12, 13, 23). Therefore, further studies need to be performed to assess measurement invariance in these groups. Pervious one-factor solution replicated in various populations. However, there is need for further research on two or four-factor structure in various populations.

4-1. Clinical Practice and Further Research

This instrument could be employed in future research to detect mothers are at risk of breastfeeding failure. Therefore, it can used to identify effecting factors on breastfeeding self-efficacy.

4-2. Limitation and suggestions for future

Several limitations were seen in systematic review that it is worthless to be address. Different method such as Monte Carlo and rule of thumb was used to determine sample size for exploratory factor analysis. Basis of rule of thumb, at least five cases for each item need to perform an exploratory factor analysis. Some sample sizes included into systematic review seems to be relatively small; for example

size sample was 103 in Dennis et al.'s study (22), 135 subjects in Oliver-Roig et al.'s study (15), 144 subjects in Wheeler et al.'s study (19), and 153 subjects in Deborah et al.'s study (21). KMO and Bartlett's test measure to assess adequacy of sample size and correlation between items and it is necessary to be conduct before factor analysis. However, some studies did not report these indices. According to COSMIN checklist, percentage of missing items and how research team decides to handle of missing items should be reported. This important item was reported only in one study. The convenience sampling, instead of random sampling, was applied in all studies included into systematic review. The convenience sample as well as the use of a single site and university site limited generalizability of the finding to other environment. Further studies should focus on longitudinal data, random sampling, and multiple sitting. One important limitation is use of self-report questionnaires for data collection, may increase response bias (28).

5- CONCLUSIONS

Original one- factor structure was confirmed in in Spanish, Chinese, American, Canadian, Swedish, and Japanese, Turkish, Portuguese, Brazilian and Creation version. Six and four- factor structure need to further test in future studies. This study provides evidence also that the modified BSES-SF (short form) may be a valid and reliable measure of breastfeeding self-efficacy in various populations.

6- CONFLICT OF INTEREST: None.

7- REFERENCES

1. Mirmohammad AM, Bahiraii A, Rahimi A, Hashemzadeh M, Sohrabi N, Sohrabi Z. Effect of educational package on breastfeeding self-efficacy in postpartum period. 2014.

2. Varaei S, Mehrdad N, Bahrani N. The Relationship between Self-efficacy and Breastfeeding, Tehran, Iran. Hayat. 2009;15(3): 31-8.

3. Yaghini SO, Khameh S, Danesh F, Modaresi MR, Saneian H. Determinants of Exclusive Breast Milk Feeding of Infants in Isfahan, Iran. Journal of Isfahan Medical School. 2011;28(117).

4. Gafari Asl M, Fadakar Sogheh R, Ghavi A. Related factors to continued breastfeeding in infants. Journal of Holistic Nursing And Midwifery. 2014;24(2):1-8.

5. Hajnasiri H. Assessment of Breastfeeding Self-Efficacy and Patterns and its Predictors in Mothers Living in Qazvin Province. The J Urmia Nurs Midwifery Fac. 2018;15(10):777-87.

6. Parsa P, Boojar A, Roshanai G, Bakht R. The Effect Breastfeeding Counseling on Self-Efficacy and Continuation Breastfeeding among Primiparous Mothers: A Randomized Clinical Trial. 2016;24(2): 98-104.

7. Blyth RJ, Creedy DK, Dennis C-L, Moyle W, Pratt J, De Vries SM, et al. Breastfeeding duration in an Australian population: the influence of modifiable antenatal factors. Journal of Human Lactation. 2004;20(1):30-8.

8. Leung GM, Lam T-H, Ho L-M. Breast-feeding and its relation to smoking and mode of delivery. Obstetrics & Gynecology. 2002;99(5):785-94.

9. Pérez-Escamilla R, Maulén-Radovan I, Dewey KG. The association between cesarean delivery and breast-feeding outcomes among Mexican women. American journal of public health. 1996;86(6):832-6.

10. Dennis C-L. Theoretical underpinnings of breastfeeding confidence: a self-efficacy framework. Journal of human lactation. 1999;15(3):195-201.

