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A Systematic Review of Instruments Measuring Family and Social Support of Breastfeeding Mothers

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Abstract

Background: Due to the low rate of breastfeeding among working mothers and support of interventions to increase the duration of breastfeeding, this systematic review conducted to evaluate psychometric properties of instruments measured mother's perception of Breastfeeding Support.

Materials and Methods: The search was carried in English language databases including Medline (via PubMed), Scopus, Cochran library and Web of Science since inception to March 2018 regarding published studies evaluating the psychometric properties of the Breastfeeding Self-Efficacy. The COSMIN checklist was used to assess the quality of related studies.

Results

Authors of Perceived Breastfeeding Support Assessment Tool' (PBSAT) suggested that instrument seem to should be two factors "workplace environmental support for breast-feeding working mother" and "the available social environmental support for working mothers". Total Cronbach's alpha was 0.85. In exclusive breastfeeding social support (EBFSS) instrument, based on exploratory factor analysis, 16 items grouped into three factors "instrumental", "emotional" and "informational factors" accounted 66% of total variance. EFA were followed by confirmatory factors analysis showed Modified model was partially fitted to the data. In the Workplace Breastfeeding Support Scale (WBSS), EFA identified four dimensions of breastfeeding support at workplace. These four factors labeled "technical support", "breastfeeding-friendly environment", "facility support" and "peer support". Cronbach's alpha was 0.77 and split-half reliability was r=0.86. In Employee Perceptions of Breastfeeding Support Questionnaire (EPBS-Q), data scaled by the Multidimensional Random Coefficients Multinomial Logit Model. A two-dimensional model (company polices/work culture and manager and her co-workers) were emerged. Cronbach's alpha was excellent (almost 0.90).

Conclusion: Four instruments found to assess breastfeeding was valid and reliable to measure breast feeding in social and workplaces.

Key Words: Adolescents, Aggression, Children, Life Satisfaction, Self-rated Health.

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1- INTRODUCTION

Breast milk as the most appropriate nutrition for newborns is the most important and effective action to support the infant health. Therefore, it is highly recommend to exclusive breastfeeding (1-5). According to the World Health Organization (WHO), and the United Nations Children's Fund (UNICEF), each child needs exclusive breastfeeding up to six months and continued by two years of old or more (1). The breast milk nutrition play important role in decreasing infant mortality, increasing in intelligence quotient, and also it provided the best pattern of infant growth and development and their health in adulthood (6-8).

Given the global goals of nutritional policies in elevating the level of exclusive breastfeeding and the promotion of breastfeeding programs, one of the ways can be to concentration on the breastfeeding-influencing factors (9) such as knowledge of mothers towards the advantages of breastfeeding, supportive systems, socioeconomic class and breastfeeding self-efficacy. Factors like socioeconomic status are less varied and the healthcare providers for improving the outcome need to consider variable parameters such as maternal knowledge of the advantages of breastfeeding, breastfeeding self-efficacy (10-13), and breastfeeding supportive systems such as access to health care providers in the event of problems with breastfeeding, support and encouragement from family and health care workers. Since health care providers are not always available, experienced women are successful in forming support groups in many countries. Supportive programs provide the right, new and scientific information for mothers, and make them aware of the experiences of other mothers. Some of the objectives of these groups are to promote breastfeeding, support for mothers, and the pleasure of breastfeeding (14). In order to perform and support breastfeeding interventions, it is required to present a tool with suitable psychometric to health providers. Review literature identified four instruments to assess breastfeeding. Hirani et al. in Pakistan developed a 29-item tool named Perceived Breastfeeding Support Assessment Tool (PBSAT) (15). The second instrument developed by Boateng et al. in Uganda, exclusive breastfeeding social support (EBFSS) is a 16-item tool (16). In the third study, BAI et al. (17) in America designed and developed a 12-item instrument labeled the Workplace Breastfeeding Support Scale [WBSS]. Green et al. in America designed and developed a 54-item instrument labeled Employee Perceptions of Breastfeeding Support Questionnaire (EPBS-Q) (18). Due to the low rate of breastfeeding in some countries especially among working mothers and support of interventions to increase the duration of breastfeeding, this systematic review conducted to evaluate psychometric properties of instruments measured mother's Perceived Breastfeeding Support to give comprehensive information for health provider and researches to use in theirs clinics and research.

