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Validity and Reliability of the Perceived Readiness for Discharge After Birth Scale

Marianne Weiss

Marquette University, marianne.weiss@marquette.edu

Polly Ryan

University of Wisconsin - Milwaukee

Lisa Lokken

St. Joseph Regional Medical Center, Milwaukee

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By Marianne E. Weiss, Polly Ryan, and Lisa Lokken

Objective: To assess the psychometric properties of a scale measuring mothers' perceptions of readiness for discharge after birth. **Design:** Psychometric analyses including construct validity using factor analysis and known groups comparisons, predictive validity, and reliability. Data were collected at discharge and 6 weeks postdischarge. **Setting:** Tertiary-level perinatal center in the Midwestern United States. **Participants:** 1,462 postpartum mothers. **Intervention:** None. **Main Outcome Measures:** Perceived Readiness for Discharge After Birth Scale scores; subscale scores for personal status and knowledge factors. **Results:** Exploratory and confirmatory factor analyses indicated that the scale contained two factors. Perceived Readiness for Discharge After Birth Scale scores were lower for mothers who were breast-feeding, married, primiparous, and had a short hospital stay (less than 30 hours) than for their comparison groups. The Perceived Readiness for Discharge After Birth Scale personal status factor was predictive of self-reported physical and psychosocial problems and unscheduled utilization of health services in the first 6 weeks postpartum. The knowledge factor was predictive of postdischarge telephone calls to the pediatric provider. Reliability estimates ranged from 0.83 to 0.89 for the total scale and subscales. **Conclusions:** The Perceived Readiness for Discharge After Birth Scale performed well in psychometric testing. Assessing mothers' perceptions of readiness for discharge is important for measuring outcomes of hospitalization and for identifying mothers at risk for postdischarge problems.

As hospital length of stay has decreased, the need to assess readiness for discharge and transition to home following hospitalization has become increasingly important to patient safety, satisfaction, physical, emotional, psychological, and social outcomes. Length of stay for childbirth has been an emotionally and politically charged issue. Public and political reaction to the perception that mothers and babies were being sent home too early and before they were ready resulted in legislation that mandated payment for a 48-hour postpartum stay for vaginal birth mothers and 96 hours for cesarean mothers (Newborn and Mothers Health Protection Act, 1996; effective January 1, 1998). However, the legislation left the decision about discharge timing to the mother and her health care provider. Professional organizations have developed criteria for use by clinicians in assessing readiness for early discharge (American Academy of

Pediatrics/American College of Obstetricians and Gynecologists [AAP/ACOG], 2002). The clinician's assessment of a new mother's readiness for discharge may be different from the new mother's perception. Shorter length of stay has been associated with lower perceived readiness for discharge (Weiss, Ryan, Lokken, & Nelson, 2004), suggesting that the mothers' perceptions of readiness may not be taken into account in discharge timing decisions. Instruments to measure the new mother's perception of her readiness for discharge after birth have not been available for clinical assessment or research purposes. The purpose of this study was to assess the validity and reliability of a new scale to measure perceived readiness for discharge after birth.

Background

Readiness for discharge has been described as a multifaceted concept that provides an estimate of patients' and family members' ability to leave an acute care facility (Steele & Sterling, 1992). It is a perception of being prepared or not prepared for hospital discharge (Congdon, 1994; Fenwick, 1979). *Home readiness*, a term used in the anesthesia and ambulatory surgery literature, describes patients in intermediate rather than later stages of recovery and indicates a sufficient level of recovery to permit safe discharge (Korttila, 1991). Concerns about adequacy of maternal preparation and safety of early neonatal discharge (Braveman, Egerter, Pearl, Marchi, & Miller, 1995; Brown, Small, Faber, Krastev, & Davis, 2002; Eaton, 2001; Grullon & Grimes, 1997) have been prominently reported in the professional and lay literature.

Readiness for discharge can be assessed from the perspectives of the providers, patients, and family members. Criterion-based assessment by the provider is the most commonly reported method of determining discharge readiness, and discharge criteria have been reported for many clinical populations (Barnes, 2000; Chung, 1995; Fenwick, 1979; Korttila, 1991; Merritt & Raddish, 1998; Stephenson, 1990; Titler & Pettit, 1995; Wong & Wong, 1999). Criteria that have been included in discharge readiness assessments are physiological stability; functional ability; preparedness and competence for self-care at home; caregiver competence; availability of social support, access to the health care system and resources; psychosocial factors and coping skills; and knowledge about what to do and what to expect post-discharge. The AAP/ACOG have identified criteria for discharge after birth and have indicated it is unlikely that these criteria can be met in less than 48 hours after birth (AAP/ACOG, 2002). These criteria include parameters related to physiological stability; maternal knowledge, ability, and confidence in self and infant care; availability of support persons to assist in the initial transition period at home; and availability of continuing care postdischarge.

The patient's perception of readiness for discharge is an important component of

discharge assessment (Baker, 1991; Bent, Keeling, & Routson, 1996; Fenwick, 1979; Stephenson, 1990). Most patients report being ready for discharge when questioned at the time of their discharge. In studies of elderly (Schaefer, Anderson, & Simms, 1990) and medical-surgical patients (Greene, 1991), 96% of patients reported being ready for discharge. Among postpartum mothers, 90% believed that they were ready to go home on the day of discharge and 87% believed that their infant was ready to go home (Bernstein et al., 2002). Family members perceptions of readiness for discharge have been reported in nonobstetric populations in the form of spousal and caregiver perceptions (Artinian, 1993; Bull, Hansen, & Gross, 2000).

Patients, family members, and health care practitioners may have different perceptions of a patient's readiness for discharge (Reiley et al., 1996), and perceptions of readiness may change as the realities of the postdischarge period become apparent (Greene, 1991; Schaefer et al., 1990). Agreement between perceptions of discharge readiness of postpartum mothers and their newborns' pediatrician was 92% on the day of discharge but fell to 59% by 1 month after discharge (Bernstein et al., 2002).

