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ABSTRACT

The purpose of this study was to create and establish the validity of a short questionnaire to measure mothers' perceived support for breastfeeding from the workplace. The items in the workplace breastfeeding support scale (WBSS) were derived from a literature review. The scale was self-administered in central Indiana during the fall of 2005 to a convenience sample of 66 volunteers who were primiparous, 6 to 12 months postpartum, worked outside home, and had initiated breastfeeding prior to the survey. Internal consistency (α) and split-half reliability (r) tests and a factor analysis were done to establish reliability and construct validity of the scale. The WBSS showed acceptable reliability (α=.77, r=0.86). Content validity was established by review using a panel of experts. Four distinct constructs of the scale were identified that accounted for 62.1% of the total variability of the scale: technical, environmental, facility, and peer support, thus establishing construct validity of the scale. Lactation consultants and worksite lactation program planners can use the WBSS to help mothers returning to work and to assess the needs for improvement of support programs.

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Health benefits of breastfeeding are attributable to the characteristics of breast milk. Breast milk is a dynamic fluid, changing composition from day to day and throughout the course of lactation. It contains antibacterial agents and provides the baby with the specific nutrients that are needed at each stage of growth (1). The unique composition of breast milk provides nutrients in bioavailable forms that are essential for infants' healthy growth and development as well as protection against gastrointestinal, respiratory, and ear infections. A longer duration of breastfeeding optimizes these health benefits of breastfeeding (1,2). Observational studies have suggested an inverse association between the duration of breastfeeding and the risk of overweight later in life. The studies found that each additional month of breastfeeding reduced the risk of overweight by 4% (3).

One goal of Healthy People 2010 is to increase the proportion of mothers who initiate breastfeeding to 75%, the proportion who continue breastfeeding for 6 months to 50%, and the proportion who continue breastfeeding until 1 year to 25% (4). The current breastfeeding practices reported in the 2005 National Immunization Survey are 70% initiation, 36.2% breastfeeding for 6 months, and 20.1% breastfeeding for 1 year (5). Although the initiation rate is approaching the Healthy People 2010 goal, the continuation rate lags, depriving more than 60% of 6-month-old American babies the benefits associated with optimal nutrition.

Mothers who work outside the home initiate breastfeeding at the same rate as mothers who stay at home. The breastfeeding continuation rate, however, decreases among mothers who return to work. Nationally, only 22.8% of full-time employed mothers who initiate breastfeeding their infants continue through 6 months, compared with a breastfeeding continuation of 35.4% among mothers who are not employed (6). Women who have infants and children younger than age 3 years are the fastest growing segment of today's labor force in America. Projections indicate that the proportion of postpartum mothers returning to the workplace will increase, especially considering the enactment of welfare reform in many states where mothers on welfare are required to return to the workforce (7). Many women stop breastfeeding soon after they return to work because of a lack of preparation and support. Lack of support and knowledge regarding the management of breastfeeding while employed, a nonsupportive work environment, and problems pumping and storing breast milk are frequently cited as reasons why working women wean their babies before 6 months (8).

Challenges to working mothers for continuation of breastfeeding include insufficient break time and inadequate facilities to pump and store milk. Several states,

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including California, Connecticut, Illinois, Hawaii, and Texas, have specific legislation or resolutions that encourage support for breastfeeding in the workplace (9). In 2002, California passed the Lactation Accommodation Law, which expands previous workplace provisions to require adequate break time and space for breastfeeding or milk expression, with a violation penalty of $100. In 1995, Texas passed legislation to standardize basic components of workplace support for breastfeeding, with an incentive of receiving recognition as a Mother-Friendly Workplace (10). Some companies offer services such as prenatal education, day-care services, flexible work schedules, and/or lactation professionals on-site. Although lactation accommodation efforts are improving the duration of breastfeeding for working mothers, overall breastfeeding rates at 6 months among full-time working mothers are considerably less than those of nonworking mothers (6).

Many women stop breastfeeding soon after they return to work because of a lack of preparation and support.

To maintain and further improve the effects of the workplace lactation support programs, it is important to assess the degree of support from the mother's point of view. Currently, a valid instrument is not available to assess a mother's perception of the support for breastfeeding at the workplace. The purpose of this study, therefore, was to develop and explore psychometric properties of such an instrument (the Workplace Breastfeeding Support Scale [WBSS]), and to establish the reliability and validity of the scale.