11. Dennis CL. The breastfeeding self-efficacy scale: Psychometric assessment of the short form. Journal of Obstetric, Gynecologic, & Neonatal Nursing. 2003;32(6):734-44.

12. Zubaran C, Foresti K, Schumacher M, Thorell MR, Amoretti A, Müller L, et al. The Portuguese Version of the Breastfeeding Self-

Efficacy Scale-Short Form. Journal of Human Lactation. 2010;26(3):297-303.

13. Wutke K, Dennis C-L. The reliability and validity of the Polish version of the Breastfeeding Self-Efficacy Scale-Short Form: Translation and psychometric assessment. Int J Nurs Stud. 2007 Nov;44(8):1439-46.

14. Nanishi K, Green J, Taguri M, Jimba M. Determining a cut-off point for scores of the Breastfeeding Self-Efficacy Scale–Short Form: secondary data analysis of an intervention study in Japan. PloS one. 2015;10(6):e0129698.

15. Oliver-Roig A ,d'Anglade-González M-L, García-García B, Silva-Tubio J-R, Richart-Martínez M, Dennis C-L. The Spanish version of the breastfeeding self-efficacy scale-short form: reliability and validity assessment. International Journal of Nursing Studies. 2012;49(2):73.

16. Aydin A, Pasinlioglu T. Reliability and Validity of a Turkish version of the Prenatal Breastfeeding Self-Efficacy Scale. Midwifery. 2018;64:11-6.

17. Ip WY, Yeung LS, Choi KC, Chair SY, Dennis CL. Translation and validation of the Hong Kong Chinese version of the breastfeeding self-efficacy scale—short form. Research in nursing and health. 2012;35(5):450-9.

18. Mokkink L, Terwee C, Patrick D, Alonso J, Stratford P, Knol D. COSMIN checklist manual. Amsterdam: COSMIN; 2012 [Cited 2016 Nov 2].

19. Wheeler BJ, Dennis CL. Psychometric Testing of the Modified Breastfeeding Self-Efficacy Scale (Short Form) Among Mothers of Ill or Preterm Infants. Journal of Obstetric, Gynecologic and Neonatal Nursing. 2013;42(1):70-80.

20. Gerhardsson E, Nyqvist KH, Mattsson E, Volgsten H, Hildingsson I, Funkquist E-L. The Swedish version of the breastfeeding self-efficacy scale–short form: reliability and validity assessment. Journal of Human Lactation. 2014;30(3):340-5.

21. McCarter-Spaulding DE, Dennis CL. Psychometric testing of the breastfeeding self-efficacy scale-short form in a sample of black women in the United States. Research in nursing & health. 2010;33(2):111-9.

22. Dennis C-L, Heaman M, Mossman M. Psychometric testing of the breastfeeding self-efficacy scale-short form among adolescents. Journal of Adolescent Health. 2011;49(3):265-71.

23. Dodt RCM, Ximenes LB, Almeida PC, Oriá MOB, Dennis C-L. Psychometric and maternal sociodemographic assessment of the breastfeeding self-efficacy scale-short form in a brazilian sample. Journal of Nursing Education and Practice. 2012;2(3):66.

24. Pavicic Bosnjak A, Rumboldt M, Stanojevic M, Dennis CL. Psychometric assessment of the Croatian version of the Breastfeeding Self-Efficacy Scale–Short Form. Journal of Human Lactation. 2012;28(4):565-9.

25. Vakili R, Emami Moghadam Z, Khademi Gh, Vakili S, Saeidi M. Child Mortality at Different World Regions: A Comparison Review. Int J Pediatr 2015; 3(4.2): 809-16.

26. Bibi Leila Hoseini; Rahim Vakili; Mohammad Ali Kiani; Ali Khakshour; Masumeh Saeidi. Maternal Knowledge and Attitude toward Exclusive Breast Milk Feeding (BMF) in the First 6 Months of Infant Life in Mashhad. Int J Pediatr 2014; 2(1): 63-9.

27. Masumeh Saeidi; Rahim Vakili; Bibi Leila Hoseini; Ali Khakshour; Behjat Zarif; Somayeh Nateghi. Assessment the Relationship between Parents' Literacy Level with Children Growth in Mashhad: An Analytic Descriptive Study. Int J Pediatr 2013; 2(1):39-43.