Despite concerns regarding shortened length of postpartum hospital stay, only two studies were identified in which readiness for postpartum discharge was specifically addressed. In a large, population-based study ($N = 1,555$) of women with low-risk, uncomplicated vaginal births (Dato, Saraiya, & Ziskin, 2000), 62.7% reported that their length of stay was just right and 37.3% thought it was too short. Those who thought it was too short were concerned about their own and their babies' health, had feeding problems, and believed they did not receive enough teaching about the baby. In a smaller study ($N = 55$) of perceptions of readiness for discharge of new mothers and their pediatricians (Bernstein et al., 2002), 90% of new mothers believed it was the right day for their own discharge and 87% thought it was the right day for their infant's discharge. Pediatricians reported that the chosen day of discharge was appropriate in 97% of cases. Overall, 20% of mother-infant pairs were classified as unready for discharge by either maternal or pediatrician assessment. A mother-infant pair was classified as unready if either the mother or the pediatrician perceived that the mother or the baby was not ready on the day of discharge. Among mothers who reported not being ready for discharge, adverse postpartum outcomes occurred, including being less happy, making twice as many phone calls to providers, and incorrectly placing the infant in a prone sleeping position. The two studies described above measured readiness for discharge in a single-question format.

Perception of readiness for discharge represents the patient's reality. Nursing assessment of the new mother's perception of her readiness to go home after birth provides

subjective data to augment the objective criterion-based assessment recommended in professional guidelines (AAP/ACOG, 2002). In research and clinical practice, measurement of the patient's perspective has been largely limited to a single-item question. The Perceived Readiness for Discharge After Birth Scale (PRDBS) was developed to provide researchers and clinicians with a multi item tool to more adequately evaluate a new mother's perceptions of her readiness for discharge from the hospital after birth.

Methods

Design

A longitudinal comparative study of factors associated with postpartum length of hospital stay (Weiss et al., 2004) provided the data set for this analysis of the psychometric properties (validity and reliability) of the PRDBS. The psychometric analyses included estimates of construct validity, predictive validity, and reliability. Construct validity assessment included (a) factor analysis to determine if the PRDBS contained a subscale structure and (b) known groups comparisons of groups expected to be high or low on the readiness for discharge construct. Groups included in these comparisons were short versus longer length of stay, breastfeeding versus bottle-feeding, primiparas versus multiparas, married versus single, ready for discharge versus not ready (single-item question), and presence versus absence of clinical variances during the postpartum hospitalization. Predictive validity assessment was conducted using logistic regression analysis to determine if perceived readiness for discharge predicted outcomes at 6 weeks postdischarge. Mothers' reports of postdischarge health problems and utilization of health services, categorized as occurrence or nonoccurrence, served as the outcome variables. The PRDBS factors, identified in the preceding factor analysis, were the predictor variables. Reliability was assessed using Cronbach's alpha coefficients.

Sample and Setting

The sample included postpartum mothers who gave birth at a tertiary-level perinatal center in the Midwestern United States. Inclusion criteria were at least 18 years of age, able to speak and read sufficient English to complete consent processes and study questionnaires, and no complications associated with the birth that interfered with postpartum rooming-in or discharge home together with the newborn by the 2nd postpartum day for vaginal birth mothers or the 3rd postpartum day for cesarean birth mothers.

The sample consisted of 1,462 postpartum mothers (1,192 vaginal births and 270 cesarean births). Seventy-seven percent of postpartum mothers at the study site met the study's eligibility criteria, and 55% enrolled in the study (Weiss et al., 2004). Failure to enroll was related

to failure to receive or return the enrollment form and to refusal to participate. The sample characteristics are summarized in Table 1 . As a group, the sample reflected the population of the birth hospital and the community it serves. The sample was predominately White (72%), married (68%), and had completed 4 years of college (43%). The sociodemographic diversity of the sample was evident as the sample included 24% Black participants, 13% with neither mother nor father employed, and 48.5% using a public health care payor source.

Variables and Instruments

Perceived Readiness for Discharge After Birth Scale. The PRDBS measures a postpartum mother's perceptions of readiness for discharge from the hospital and was adapted from a scale measuring adult and elderly postsurgical patients' perceptions of their readiness for discharge (Greene, 1991; Schaefer et al., 1990). Initial testing of the instrument with 50 postsurgical participants resulted in a Cronbach's alpha reliability estimate of 0.76 pre-discharge and 0.84 post-discharge (Greene). No further instrument assessment or development has been reported. In adapting the scale for this study, the researchers retained the major concepts of general readiness, pain, strength, energy, mood, functional ability, and self-care knowledge but modified the language of the items to reflect the postpartum experience. Addition of two items to measure functional ability and knowledge about infant care resulted in a 9-item summated rating scale. Items are scored on a 0 to 10 scale, with a maximum scale score of 90. High scores reflect positive ratings of readiness. The PRDBS was pretested using a sample of 20 patients, with a resulting Cronbach's alpha reliability coefficient of 0.76.

Content validity was assessed using a separate sample of postpartum women and nurses as content experts. Twenty postpartum mothers (five vaginal and five cesarean primiparas, five vaginal and five cesarean multiparas), recruited during the postpartum hospitalization, were considered primary experts because the instrument assesses the mother's perception of readiness for discharge. Five nurse experts who had at least 2 years experience working directly with postpartum women also provided an assessment of content validity. Mother and nurse respondents were asked whether the instrument's items included content reflecting factors important in determining whether new mothers feel ready for discharge. Each item was assessed using a 4-point scale (*not at all important to very important*). Items with responses of important or very important were considered indicative of validity of the item. A content validity index (CVI), representing the number of respondents scoring the items as valid divided by the total number of items, was calculated for each respondent group (Lynn, 1986). The CVI for the total scale was 0.90 for the total sample (mothers and nurses), 0.93 for vaginal birth primiparas, 0.84 for vaginal birth multiparas, 0.93 for cesarean birth primiparas, 0.84 for cesarean birth

multiparas, and 0.89 for the nurse group. Item validity ranged from 0.60 to 1.0. Two items, one in the mothers' sample (mood) and one in the nurse sample (energy), fell below a CVI of 0.80. These items were retained for further testing.