METHODS

A cross-sectional and anonymous survey was conducted between September and November of 2005. Subjects were recruited using a convenience sampling method. A total of 90 eligible mothers were invited and 66 of them participated (73% response rate). Minimum sample sizes suggested for conducting a factor analysis to establish the validity of a scale are 3 to 20 times the number of variables (11). Thus, the number of participants in the current study (n=66, 5.5 times the 12 variables) falls within the recommended range of minimum sample sizes for conducting a factor analysis.

Mothers were recruited from one pediatric and three clinics of the Special Supplemental Nutrition Program for Women, Infants, and Children. Mothers who were primiparous, 6 to 12 months postpartum, working outside the home for pay, and who had breastfed the baby for some duration were invited to participate in the study. Mothers who volunteered to participate in the study completed the self-administered questionnaire at their clinic visits. The Indiana University Institutional Review Board approved this study.

The initial pool of the WBSS items was derived from a review of the literature (12-14). Many items were modified from the return-to-work breastfeeding assessment tool (14) designed to help lactation consultants evaluate lactation support at clients' workplaces. Each item was reviewed for content validity by four experts, including specialists in nutrition, lactation, scale development, and survey instrument development. The WBSS included challenges that working mothers encounter to continue breastfeeding, such as a lack of break time, lack of peer support, and inadequate facilities for pumping and storing milk. These challenges were formulated into a short, 12-item questionnaire. Even though a long questionnaire might have included more variables of interest, it could substantially reduce the likelihood that respondents would complete it (15). Hence, investigators attempted to minimize the length of the questionnaire. Responses to question items were measured on a seven-point Likert scale. A high score indicates the respondent's perception of positive workplace breastfeeding support.

Internal consistency (Cronbach's α) and split-half reliability (r) were measured to establish reliabilities of the WBSS instrument. The full instrument possesses internal consistency reliability to the extent that individual question items measure the same thing (16). Another measure of reliability, split-half reliability, was used to provide further evidence of reliability. The question items were grouped by even- and odd-numbered items. After each person's total score on each half of the instrument was computed, these two sets of scores were correlated to provide the split-half reliability coefficient.

Construct validity was established by conducting a factor analysis of responses to the WBSS. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to assess the factorability of the data. The principal component method was used to extract factors. After extraction, rotation is ordinarily used to maximize high factor loadings and minimize low ones. Rotation improves the interpretability and application of the solution. An oblique rotation was done because the scale was to measure somewhat correlated underlying processes (17). Every dimension of perception is somehow related rather than independent, which gives oblique rotation advantages. Data were analyzed using the Statistical Package for the Social Sciences, version 14.0 (2006, SPSS Inc, Chicago, IL).

RESULTS AND DISCUSSION

Demographic characteristics of the subjects are shown in Table 1. The mean age of the subjects was 27.7 (standard deviation=5.8) with a range of 17 to 43 years. Overall demographic data showed that 80% of women were white, 49.2% were eligible for the Special Supplemental Nutrition Program for Women, Infants, and Children, 80.3% had some college or higher education, 56.1% were never breastfed when they were babies, and 70.8% worked more than 21 hours per week. The proportion of mothers who continued breastfeeding more than 6 months was less than that of mothers who stopped breastfeeding before 6 months (12.3% vs 87.7%). Seventy-five percent of mothers who continued breastfeeding for more than 6 months had been breastfed as babies.

The reliability of the WBSS was found to be acceptable with α=.77 and r=0.86. Each scale has some degree of reliability, but a well-constructed attitude scale can have a reliability coefficient near the upper limit of the contin-

Table 1. Demographic characteristics of working mothers (n=66) who were primiparous, 6 to 12 months postpartum, and had breastfed their babies

Characteristics	Overall[a]	Breastfeeding <6 mo[b]	Breastfeeding ≥6 mo[b]
Maternal age (y) (mean±standard deviation)	27.7±5.8	27.1±7.3	27.7±5.8
	←	%	→
Education			
<High school	6.1	12.5	5.3
High school	13.6	37.5	10.5
Some college	33.3	37.5	33.3
College graduate	27.3	0.0	31.6
Postgraduate degree	19.7	12.5	19.3
Ethnicity			
White	80.0	75.0	80.7
Other	20.0	25.0	19.3
Working hours per week			
≥21	70.8	75.0	70.2
≤20	29.2	25.0	29.8
Socioeconomic status			
WIC[c] eligible	49.2	37.5	50.9
Non–WIC eligible	50.8	62.5	49.1
Mother's personal breastfeeding experience			
Breastfed as a baby	39.4	52.6	75.0
Not breastfed as a baby	56.1	42.1	25.0
Don't know	4.5	5.3	0.0
Breastfeeding duration		87.7	12.3