28. Hill G. Nursing Research-Generating and Assessing Evidence for Nursing Practice. Nurse Researcher. 2010;17(2):88-90.

Table-1: The COSMIN checklist (aspects of internal consistency) for methodological quality of studies (11).

Authors, Reference	1	2	3	4	5	6	7	8	9	10	11
Deborah et al., (21)	Unclear	No	No	Unclear	Yes	Yes	Not applicabale	No	Yes	Not applicable	No
Dennis et al., (22)	Unclear	No	No	Unclear	Yes	Unclear	Not applicabal	No	Yes	Not applicable	No
Dodt et al., (23)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Bosnjak et al., (24)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Ip et al., (17)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Oliver-Roig et al., (15)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Wheeler et al., (19)	Unclear	Yes	Yes	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Aydin et al., (16)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Zubaran et al., (12)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	Yes
Nanishi et al., (14)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	Yes
Wutke et al., (13)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No
Gerhardsson et al., (20)	Unclear	No	No	Unclear	Yes	Unclear	Not applicable	No	Yes	Not applicable	No

1.Do the scales have effect indicators, meaning is a reflective model a basis?
2. Design requirements?
3. Was the percentage of missing items presented?
4. What was a description of how missing items were addressed?
5. Was there adequacy for the sample size in the internal consistency analysis?
6. Was the unidimensionality of the scale evaluated, meaning was factor analysis or IRT model used?
7. Was there adequacy for the sample size in the unidimensionality analysis?
8. Was there separate internal consistency statistic calculated for each unidimensional subscale?

9. Were there any key flaws in the study design or methods?
10. Methods of statistical analysis
11. Was Cronbach's alpha obtained for Classical Test Theory (CTT)?
12. Was Cronbach's alpha or KR-20 obtained for dichotomous scores?
13. Was a goodness of fit statistic at a global level obtained for IRT? e.g. Chi-squared test.

IRT; Item Response Theory; CTT: Classical Test Theory.

Table-2: The COSMIN checklist (aspects of construct validity) for methodological quality of studies (11).

Authors, Reference	1	2	3	4	5	6	7
Deborah et al., (21)	Unclear	No	No	Unclear	No	Yes	No
Dennis et al., (22)	Unclear	No	No	Relatively Small	No	Yes	No
Dodt et al., (23)	Unclear	No	No	Yes	No	Yes	No
Bosnjak et al., (24)	Unclear	No	No	Yes	No	Yes	No
IP et al., (17)	Unclear	No	No	Yes	No	Yes	No
Oliver-Roig, et al., (15)	Unclear	No	No	Relatively Small	No	Yes	No
Wheeler et al., (19)	Unclear	Yes	Yes	Relatively Small	No	Yes	No
Aydin et al., (16)	Unclear	No	No	Yes	No	Yes	No
Gerhardsson et al., (20)	Unclear	Yes	Yes	Relatively Small	No	Yes	No
Zubaran et al., (12)	Unclear	Yes	Yes	Relatively Small	No	Yes	No
Nanishi et al., (14)	Unclear	Yes	Yes	Yes	No	Yes	No
Gerhardsson et al., (20)	Unclear	Yes	Yes	Yes	No	Yes	No