Perceived Readiness for Discharge—Single Item. A 2nd measure of perceived readiness for discharge was a single-item question in a yes/no format that asked the mother if she perceived herself to be ready for discharge.

Clinical Readiness. Clinical readiness was defined as meeting professional criteria for discharge and was used as a criterion-based measure of discharge readiness. For vaginal birth mothers, these criteria were based on AAP/ ACOG (1997) criteria for early discharge that were included in the clinical pathway developed by the study hospital for use in clinical care management. A similar clinical pathway was developed by clinicians at the study hospital for cesarean birth mothers, and discharge parameters reflected outcome expectations for this population. Clinical readiness was operationalized as the absence of clinical variances documented on the postpartum and newborn clinical pathways. A variance is a deviation from usual care practices or patient outcomes and is documented when care activities are not performed in a timely fashion or targeted patient outcomes are not achieved (Coffey et al., 1992). Variances were recorded by the nurse caregiver for clinical purposes. Variance data were abstracted from the hospital's clinical variance tracking system, and the total number of variances were calculated separately for mother and newborn.

Postpartum Problems. During a structured interview conducted by telephone at 6 weeks postpartum, mothers were asked to report problems they were experiencing now (at 6 weeks postpartum) or had experienced over the 6 weeks since the birth. The interview questions were selected through a systematic review of problems and complications experienced by postpartum mothers and newborns and were based on an earlier version of the interview tool that had been used in the hospital's telephone follow-up program for over 2 years. Problems were categorized as (a) maternal physical problems (rest, bleeding, vaginal discharge, episiotomy, fever, hemorrhoids, breasts, nipples, urine, bowel, and other physical problems), (b) maternal psychosocial problems (adjustment to the baby, support, sadness, and other children's adjustment), and (c) neonatal problems (feeding, urinating, stools, cord, circumcision, jaundice, sleep, rashes, and other neonatal problems).

Postdischarge Utilization of Health Services. During the telephone follow-up interview at 6 weeks postpartum, mothers were also asked to recall the number and type of unscheduled health care contacts since their discharge from the hospital. Unscheduled health care contacts were contacts initiated by the mother for purposes other than a scheduled, planned follow-up

with her own or her newborn's health care provider for usual postbirth follow-up care. Telephone, office visit, and urgent care/emergency visits were recorded separately for mother and newborn.

Length of Stay and Demographic Variables. Length of postpartum hospital stay was obtained from the study site's hospital information system and was categorized a priori for the purposes of the larger study (Weiss et al., 2004) into three vaginal lengths of stay (18-30 hours, 31-42 hours, and 43-54 hours) and two cesarean lengths of stay (2 and 3 days).

Sociodemographic variables relevant for the purposes of this study were selected from demographic data collected on study enrollment and were categorized as dichotomous variables: parity (primipara, multipara), marital status (married, not married), and feeding methods (breast, bottle).

Procedures

Following approval from university and participating site Institutional Review Boards, postpartum women were recruited on the day of postpartum discharge. A study packet containing the consent form, the PRDBS, and demographic questions was given to the mother within 2 hours prior to discharge at the time when the nurse reviewed discharge instructions with the mother. Mothers completed the study forms prior to discharge. Clinical pathway data were obtained electronically from the hospital's clinical information system. Undergraduate student nurse research assistants who were trained in telephone interviewing procedures performed structured telephone interviews at 6 weeks postpartum to collect data on problems encountered by new mothers in the postdischarge period and utilization of health services.

Results

Construct Validity

Factor Analysis. Suitability of the data set for factoring was assessed before beginning factor analysis (Munro, 2001). The sample size well exceeded recommendations for at least 300 participants, and the Kaiser-Meyer-Olkin value of 0.833 confirmed sampling adequacy (Tabachnick & Fidell, 2001). Bartlett's test of sphericity ($X^2 = 6998.65$, $df = 36$, $p = 0.00$) indicated the presence of at least one factor within the data. Of 36 interitem correlations, 33 exceeded the recommended 0.3. The items with interitem correlations below 0.3 all included the pain item. Common variance among the items, as indicated by squared multiple correlations ranging from 0.17 to 0.70 with values for six of nine items in the range of 0.6 to 0.7, supported the choice of a common factor approach for factor analysis.

A common factor approach (maximum likelihood estimation with Promax rotation) was selected for the exploratory factor analysis because of the small number of items in the scale

(Nunnally & Bernstein, 1994). The factor analysis yielded two factors with eigenvalues greater than 1.0 (Nunnally & Bernstein) that accounted for 45.8% and 10.9% of the variance. Factor 1 (eigenvalue = 4.56) included seven items representing the mother's personal status, and Factor 2 (eigenvalue = 1.24) included two items representing the knowledge of self and infant care. The items loaded uniquely on a single factor as evidenced by all items loading at greater than 0.30, a difference of at least 0.20 between loadings on the two factors, and no item loading at more than 0.30 on the alternate item (Munro, 2001 ; Nunnally & Bernstein). A scree test confirmed a two-dimensional structure (Mertler & Vannatta, 2002). The two-factor solution reflected different but related dimensions of the readiness for discharge construct, with factors correlated at $r = .53$ with a shared variance of 28% between the factors. The analysis was also conducted separately for vaginal, cesarean, primipara, and multipara subgroups, resulting consistently in a two-factor solution with items loading on the same factors as for the total sample. Factor loadings for the total sample and for birth method and parity subgroups are presented in Table 2.