[a]Overall percentages represent the proportion of the sample in each demographic category. For example, 6.1% of the sample had less than high school education, 13.6% of the sample had high school education, etc.
[b]Breastfeeding duration percentages represent the proportion of the sample in breastfeeding duration category. For example, 12.5% of mothers who breastfed for <6 months had the education level of "less than high school," and 5.3% of mothers who breastfed for >6 months had the education level of "less than high school," and so forth.
[c]WIC=Special Supplemental Nutrition Program for Women, Infants, and Children.

uum (18). The validity of the WBSS was established for content and underlying constructs. The content validity was assessed by a panel of four experts who reviewed the WBSS items in terms of the content and phrasing within a 1-week time period. The items were refined using the panel's suggestions, resulting in 12 items on the questionnaire.

The construct validity was assessed by performing the factor analysis. A KMO value more than 0.6 was required for an acceptable factor analysis (17). A KMO measure of sampling adequacy was 0.71, supporting the use of factor analysis on these data. The principal component factor extraction with rotation was applied to explain as much of the variation in the data on the 12 items with as few factors as possible, and to allow for meaningful interpretation of the factors. The oblique factor analytic results are reported in Table 2.

The construct validity of the WBSS was established by extraction of four factors that accounted for 62.1% of the total variance of the scale. These four factors can be interpreted as four dimensions of the perception of breastfeeding support at the workplace: technical support, breastfeeding-friendly environment, facility support, and peer support. The first factor (Eigen value=3.58) accounted for the largest proportion of the variance (29.8%). Three items in the questionnaire loaded highly on this factor. Thus, the degree of the mothers' perception of breastfeeding support in this sample population was largely determined by the level of technical support at the workplace, such as available nursing rooms and refrigerators to store milk. A breastfeeding-friendly environment (expressed as "having a supportive supervisor" and "breastfeeding being common in workplace") emerged as a separate concept from peer support such as "breastfeeding considered as a healthier choice among co-workers" and "sharing breastfeeding experience with co-workers." Items in technical support and facility support dimensions may seem to overlap in terms of wording and content of question items. However, the way mothers perceived the statements may have been different, resulting in distinct dimensions. A trial using orthogonal rotation showed the same results, thus supporting the notion that the four factors were distinct and independent.

Although the sample size of this study could have been larger and the sampling method could have been more random, the results nonetheless identified four dimensions in working mothers' perception of workplace breastfeeding support. Given the exploratory nature of the current study, this study has the merit of providing psychometric properties of the mothers' perception of workplace breastfeeding support. Replication of this study with a larger sample size using probability sampling methods and with mothers of various ethnic groups is needed to cross-validate the findings and firmly establish the usability of the scale.

Table 2. Results of factor analysis for the Workplace Breastfeeding Support Scale: factor loadings[a] of four identified factors (technical, environmental, facility, and peer support) after oblique rotation

Question items	Factor 1 (technical support)	Factor 2 (environmental support)	Factor 3 (facility support)	Factor 4 (peer support)
I can easily find a quiet place other than the bathroom at my work to pump breast milk.	**0.75**	0.45	0.32	0.24
My workplace has a refrigerator that I can use to store my milk.	**0.79**	0.19	0.06	0.05
I feel comfortable taking several breaks during work hours to pump breast milk.	**0.82**	0.37	0.18	0.08
I have supportive coworkers who cover for me when I need to pump my milk.	0.32	**0.67**	0.10	−0.04
Breastfeeding is common in my workplace.	0.40	**0.74**	0.37	0.17
I have a breastfeeding-supportive supervisor.	0.22	**0.76**	0.37	0.17
My workplace has an on-site daycare.	−0.18	0.46	**0.66**	−0.29
In my workplace, there is a designated space (nursing room) to nurse my baby or pump breast milk.	0.24	0.24	**0.85**	0.01
My workplace has a breast pump for nursing mothers to use.	0.11	0.08	**0.66**	0.14
My coworkers agree that breastfeeding is better for a baby's health than formula feeding.	−0.04	0.17	0.03	**0.79**
My coworkers do not make fun of me when I sometimes leak milk through my clothes.	0.49	−0.05	0.04	**0.59**
My coworkers listen to me talk about my breastfeeding experience.	0.61	0.52	0.20	**0.44**
Eigen values[b]	3.58	1.57	1.19	1.11
% of variance explained (total=62.1%)	29.8%	13.1%	9.96%	9.23%

[a]Factor loadings indicate the correlation between the factor and the variable items. Numbers in bold in each column represent items clustered to the corresponding factor.
[b]Eigen values measure the amount of variation in the variables accounted for by each factor in relation to the total variance (12 for this scale).