2- MATERIALS AND METHODS

2-1 search strategy

The search was independently done by two authors in English language databases including Medline (via PubMed), Scopus, Cochran library and Web of Science since their inception to present (March 2018) regarding published studies primary aim assessed the psychometric properties of mother's perceived Breastfeeding support. The applied keywords were: (Breastfeeding support OR breastfeeding social support OR breastfeeding family support) 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 OR predictive validity). We also checked the bibliographies of related articles to detect any studies not retrieved via the above mentioned electronic databases. In the present review, the bibliography of searched articles was studied to find studies not retrieved through the electronic databases.

2-2. Selection criteria

All instruments measured brestfeesing family and social support of mothers published in Endlish databases. Also, perimary aim of instrument was to assess psychometric properitcs.

2-3. Data extraction

The all related articles were evaluated independently by two separate reviewers in details to extract the required data using standardized data extraction form, containing the name of first author, location of study, age of participants, date of study, method of sampling, type of study, sample size, study population.

2-4. Quality of study

Consensus based standards for the selection of health status Measurement instruments (COSMIN) checklist was used to assess the quality of related studies (19). The checklist contained internal consistency, reliability, measurement error, content validity, structure validity, and hypothesis testing, cross cultural, criterion, responsiveness, interpretability and generalizability.

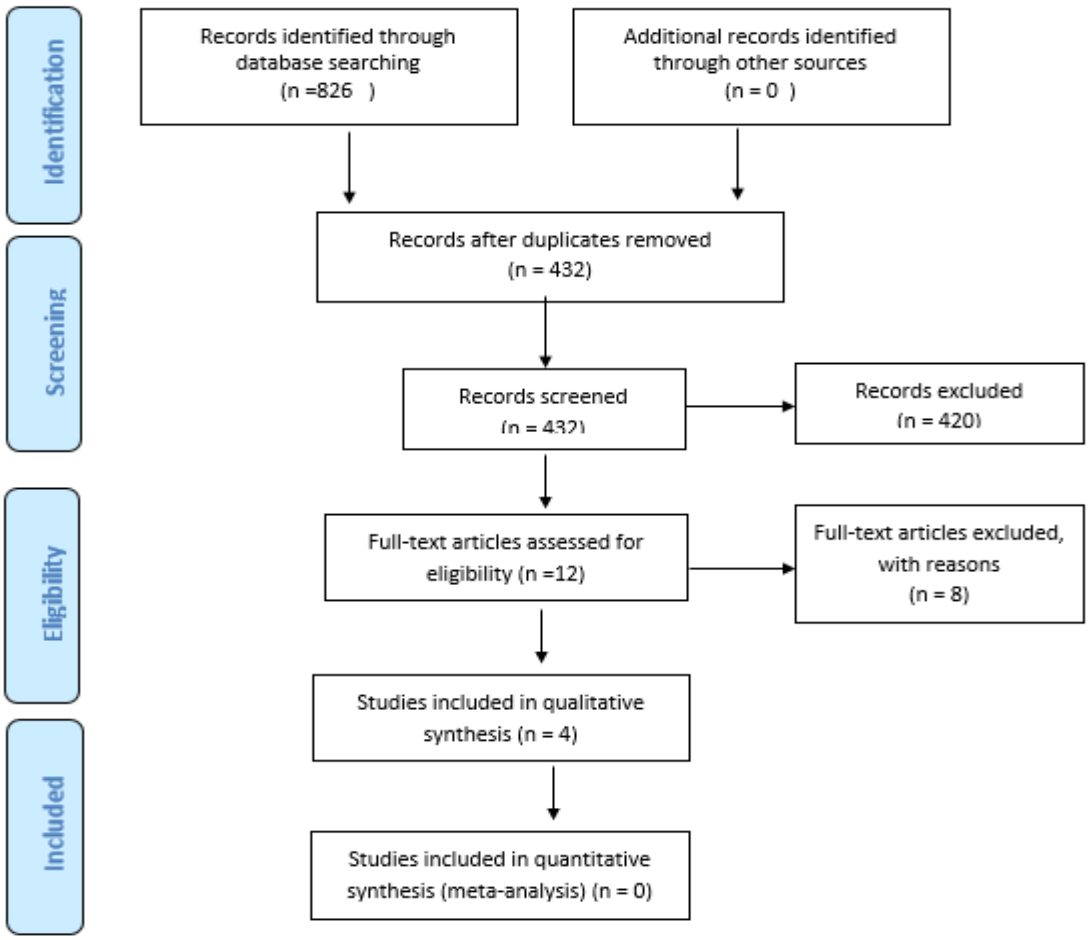

Fig.1: PRISMA flowchart of present study.