Analyses of interitem correlation matrices indicated asymmetrical skewness and kurtosis that could be problematic in factor analyses using estimators of generalized least squares or maximum likelihood (Nunnally & Bernstein, 1994). Therefore, a confirmatory factor analysis strategy using a polychoric correlation matrix with an asymptotic variance-covariance matrix was applied using Lisrel (Joreskog & Sorbom, 1993) . A congeneric measurement model fit the data well, indicating that items loaded exclusively onto a specific factor and confirmed the factor structure identified in the exploratory factor analysis. Tests of tau equivalence (which tested the assumption of equality of the magnitude of item loadings) and parallelism (which tested the assumption of similarity of error variance across scale items) failed, indicating that factor scores should be considered separately in further analyses.

Known Groups Comparisons. To further assess construct validity, PRDBS scores of groups of mothers expected to differ in their perceptions of readiness for discharge were compared (Waltz, Strickland, & Lenz, 1991). The results and test statistics for the known groups comparisons are presented in Table 3 . Mothers with short lengths of stay who were breastfeeding, single, primiparous, not ready for discharge (single-item question), or had clinical problems documented on the postpartum clinical pathway were expected to have lower readiness scores. Among vaginal birth mothers, those who were discharged at the earliest interval (18-30 hours postbirth) had significantly lower mean PRDBS scores on both subscales (Factors 1 and 2) than vaginal birth mothers discharged at the later time interval. There were no differences in PRDBS scores between cesarean birth mothers discharged on post-birth days 2 and 3. Breastfeeding mothers were expected to have lower readiness for discharge scores than

bottle-feeding mothers because of their greater knowledge and skill development needs. As anticipated, PRDBS scores for Factors 1 and 2 were lower for breastfeeding mothers than for bottle-feeding mothers. There were no differences in PRDBS scores by parity on Factor 1 (personal status). Factor 2 scores (knowledge about self and infant care) were higher, as expected, for multiparas than for primiparas. Contrary to expectations, single mothers reported that they were more ready for discharge on both the personal status and knowledge factors.

Validation of the PRDBS as a measure of the construct of readiness for discharge was also evaluated by comparing mean PRDBS scores for women who answered yes to scores for women who answered no to a single-item question about their readiness for discharge. Mean PRDBS scores for Factors 1 and 2 were significantly higher for mothers who reported being ready compared to those who did not report being ready on the single-item readiness question (Table 3).

When mothers with documented clinical pathway variances during the postpartum hospitalization were compared with mothers without variances, there were no differences in PRDBS scores. Similarly, there were no differences in PRDBS scores between mothers whose babies exhibited and mothers whose babies did not exhibit clinical variances.

Predictive Validity

The relationships between perceptions of readiness at the time of discharge and the postdischarge problems and utilization of health services were explored to assess predictive validity. Results of logistic regression analyses are presented in Table 4. Factor 1, the mother's perception of her personal status at the time of discharge, was predictive of self-reported physical and psychosocial problems present at 6 weeks postpartum or occurring at any time during the first 6 weeks postpartum. Lower PRDBS scores (lower perceived readiness) on Factor 1 predicted the occurrence of postpartum problems. Lower PRDBS Factor 1 scores were also predictive of utilization of unscheduled postpartum services (calls to provider, office visits, urgent care/emergency visits). When the types of services were analyzed separately, the same relationship was evident for calls to the obstetric provider, but neither PRDBS factor predicted office or urgent care/emergency visits. Factor 2, the knowledge subscale, predicted telephone calls made by the mother to the pediatric provider in the first 6 weeks postpartum. The odds ratios (Table 4) for each statistically significant predictor variable ($p < .05$, 95% confidence interval $\neq 1.0$) were consistently less than 1.0, indicating that the lower PRDBS scores were associated with occurrence of problems and utilization of health services.

PRDBS Reliability

Internal consistency of the PRDBS was evaluated using item descriptive statistics, interitem and corrected item-to-total correlations, and Cronbach's alpha coefficients (Table 5). The mean PRDBS scale score for the total sample was 67 ($SD = 12$) out of a possible score of 90, and the item mean for the total scale was 7.5. There were no differences between mean PRDBS scores (total scale) for vaginal and cesarean birth mothers or primiparas and multiparas, although, as reported above, multiparas had higher Factor 2 (knowledge) scores than primiparas. Analysis of interitem correlations indicated that 30 of 36 correlations fell within the acceptable range of 0.3 to 0.7 (Ferketich, 1991). Three correlations fell below 0.3, and all were related to pain. Three correlations fell above 0.7, indicating possible redundancies in questions related to physical ability to care for self and baby, knowledge about self and baby care, and the similarity of strength and energy. All corrected item-to-total correlations fell above the acceptable level of 0.3 (Ferketich; Nunnally & Bernstein, 1994).

In initial testing, the Cronbach's alpha coefficient for the total scale was estimated at 0.87. However, failures of tests of tau equivalence and parallelism during factor analyses indicated that factor reliability estimates should be calculated separately. Cronbach's alpha for each factor was calculated for the entire sample and for vaginal, cesarean, primiparous, and multiparous mothers separately. Reliability estimates for the total sample and all sample groups exceeded 0.80 and ranged from 0.83 to 0.89 (Table 5).

Discussion

The PRDBS instrument performed well on assessments of validity and reliability for the total birth sample and for primiparous, multiparous, vaginal, and cesarean birth subgroups. The instrument appears to be a robust measure across these segments of the childbearing population. Mean scores on the PRDBS were positively skewed, indicating that the majority of new mothers believed they were ready to go home from the hospital, a finding consistent with previous assessments of readiness for discharge (Bernstein et al., 2002).

Exploratory and confirmatory factor analyses identified a two-factor solution, with subscales assessing personal status and knowledge. The same factor structure emerged consistently across sample subgroups, providing further validation of the dimensional structure of the instrument.