CONCLUSIONS

A positive impact of workplace lactation programs on the duration of breastfeeding has been reported in several studies (19,20). To maintain this impact, the quality of lactation programs in the workplace needs to be evaluated regularly. The return-to-work breastfeeding assessment tool designed by Bar-Yam (14) is used primarily by lactation consultants to help working mothers prepare to return to work. The WBSS, however, can be used to determine the degree of workplace breastfeeding support from the mother's point of view once she returns. The short length of the scale provides advantages of quick feedback and evaluation of the lactation program being implemented. In addition, the four constructs of the WBSS can be compared to determine their relative importance, thus giving directions to future breastfeeding promotion efforts. A longer duration of breastfeeding as a result of successful breastfeeding promotion programs can indeed improve maternal and child health in the nation.

This study also provides a guideline for a more comprehensive scale by identifying dimensions of mothers' perception of workplace breastfeeding support. An enhanced scale can be developed by adding more items that reflect various aspects of technical support from the fact that the first factor, technical support, accounted for the largest variance of the scale. Possible items to be added include, but are not limited to, availability of hand-washing facilities, access to electric outlets for the breast pump, separate refrigerators to store breast milk away from employee lunches, or availability of on-site lactation support.

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References

1. Lawrence PB. Breast milk: Best source of nutrition for term and preterm infants. *Pediatr Clin North Am*. 1994;41:925-941.
2. American Academy of Pediatrics. Breastfeeding and the use of human milk. *Pediatrics*. 2005;115:496-506.
3. Harder T, Bergmann R, Kallischnigg G, Plagemann P. Duration of breastfeeding and risk of overweight: A meta-analysis. *Am J Epidemiol*. 2005;162:397-403.
4. United States Department of Health and Human Services. *Healthy People 2010: Conference Edition—Volume II*. http://www.healthypeople.gov/Document/HTML/Volume2/16MICH.htm#_Toc494699668. Accessed December 15, 2005.
5. US Department of Health and Human Services. National Center for Health Statistics. *The 2005 National Immunization Survey*. Hyattsville, MD: Centers for Disease Control and Prevention, 2006. http://www.cdc.gov/nis/datafiles.htm. Accessed February 15, 2007.
6. Biagioli F. Returning to work while breastfeeding. *Am Fam Physician*. 2003;68:2199-2206.
7. Wagner DK, Walstedt J, Jenkins L. Women, work, and health. *Vital Health Stat*. 1997;3:1-48.
8. Thompson P, Bell P. Breastfeeding in the workplace: How to succeed. *Issues Compr Pediatr Nurs*. 1997;20:1-9.

9. La Leche League. Summary of breastfeeding legislation in the US as of 10/15/2006. http://www.llli.org/docs/summary.rtf. Accessed October 31, 2006.
10. Centers for Disease Control and Prevention. *The CDC guide to breastfeeding intervention*. Pages 7-12. http://www.cdc.gov/breastfeeding/pdf/breastfeeding_interventions.pdf. Accessed May 18, 2008.
11. Mundfrom DJ, Shaw DG, Ke TL. Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing*. 2005;5:159-168.
12. Hills PD, Humenick SS. Development of the H & H lactation scale. *Nurs Res*. 1996;45:136-140.
13. Janke JR. Development of the breastfeeding attrition prediction tool. *Nurs Res*. 1994;43:100-104.
14. Bar-Yam NB. Workplace lactation support, part I: A return-to-work breastfeeding assessment tool. *J Hum Lact*. 1998;14:249-254.
15. Wolf RM. Questionnaires. *Educational Research, Methodology, and Measurement: an International Handbook*, 2nd ed. Ed Keeves JP. New York, NY: Pergamon Press; 1997.
16. Huck SW. *Reading Statistics and Research*. Boston, MA: Pearson Education Inc; 2004.
17. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. Needham Heights, MA: Pearson Education Inc; 2001.
18. Mueller DS. *Measuring Social Attitudes*. New York, NY: Teacher's College Press; 1986.
19. Cohen R, Mrtek MB. The impact of two corporate lactation programs on the incidence and duration of breastfeeding by employed mothers. *Am J Health Promot*. 1994;8:436-441.
20. Ortiz J, McGilligan K, Kelly P. Duration of breast milk expression among working mothers enrolled in an employer-sponsored lactation program. *Pediatr Nurs*. 2004;30:111-119.