1. Do the scales have effect indicators, meaning is a reflective model a basis?
2. Was the percentage of missing items presented?
3. What was a description of how missing items were addressed?
4. Was there adequacy for the sample size in the analysis?
5. Were there any key flaws in the study design or methods?
6. Was exploratory or confirmatory factor analysis carried out for CTT?
7. Were IRT tests carried out for IRT to detect the unidimensionality of the items?
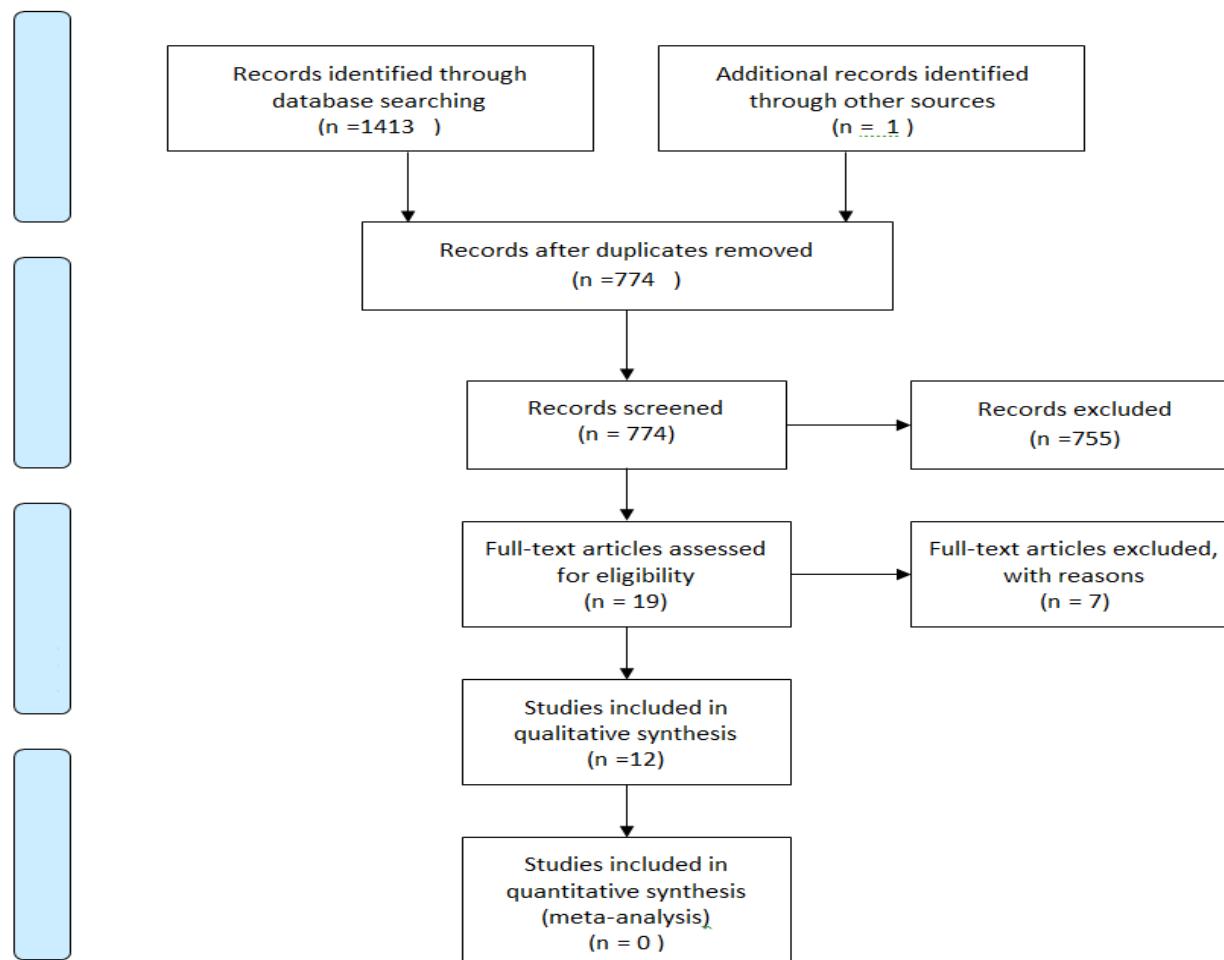
IRT; Item Response Theory; CTT: Classical Test Theory.

Fig.1: PRISMA flowchart of study.

Table-3: The characteristic of 12 studies included into systematic review.