The results of many of the known groups comparisons provide support for the construct validity of the PRDBS. However, some nonsignificant or contrary findings require examination. As anticipated, vaginal birth mothers who went home very early (18-30 hours postvaginal birth)

believed less ready in terms of their personal status (reflecting their pain, mood, energy, strength, physical ability) than those who stayed longer. Interestingly, there were no differences in the knowledge subscale scores across the length of stay groups. The mean knowledge score was relatively high (17.1 out of a possible 20). Several interpretations are possible. The knowledge needed for self and infant care may have been acquired prior to or early in the postpartum period. The goal of discharge teaching well in advance of the discharge time may have been realized. Another possible explanation is that the postpartum teaching was the same in volume and content whether delivered over a shorter or longer hospital stay. There were no differences in cesarean mothers' PRDBS scores on either factor by the length of stay. It is possible the PRDBS is not a valid measure of readiness for these mothers or there is no difference in readiness at 2 and 3 days postpartum.

Breastfeeding mothers believed they were less ready for discharge than bottle-feeding mothers on the personal status and knowledge factors of the PRDBS. This finding reflects the substantial physical investment and learning needs of breastfeeding mothers. Other studies have found that lack of maternal breastfeeding confidence is associated with breastfeeding termination in the early postpartum period (Dennis, 2002). Maternal confidence and readiness may be related concepts, and their relationship should be explored in future studies.

Unmarried mothers reported being more ready for discharge than married mothers. This finding might be explained in part by the fact that these mothers were younger, Black, primiparous, less educated, and more likely to be bottle-feeders. While the learning needs of young, less educated mothers have been well documented, primiparas with short postpartum hospital stays have reported fewer postpartum information needs than those with longer hospital stays (Moran, Holt, & Martin, 1997), although the confounding effects of age, race, education, and feeding method were not presented. In this study, the primiparas, representing a broad spectrum of sociodemographic characteristics, had lower mean scores on the knowledge sub-scale of the PRDBS than multiparas. The contrast in these results may be related to the paradox that primiparas have greater learning needs but less experiential basis on which to identify, articulate, and anticipate the information and skills needed in the transitional period after discharge. The finding that single mothers believed they were more ready on both PRDBS factors reflects the complexity of sociodemographic characteristics such as age, race, parity, education, and feeding choice that converge to construct their postpartum experience.

In comparing PRDBS scores with other measures of readiness for discharge, results were mixed. In the analysis of the two measures of perceived readiness (PRDBS and single-item question), mothers responding affirmatively to the single-item question had higher PRDBS

scores than mothers responding negatively. In the analyses involving the PRDBS as the measure of perceived readiness and the clinical variance as the measure of criterion-based readiness, there were no differences in PRDBS scores for mothers who had clinical variances and those who did not. The explanation of this latter finding may be that all mothers in the study were deemed clinically ready for discharge by their provider prior to completion of the PRDBS. The PRDBS was completed on the discharge day not at a defined postbirth time interval. If assessments of perceived and clinical readiness were completed at the same time interval, perhaps a relationship would have been found. A further limitation is that the sample consisted only of mothers without major complications that would result in prolongation of hospital stay. The recorded variances may not have reflected substantial problems that would impact a mother's perception of her readiness for discharge.

Results of the predictive validity assessment supported the validity of the PRDBS. Factor 1, personal status at the time of discharge, was predictive of maternal postdischarge problems and utilization of health services. Factor 2, knowledge, was predictive of maternal telephone calls to the pediatric provider. Personal status and knowledge were associated with postdischarge problems and utilization in the expected direction. Greater perceived readiness was associated with few problems and less unscheduled utilization of health services. While statistically significant, the predictive ability of perceived readiness for discharge was relatively weak. The mothers selected for the study sample were essentially normal mothers with healthy newborns. These sample characteristics resulted in a study sample in which the participants generally described themselves as ready to go home, and most had a normal postpartum course. The predictive ability of the PRDBS may have been reduced in this relatively homogeneous sample. Even with these sample attributes, the predictive properties of the instrument were evident and the direction of the association between the variables was as expected.

Occurrence of neonatal problems in the first 6 weeks postpartum was not associated with maternal readiness for discharge. However, lower PRDBS scores on the knowledge subscale (Factor 2) were predictive of use of unscheduled telephone calls to the pediatric provider. One interpretation of this finding is that mothers who did not believe they were ready with regard to knowledge may have called the provider in anticipation of problems, prior to overt occurrence of the problem.

From these results, it appears that lower PRDBS scores may serve as an indicator of risk for postdischarge problems and the need for maternal and neonatal follow-up and guidance. Further, it appears that greater emphasis in discharge preparation on assuring maternal perceptions of readiness for discharge may help mothers to anticipate questions or concerns that,

if left unresolved, result in patient-initiated provider contacts in the postpartum period.

Predictive validity requires further assessment. The 2-item knowledge subscale was not as effective in predicting postdischarge outcome as the personal status subscale. Expansion of the number and content of items in this sub-scale may increase the predictive properties of the scale. While the association between PRDBS scores and self-reported postdischarge outcomes is evident in the results of this study, the use of the instrument to prospectively identify women at risk for adverse postpartum outcomes has not been tested. Preliminarily, a score of 60 appears to be a useful cut point for classifying patients as ready or not ready. In this study, only 18.8% of women who said they were not ready on the single-item question had a scale score of 60 or greater. Eighty-six percent of those who reported being ready had a total PRDBS score of 60 or more.

Further development and testing of the item content of the PRDBS will be beneficial. The PRDBS was adapted from an instrument used with adult medical-surgical patients (Greene, 1991). The nine items on the PRDBS explain 56.7% of the variance in scale scores. Further explication of the content domain of readiness for discharge after birth may identify attributes not yet included in the PRDBS. Development of additional PRDBS items that reflect these attributes would improve the instrument and add to the explained variance. In the content validity assessment of the 9-item instrument, respondents indicated that the word “ mood ” should be changed to psychologically or emotionally ready and that the mother’s confidence, knowledge about what to watch for, and the amount of anticipated support were additional factors associated with a mother’s perception of her readiness for discharge. These recommendations for modification of the wording and content will be explored in future refinement efforts. Collection of data from a single perinatal center, a sample including only uncomplicated mothers and neonates, and use of postpartum problem and utilization data based on self-reported recall of postdischarge problems and service utilization are limitations of this study. Further testing in diverse clinical settings and cross-validation of self-reported problems and utilization with medical record data are needed.