3-RESULTS

Table.1 showed the characteristic and quality of four studies included into systematic review. **Figure.1** showed search process of included articles in systematic review. At first, 826 studies found primarly search; 822 studies excluded after reading title and abstract; Finally, four questionnaires included in systematic review.

3-1. Perceived Breastfeeding Support Assessment Tool' (PBSAT) (15).

Hirani et al. in Pakistan developed a 29-item tool named Perceived Breastfeeding Support Assessment Tool' (PBSAT). This instrument measured Pakistani urban working mothers's preception regarding brestfeeding support. These questionnaire included two factors "workplace environmental support for breast-feeding working mother" and "the available social environmental support for working mothers. Following Psychometric properties was used to valid and reliable of instrument (15).

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

EFA was conducted on 41 items. The Kaiser-Meyer-Olkin (KMO) was tested before EFA to assess adequacy of sample size. KMO was 0.762. EFA was conducted using principle component analysis (PCA), and identified 12 factors with Eigen values more than one. These identified factors explained 62% of total variance. However, screen plot identified two factors. The two first Eigen value was 7.36 (17.96 variance), and 3.13 (7.64% of variance). Factor loading below 0.34 or cross loading more than 0.2 was removed; 29 out of 41 items remained. Authors decided that factors structure of PBSAT should be two factors. The first factor labeled "workplace environmental support for breast-feeding working mother", and the second factor labeled to "the available social environmental support for working mothers". The PBSAT with 29-item revealed an acceptable inter-rater reliability of 0.95.

3-1-2. Reliability

Reliability was tested by internal consistency reliability coefficient. Total Cronbach's alpha was 0.85. The Cronbach's alpha of first factor was 0.86 and second factor was 0.77. All obtained value was in a normal range. Also, correlation each item with its factor' sum were assessed. Item-first factor correlation was significant and ranged from 0.48 to 0.77. Item-second factor correlation was significant and ranged from 0.26 to 0.71(15).

3-2. Exclusive breastfeeding social support (EBFSS) (16)

Boateng et al. in Uganda developed a 16-item tool named exclusive breastfeeding social support (EBFSS) (16). The response to each item was measured on three-point: a) "no help at all", (b) "less than you would like", and (c) "as much as you would like". Validity of questionnaire was assessed construct validity (EFA and CFA), predictive validity, and convergent validity. Reliability was assessed using internal consistency.

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

EFA using Geomin oblique rotation was conducted on 18 items. A three- factors solution was yield. Eigenvalue value of the third first factor was 8.93, 1.66, and 1.28 explained 66%. Scree plot confirmed a three-factor solution with eigenvalue more than one. One item with low factor loading (<0.40), and one item with loading cross (>0.4) were removed. The remaining 16 items group into three factors. These three factors labeled "instrumental", "emotional" and "informational factors". EFA followed by confirmatory factor analysis (CFA). Three -factor model was satisfactory fitted to the data (The Root Mean Square Error of Approximation

[RMSEA=0.07]**,** Comparative Fit Index [CFI=0.97], Tucker-Lewis Index (TLI=0.95), Standardized root mean square [SRMS= 0.06](16).

3-2-2. Confirmatory Factor analysis

Extracted three –factor solution of EFA were tested using CFA. CFA was conducted on data from 3 months (n=237) post-partum. Initial model was partially fitted to the data. Base on modification indices (16).

3-2-3. Reliability

Cronbach's alpha was 0.78, 0.85, and 0.78 for instrumental, emotional, and informational of EBFSS scales at Month one. Cronbach's alpha was 0.78, 0.85, and 0.83 for instrumental, emotional, and informational of EBFSS scales at Month three (16).

3-2-4. Predictive validity

Predictive validity showed that three factors of "instrumental" (β=1.79; $p<0.001$), "informational" (β=1.29; $p<0.001$), and "emotional" (β=1.33, $p<0.001$) of EBFSS predicted significantly exclusive breastfeeding self-efficacy (EBF). However, only "emotional" factor of EBFSS was significantly associated to EBF behavior (16).