Authors, Area of study, Year, Reference	Age, year	Sample size	Study population	Type of studies	Timing administration of test	Factorial structure	Reliabilitty	Main result
Deborah et al., (21), 2010, USA	18 or older	153 mother	Black Women in the USA	NM	4-week postpartum	EFA	Internal consistency and item-total correlation	Total cronbach's alpha was 0.94 and item-total correlation ranged from 0.49 to 0.85. EFA identified single factor structure Factor with factor loading ranged from 0.66 to 0.87.
Dennis et al., (22), 2011, Canada	16.82 ± 1.18	103 adolescents	Candaian adolescents	NM	Antenatal and postnatal	EFA	Internal consistency and item-total correlation	Cronbach's alpha was 0.844 and 0.93 antenatal and post-natal, respectively. Item-total correlation ranged from 0.34 to 0.67 for the antenatal assessment and from 0.51 to 0.81 for posts natal assessment. EFA extracted only one factor structure accounted 53% of the variance.
Dodt et al., (23), 2012, Brezile	23.9	294 postpartum women	Brazilian women with low income	NM	Postpartum	EFA	Internal consistency and item-total correlation	In Brezilian, cronbach's alph was s 0.74 and 078% of item-total correlation falled in normal rang 0.3 to 0.7. Interclass correlation cofficient (ICC)ranged from 0.69 and 0.78, EFA using PCA without any rotation showed only one factor accounted 57%of the variance.
Pavicic Bosnjak et al. (24), 2012, Croation	30 (± 4)	190 breastfeeding mothers	Croatian mothers	NM	1 and 6 postpartum	EFA	Internal consistency and item-total correlation	Cronbach's alph was 0.86 and all of item-total correlation falled in normal rang 0.3 to 0.7. EFA using maximum likelihood with rotation varimax identified one factor solution explained 33 % of variance.
Ip et al., (17), 2012, Chaina	30	185 breastfeeding mothers	Chainese mothers	NM	1 and 6 postpartum	CFA	Internal consistency and item-total correlation	The Cronbach's alpha coefficient was excellent 0.95. All item-correlations were positive and above 0,50. The goodness of fit indices showed that model was resonably good fit to the data.
Oliver-Roig (15), 2012, Spania	30.1± 55.03	135 breastfeeding mothers	Spanish mothers	Methodological study	The second day postpartum	EFA	Internal consistency	Total cronbach's alpha of of BSES-SF was 0.92 . EFA using PCA showed a one factor sloution Also all factor loading were more than 0.3.
Wheeler et al. (19), 2012, Canada	29.8± 5.2	144 breastfeeding mothers	Canadian mothers with preterm infants	Methodological study.	1-week post partum	EFA	Internal consistency and item-total correlation	Total cronbach's alpha of BSES-SF was 0.88. item-total correlation ranged from 0.23 to 0.70. EFA using PCA without rotaintion showed one factor sloutionexplained 47.1% of total variance. All factor loading was above 0.3.

Aydin et al., (16), 2018, Turky	30% between 19-24, 33.7% between 25-29 %, 36% between 30-34	326 pregnant women	Turkish pregnant women	Methodological study.	During pregnancy	EFA	Internal consistenc and corelation between two interval	Test-retest reliability (correlation=0.94). Total cronbach's alpha was 0.86. Item-total correlation ranged from 0.23 to 0.65. EFA extracted four factore. Because a lots of items had cross loading, authors reported it seem that turkish version should be one factore structure.
Zubaran et al., (12), 2010, **Po**rtugal	25.4	89 mothers in Southern Brazil	Prlotugua mothes	NM	Postpartum	EFA	Internal consistency and item-total correlation	Total cronbach's alpha of BSES-SF was 0.71. item-total correlation ranged from 0.23 to 0.70. EFA identified 6 factors explained 71.5% of total variance. However, scree plot suggested the one- factor structure counted 20% of the variance.
Wutke et al., (13) 2006, Poland	28	104 mothers	Poland mothrs	Methodological study.	6-16postpartum	-	Internal consistency	Total cronbach's alpha of BSES-SF was 0.89.
Nanishi et al., (14), 2015, Japan	30.8±4.8	378 women in their third trimisteres	Japangese mothers	A secondery analysis of intervention study	Third trimisteres of prgnanacy	–	Internal consistency	Total cronbach's alpha of BSES-SF was 0.94.
Gerhardsson et al., (20), 2014, Swedish	Median=31	120 mothers	Seweden mother	NM	During the first week postpartum	EFA	Internal consistency and item-total correlation	Total Cronbach's alpha was 0.90., item-total correlation was in a range 0.34 to 0.74. EFA yielded one- factor stricture confirmed by scree plot.