Conclusions

The PRDBS performed well in psychometric analyses of validity and reliability. Reliability estimates were acceptable, and construct validity based on factor analysis was established for all sample subgroups. Additional support for construct and predictive validity of the instrument was presented. From a clinical perspective, most new mothers report being ready to go home at the time of the discharge decision. However, lower PRDBS scores were associated with

subsequent postdischarge problems or unscheduled service utilization. This finding suggests that assessing a mother's perception of readiness for discharge should become a standard nursing practice prior to discharge. To date, the PRDBS has been used solely for measurement of readiness for discharge for research purposes. Clinically, it offers a simple, rapid mechanism for assessing perceptions of readiness for discharge. Routine assessment of mothers' perceptions of readiness for discharge would increase patient input into the discharge decision process and promote early identification of mothers at risk for problems in the postdischarge period. Continuity of care would be promoted through anticipatory identification of mothers who may need postdischarge follow-up care and services to prevent adverse outcomes that necessitate unplanned utilization of health care services. Measurement of perceived readiness for discharge could also be incorporated as an outcome measure of postpartum patient education and family-centered maternity care practices in unit-based quality assessment and improvement programs.

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Marianne Weiss, DNSc, RN is an associate professor and St. Joseph Regional Medical Center/Sr. Rosalie Klein Professor of Women's Health at Marquette University College of Nursing, Milwaukee, WI. Polly Ryan, PhD, RN, is an associate professor at Marquette University College of Nursing, Milwaukee, WI. Lisa Lokken, MSN, RNC, is a perinatal clinical nurse specialist at St. Joseph Regional Medical Center, Milwaukee, WI.

References

- American Academy of Pediatrics/American College of Obstetricians and Gynecologists . (1997). *Guidelines for perinatal care* (4th ed.). Elk Grove Village/Washington, DC Authors.
- American Academy of Pediatrics/American College of Obstetricians and Gynecologists . (2002). *Guidelines for perinatal care* (5th ed.). Elk Grove Village/ Washington, DC Authors.
- Artinian, N.T. (1993). Spouses' perceptions of readiness for discharge after cardiac surgery. *Applied Nursing Research*, 6, 80-88.
- Baker, A. L. (1991). The transition home for preterm infants: Parent's perceptions, *Neonatal Network*, 10, 65.
- Barnes, S. (2000). Ambulatory surgery: Are you watching the clock? Let criteria define discharge readiness. *Journal of PeriAnesthesia Nursing*, 15, 174-176.

- Bent, K. N., Keeling, A., & Routson, J. (1996). Home from the PICU: Are parents ready? *MCN. The American Journal of Maternal Child Nursing*, 21, 80-84.
- Bernstein, H. H., Spino, C., Baker, A., Slora, E. J., Touloukian, C. L., & McCormick, M. C. (2002). Postpartum discharge: Do varying perceptions of readiness impact health outcomes . *Ambulatory Pediatrics*, 2, 388-395.
- Braveman, P., Egerter, S., Pearl, M., Marchi, K., & Miller, C. (1995). Problems associated with early discharge of newborn infants: Early discharge of newborns and mother: A critical review of the literature. *Pediatrics*, 96, 716-726.
- Brown, S., Small, R., Faber, B., Krastev, A., & Davis, P. (2002). Early postnatal discharge from hospital for health mothers and term infants (Cochrane Review). In *The Cochrane Library*, Issue 4. Oxford, England: Update Software.
- Bull, M. J., Hansen, H. E., & Gross, C. R. (2000). Predictors of elder and family caregiver satisfaction with discharge planning. *Journal of Cardiovascular Nursing*, 14, 76-87.
- Chung, F. (1995). Discharge criteria—A new trend. *Canadian Journal of Anaesthesia*, 42, 1056-1058.
- Coffey, R. J., Richards, J. S., Remmert, C. S., LeRoy, S. S., Schoville, R. R., & Baldwin, P. J . (1992). An introduction to critical paths. *Quality Management in Health Care*, 1, 45-54.
- Congdon, J. G. (1994). Managing the incongruities: The hospital discharge experience for elderly patients, their families, and nurses. *Applied Nursing Research*, 7, 125-131.
- Dato, V. M., Saraiya, M., & Ziskin, L. (2000). Use of a comprehensive state birth data system to assess mother's satisfaction with length of stay. *Maternal and Child Health Journal*, 4, 223-231.
- Dennis, C.L. (2002). Breastfeeding initiation and duration: A 1990-2000 literature review. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 31, 12-32.
- Eaton, A. P. (2001). Early postpartum discharge: Recommendation for a preliminary report to congress. *Pediatrics*, 107, 400-404.
- Fenwick, A. M. (1979). An interdisciplinary tool for assessing patients' readiness for discharge in the rehabilitation setting. *Journal of Advanced Nursing*, 4, 9 - 21 .
- Ferketich, S. (1991). Focus on psychometrics: Aspects of item analysis. *Research in Nursing & Health*, 14, 165-168.
- Greene, M. (1991). *Adult surgical patients' perceptions of discharge readiness and postoperative recovery*. Unpublished master's thesis, University of Wisconsin—Milwaukee.
- Grullon, K. E., & Grimes, D. A. (1997). The safety of early postpartum discharge: A review and critique. *Obstetrics & Gynecology*, 90, 860-865.