3-2-5. Convergent validity

General social support showed a statistical significant correlation with instrumental ($r = 0.41$, $p \leq 0.001$), Informational ($r = 0.15$, $p \leq 0.05$), and Emotional ($r = 0.25$, $p \leq 0.001$) EBFSS (16).

3-3. The Workplace Breastfeeding Support Scale (WBSS)

BAI et al. (17) in America designed and developed instrument to measure mother's perception of Breastfeeding Support in workplace. They called their instrument "The Workplace Breastfeeding Support Scale (WBSS)"; 12-item "group into four factor including technical support", "breastfeeding-friendly environment", "facility support", and "peer support instrument". Each item was measured by a seven point- Likert.

3-3-1. EFA

KMO was 0.71 which is higher acceptable value of 0.6. EFA using the principal component factor with rotation identified four dimensions of breastfeeding support at workplace. Eigenvalue for the first four factors was 3.58, 1.57, 1.19 and 1.11. These four factors explained 62% of total variance. These four factors labeled "technical support", "breastfeeding-friendly environment", "facility support" and "peer support"(17).

3-3-2. Reliability

The reliability of the WBSS was measured using internal consistency (Cronbach's alpha), and split-half reliability. Cronbach's alpha was 0.77 and split-half reliability was r=0.8617) (17).

3-4. Employee Perceptions of Breastfeeding Support Questionnaire (EPBS-Q) (18)

Green et al. (18). in America designed and developed a 41-item instrument labeled Employee Perceptions of Breastfeeding Support Questionnaire (EPBS-Q). Items were rated either yes/no or Likert scale. Pilot test result in reducing initial item pool from 54 to 41 items. Questionnaire divided into five sub-scales including physical environment of breast-feeding space, company policies, co-worker support, manager support and work- flow. Data scaled by the Multidimensional Random Coefficients Multinomial Logit Model. A two-dimensional model (company polices/work culture and manager and her co-workers) were emerged. Cronbach's alpha was excellent (almost 0.90). A moderately strong correlation were observed between two subscale (18).

4- DISCUSSION

The infants commonly meet their nutritional needs thoroughly by breastfeeding. Nevertheless, this essential source is in descending trend, especially among the newborns with employed mothers, so that minimal or absent social and occupational support reportedly makes it difficult to ensure the significance of exclusivity and continuation of breastfeeding. Accordingly, a comprehensive, reliable and validated instrument to assess perceived breastfeeding support, is required to deal with this concern on breastfeeding support for working mothers (15). Due to the low rate of breastfeeding among working mothers and support of interventions to increase the duration of breastfeeding, this systematic review conducted to evaluate psychometric properties of instruments measured mother's perception of Breastfeeding Support. Four studies were incded into systematic reviwe. Two studies were conducted in America, one study in Uganda and one study in Pakistan. Three studies assessed perceived breastfeeding support of working mothers. Four instruments PBSAT (15), EBFSS (16),WBSS (17), and EPBS-Q to measur mother's perception of brestfeeding supporte were found to have sutiable validity and reliabelity (18).

The PBSAT (15) had a suitable factorial structure and good reliability. In term of validity, EBFSS instrument had a defined-well EFA. CFA was confirmed on three–factor model proposed by EFA that showed a partial fit to the data and good predictive and convergent validity. This instrument had a moderate reliability. WBSS (17) had a defined –well EFA. Cronbach's alpha and split-half reliability of WBSS was 0.77 and 0.861, respectively. EPBS-Q (18) had two-dimension. In term of reliability, Cronbach's alpha was excellent and two subscale had a moderately –strong correlation (18). Based on Exploratory Factor Analysis (EFA), the 29-item PBSAT consists of two domains, including workplace environmental support with 12 items and social environmental support with 17 items. The present study compared the two-factor solution with the four-factor solution by the EFA. The two-factor solution rejected the four-domain based theoretical framework. The reliability was tested by internal consistency reliability coefficient. Total Cronbach's alpha was 0.85. The Cronbach's alpha of first factor was 0.86 and second factor was 0.77. Item-first factor correlation ranged from 0.48 to 0.77. Item-second factor correlation ranged from 0.26 to 0.71 (15). The study sample size was calculated to be 200 among the breastfeeding employed mothers in urban areas. According to the reports, the least subject to item ratio is better to be 5:1 in EFA (15), confirming the adequacy of 200 breastfeeding employed mothers for this study. The PBSAT was evaluated among large sample size of the breastfeeding employed mothers in urban areas.