- Joreskog, K. G., & Sorbom, D. (1993). *DOS Lisrel 8.02*. Chicago, IL: Scientific Software International.
- Korttila, K. (1991). Anaesthesia for ambulatory surgery: Firm definitions of "home readiness" needed. *Annals of Medicine*, 23, 635-636.
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35, 382-385.
- Merritt, T. A., & Raddish, M. (1998). A review of guidelines for the discharge of premature infants: Opportunities for improving cost effectiveness. *Journal of Perinatology*, 18, S27 - S37.
- Mertler, C. A., & Vannatta, R. A. (2002). *Advanced and multivariate statistical methods: Practical application and interpretation* (2nd ed.). Los Angeles: Pycszak Publishing.
- Moran, C. F., Holt, V. L., & Martin, D. P. (1997). What do women want to know after childbirth. *Birth*, 24, 27 - 34.
- Munro, B. H. (2001). *Statistical methods for health care research*. Philadelphia: Lippincott Williams and Wilkins.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Reiley, P., Iezzoni, L. I., Phillips, R., Davis, R. B., Tuchin, L. I., & Calkins, D. (1996). Discharge planning: Comparison of patients' and nurses' perceptions of patients following hospital discharge. *Image—Journal of Nursing Scholarship*, 28, 143 - 147.
- Schaefer, A. L., Anderson, J. A., & Simms, L. M. (1990). Are they ready? Discharge planning for older surgical patients. *Journal of Gerontological Nursing*, 16, 16-19, 36 - 37.
- Steele, N. F., & Sterling, Y. M. (1992). Application of the case study design: Nursing interventions for discharge readiness. *Clinical Nurse Specialist*, 6, 79 - 84.
- Stephenson, M. E. (1990). Discharge criteria in day surgery. *Journal of Advanced Nursing*, 15, 601 - 613.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston: Allyn & Bacon.
- Titler, M. G., & Pettit, D. M. (1995). Discharge readiness assessment. *Journal of Cardiovascular Nursing*, 9, 64 - 74.
- Waltz, C. F., Strickland, O. L., & Lenz, E. R. (1991). *Measurement in nursing research* (2nd ed.). Philadelphia: FA Davis.
- Weiss, M., Ryan, P., Lokken, L., & Nelson, M. (2004). Length of stay after vaginal birth: Sociodemographic and readiness for discharge factors. *Birth*, 31, 93 - 101.
- Wong, J., & Wong, S. (1999). Criteria for determining optimal time of discharge after total hip replacement. *British Journal of Clinical Governance*, 4, 135-141.

Appendix

Table 1

Sociodemographic Characteristics of the Study Sample

<i>Sociodemographic Characteristic</i>	<i>N = 1,462^a</i>	
	<i>Mean</i>	<i>SD</i>
Age	28.47	6.10
	<i>N</i>	<i>%</i>
Type of birth		
Vaginal	1,192	81.5
Cesarean	270	18.5
Parity		
Primipara	431	29.5
Multipara	1,030	70.5
Marital status		
Married	992	68.4
Single	438	30.2
Other	21	1.4
Race		
White	1,024	72.2
Black	344	24.3
Other	50	3.5
Payor		
Public	706	48.5
Private	695	47.7
Self	56	3.8
Education (highest level)		
Less than high school	179	12.3
High school	294	20.2
Partial college/specialized training	354	24.3
4-year college	491	33.7
Graduate education	139	9.5
Unemployed		
Mother	508	34.7
Family (mother and partner)	192	13.5

^a Some categories do not total 1,462 due to missing data.

Table 2
Factor Loadings for Exploratory and Confirmatory Factor Analyses

Item	Exploratory Factor Analysis: Maximum Likelihood Estimation with Promax Rotation										Confirmatory Factor Analysis	
	Vaginal (n = 1192)		Cesarean (n = 270)		Primiparas (n = 431)		Multiparas (n = 1,031)		Total Sample (n = 1,462)		Total Sample (N = 1,462)	
Factor	1	2	1	2	1	2	1	2	1	2	1	2
How ready	0.51	0.21	0.58	0.16	0.45	0.25	0.53	0.20	0.52	0.12	0.75	
Pain/discomfort	0.39	0.00	0.37	0.00	0.47	-0.07	0.34	0.03	0.38	-0.00	0.45	
Mood	0.58	0.10	0.53	0.11	0.43	0.19	0.60	0.09	0.57	0.01	0.76	
Strength	0.96	-0.12	0.94	-0.15	0.89	-0.11	0.98	-0.13	0.95	-0.13	0.78	
Energy	0.94	-0.15	0.94	-0.14	0.87	-0.07	0.96	-0.15	0.94	-0.15	0.78	
Physical ability												
Self-care	0.60	0.18	0.54	0.21	0.69	0.06	0.55	0.23	0.59	0.18	0.76	
Baby care	0.58	0.28	0.57	0.22	0.68	0.12	0.54	0.32	0.58	0.26	0.83	
Knowledge												
Self-care	-0.03	0.89	0.01	0.88	-0.05	0.85	-0.01	0.90	-0.02	0.89		0.93
Baby care	0.00	0.87	-0.01	0.90	-0.01	0.85	-0.01	0.89	0.00	0.87		0.92
Correlation among factors		0.54		0.47		0.53		0.54				0.66

Table 3
Construct Validity Assessment: Known Groups Comparisons

Comparison Groups	Factor 1: Personal Status		Factor 2: Knowledge	
	PRDBS Mean (SD)	Test Statistics	PRDBS Mean (SD)	Test Statistics
Length of postpartum hospital stay				
Vaginal birth				
18-30 h	49.0 (11.2)	$p = .001, F = 7.00,$ $df = 2,1189$	16.9 (3.0)	$p = .333, F = 1.10,$ $df = 2,1189$
31-42 h	50.5 (10.7)		17.2 (3.0)	
43-54 h	51.8 (9.6) ^a		17.0 (2.4)	
Cesarean birth				
2 days	50.1 (9.6)	$p = .443, F = 0.59,$ $df = 1,268$	17.4 (2.1)	$p = .137, F = 2.23,$ $df = 1,268$
3 days	49.2 (10.2)		17.0 (2.8)	
Feeding method				
Breast	49.7 (10.2)	$p = .003, t = -3.00,$ $df = 1324$	16.8 (2.8)	$p = .000, t = -5.47,$ $df = 1324$
Bottle	57.5 (10.9)		17.6 (2.7)	
Parity				
Primipara	50.4 (10.1)	$p = .683, t = 0.41,$ $df = 1460$	16.3 (2.8)	$p = .000, t = 7.05,$ $df = 1460$
Multipara	50.2 (10.6)		17.4 (2.7)	
Marital status				
Married	49.6 (10.2)	$p = .001, t = 3.48$ $df = 1460$	17.0 (3.6)	$p = .009, t = 2.62,$ $df = 821.6$
Not married	51.7 (10.9)		17.4 (3.0)	
Perceived readiness for discharge (single item)				
Yes	52.3 (8.7)	$p = .000, t = -23.58,$ $df = 1425$	17.3 (2.5)	$p = .000, t = -7.09,$ $df = 166.68$
No	34.3 (9.4)		15.3 (3.5)	
Clinical readiness (variances documented on postpartum clinical pathway)				
Mother	50.3 (10.4)	$p = .558, t = 0.59,$ $df = 1460$	17.1 (2.8)	$p = .461, t = -0.74,$ $df = 1460$
None	49.6 (11.3)		17.0 (2.6)	
One or more				
Newborn	50.3 (10.4)	$p = .610, t = 0.51,$ $df = 1460$	17.1 (2.8)	$p = .728, t = 0.35,$ $df = 1460$
None	49.8 (11.5)		17.0 (2.6)	
One or more				

Note. PRDBS = Perceived Readiness for Discharge After Birth Scale.

^a Differs from 18- to 30-h group.

Table 4
Predictive Validity Assessment

<i>Outcomes Variables</i>	<i>Predictor Variables: PRDBS</i> <i>Factors</i>	<i>Logistic Regression Test Statistics</i>					
		<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>Odds Ratio</i>	<i>CI (95%)</i>	<i>p</i>
Maternal self-reported physical problems Present at 6 week follow-up call	Factor 1	-0.03	0.01	18.06	0.97	0.96-0.99	.00
	Factor 2	0.00	0.02	0.00	1.00	0.95-1.05	.98
During the first 6 weeks postpartum	Factor 1	-0.03	0.01	14.00	0.97	0.96-0.99	.00
	Factor 2	-0.04	0.03	2.26	0.96	0.91-1.01	.13
Maternal self-reported psychosocial problems Present at 6 week follow-up call	Factor 1	-0.04	0.02	4.03	0.96	0.93-0.99	.04
	Factor 2	-0.01	0.07	0.03	0.99	0.86-1.14	.87
During the first 6 weeks postpartum	Factor 1	-0.04	0.01	11.28	0.96	0.94-0.98	.00
	Factor 2	-0.07	0.04	2.69	0.94	0.87-1.01	.10
Neonatal problems reported by mother Present at 6-week follow-up call	Factor 1	-0.01	0.01	1.89	0.99	0.98-1.00	.17
	Factor 2	-0.01	0.02	0.04	1.0	0.95-1.04	.84
During the first 6 weeks postpartum	Factor 1	-0.00	0.01	0.45	0.97	0.98-1.01	.50
	Factor 2	-0.02	0.02	0.50	0.98	0.94-1.03	.48
Unscheduled postpartum services (calls, office visits, urgent care/emergency visits)	Factor 1	-0.01	0.01	6.28	0.98	0.97-0.99	.01
	Factor 2	-0.01	0.02	0.99	0.98	0.93-1.02	.32
Telephone call to obstetric provider	Factor 1	-0.00	0.01	10.47	0.98	0.96-0.99	.00
	Factor 2	-0.02	0.03	0.13	0.99	0.94-1.00	.72
Unscheduled neonatal services (calls, office visits, urgent care/emergency visits)	Factor 1	-0.02	0.01	0.27	1.00	0.98-1.01	.60
	Factor 2	-0.02	0.02	2.28	0.96	0.91-1.01	.13
Telephone call to pediatric provider	Factor 1	-0.02	0.01	0.03	1.00	0.99-1.01	.87
	Factor 2	-0.01	0.23	6.89	0.94	0.90-0.99	.01

Table 5
Reliability and Items Statistics for the PRDBS

	<i>Total Sample</i> (N = 1462)	<i>Vaginal Birth</i> (n = 1192)	<i>Cesarean Birth</i> (n = 270)	<i>Primiparas</i> (n = 431)	<i>Multiparas</i> (n = 1031)
Cronbach's alpha					
PRDBS—total	0.87	0.88	0.86	0.86	0.88
PRDBS Factor 1: personal status	0.86	0.87	0.86	0.85	0.87
PRDBS Factor 2: knowledge	0.88	0.87	0.89	0.83	0.89
Average interitem correlation					
PRDBS—total	0.43	0.44	0.41	0.40	0.45
PRDBS Factor 1: personal status	0.48	0.48	0.46	0.44	0.49
PRDBS Factor 2: knowledge	0.77	0.77	0.79	0.83	0.80
Item means (<i>SD</i>)					
PRDBS—total	7.49 (0.99)	7.50 (0.98)	7.44 (1.05)	7.42 (0.83)	7.52 (1.06)
PRDBS Factor 1: personal status	7.18 (0.90)	7.20 (0.90)	7.10 (0.93)	7.21 (0.83)	7.17 (0.94)
PRDBS Factor 2: knowledge	8.55 (0.06)	8.53 (0.07)	8.63 (0.03)	8.16 (0.09)	8.70 (0.05)
Scale means (<i>SD</i>)					
PRDBS—total	67.38 (12.06)	67.48 (12.25)	66.94 (11.20)	66.78 (11.60)	67.63 (12.24)
PRDBS Factor 1: personal status	50.29 (10.45)	50.42 (10.58)	49.69 (9.87)	50.46 (10.05)	50.21 (10.62)
PRDBS Factor 2: knowledge	17.09 (2.76)	17.06 (2.83)	17.25 (2.44)	16.32 (2.76)	17.42 (2.70)

Note. PRDBS = Perceived Readiness for Discharge After Birth Scale.