In exclusive breastfeeding social support (EBFSS) instrument (15), based on exploratory factor analysis, 16 items grouped into three factors "instrumental", "emotional" and "informational factors" accounted 66% of total variance. EFA were followed by confirmatory factors analysis showed Modified model was partially fitted to the data. The third questionnaire was a 12-item instrument labeled. The Workplace Breastfeeding Support Scale (WBSS). Four factors explained 29.8% of total and labeled "technical support", "breastfeeding-friendly environment", "facility support" and "peer support". The Cronbach's alpha was 0.77 and split-half reliability (r) was 0.86 (17). An advantage of WBSS is the short length. BAI et al. argued that the "technical support" factor with three items explained the greatest variance (29.8%). The WBSS scale might be improved by

adding more items in the "technical support" factor. The added four possible items included "accessibility to hand-washing devices", "accessibility to electric outlets for breast pumping", "accessibility to separate refrigerators for storing breast milk away from employees", and "accessibility to on-site lactation support" (17). The fourth questionnaire was a 54-item instrument labeled EPBS-Q (18). A two-dimensional model (company polices/work culture and manager and her co-workers) was emerged. Internal consistency was excellent and correlation between two subscales was moderately strong (18). This questionnaire had two key limitations that should be addressed. First, EPBS-Q with 54 items may be considered a relatively long-term questionnaire. Second, the sample size (n=104) of study was relatively small.

4-1. Limitation

The limitations of systematic review need to be addressed. First, psychometric properties of the instruments were not comprehensively tested. Further researches required to be conducted based on COSMINE checklist. In term of the test-retest reliability, it was not reported in none of questionnaires. Missing percentage of items and how they were handled were not reported in some studies. Adequacy of sample size in factors analysis can be determined based on rule of thumb and Monte Carlo according to rule of thumb, at least five cases for each items are need to conduct EFA. Therefore, it seems that sample size included in some studies was insufficient.

5- CONCLUSIONS

PBSAT, EBFSS, WBSS and EPBS-Q are valid and reliable instruments to measure mother's perception of breastfeeding support in family, social and workplaces. These instruments can be used in clinical and research setting. Future work should be done in diverse population.

6- CONFLICT OF INTEREST: None.

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Table-1: The characteristic and quality of four studies included into systematic review

Authors, Reference, Area of study, Reference	Age, Year	Instrument	Sample size	Study population.	Type of studies	Timing administration of test	A	B	C	D	E	F	G	H	I	J	K
BAI, References (17) 2008, American	27.7±5.8	WBSS	66 mothers	American Primiparous mothers.	Cross-sectional	6 to 12 months postpartum	2	()	()	(1)	(3)	()	()	()	()	()	(2)
Hirani, Reference (15), 2012, Pakistan	19-45	PBSAT	200 breast-feeding working mothers	Working mothers Pakistani urban working mothers had babies who were less than or equal to 12 months.	Methodological research	Post partum	2	()	()	(1)	(3)	()	()	()	()	()	(2)
Boateng, Reference (16), 2017, Uganda	25.2	EBFSS	1 (n = 238), and 3 (n = 237) months post-partum	Uganda mothers.	Observational cohort	1 and 3 months Post partum	2	()	()	(1)	(3)	()	()	()	()	()	(2)
Greene, References (18), 2007, America	30.5	EPBS-Q	n=104	American pregnant mothers or had recently delivered.	-	Pregnancy or postpartum	2	()	()	(1)	(3)	()	()	()	()	()	(2)

Empty boxes=not applicable, 0=poor, 1=good, 2= fair, 3=good and 4=excellent.
A: Internal consistency; B: Reliability, C: Measurement error; D: Content validity; E: Structural validity, F: Hypothesis testing, G: Cross cultural, H: Criterion; I: responsiveness; J: Interpretability; K: Generalizability.
PBSAT: Perceived Breastfeeding Support Assessment Tool; EBFSS: Exclusive breastfeeding social support; WBSS: The Workplace Breastfeeding Support Scale; EPBS-Q: Perceptions of Breastfeeding Support Questionnaire.