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Predictors of Women's Postpartum Health Status in the First 3 Months After Childbirth

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Purpose The purpose of this study was to examine the significant predictors of postpartum health indicated by physical health, mental health, and role performance during the first 3 months postpartum.

Methods This study used a correlational survey design. The study subjects were 152 mothers at 6 weeks postpartum (T1) and 131 mothers at 3 months postpartum (T2). At 6 weeks and 3 months postpartum, subjects completed a packet of instruments—measuring physical and mental health, role performance, sense of mastery, social support, and infant temperament.

Results Findings indicated that lower family income, more difficult infant temperament, and lower sense of mastery were consistently significant predictors of poorer health outcomes during the postpartum period. Having preterm infants and caring for them was related to higher levels of maternal fatigue in the morning at 6 weeks. Employment did not influence postpartum health.

Conclusion The findings suggest that mother and infant's individual factors and environmental context may continue to negatively affect the mother's health outcomes during the postpartum period. [*Asian Nursing Research* 2007;1(2):136–146]

Key Words employment, health, preterm birth, postpartum

INTRODUCTION

Postpartum women experience changes in their physiological and psychological function as they adapt to their parenting role. Although many physiological changes resolve soon after delivery of the baby (Cunningham et al., 2005), other changes may detract from recovery of maternal health during the postpartum period. Additionally, new health

problems common to the period occur, such as postpartum depression. Longitudinal studies of maternal health after childbirth revealed that physical and emotional health problems of mothers may persist up to 12 months postpartum, not ending within the 6 weeks of the traditional postpartum period (Brown & Lumley, 2000; Saurel-Cubizolles, Romito, Lelong, & Ancel, 2000). Maintaining optimal health is very important for mothers who

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are undertaking major responsibilities, such as caring for infant and family. Health care providers can support these postpartum women by understanding how postpartum health indicated by physical health, mental health and role function is affected by various personal, social, familial and other health-related variables.

The degree to which mothers experience postpartum health problems and the duration of recovery of maternal health may vary with individual and environmental factors (Beck, 2001; Grice et al., 2007; Robertson, Grace, Wallington, & Stewart, 2004; Schytt & Waldenström, 2007). Few studies of maternal health identify the effects of demographic variables, pregnancy complications and type of delivery after preterm birth. One study of maternal depression at 12 months after the birth of a very low birth weight infant failed to reveal an association between depression scores and factors considered to be important influences on maternal depression, including maternal age, maternal employment, family income, number of children, and the baby's rehospitalization for more than 24 hours (Finello, Litton, deLemos, & Chan, 1998).

Lower social support, infant temperament, and being single and of low socioeconomic status were significant predictors of postpartum depression based on meta-analysis (Beck, 2001; Robertson et al., 2004). Postpartum women with higher fatigue and stress were younger, married, and less educated, with low income and less household help (Lee & Zaffke, 1999), and perceived more difficulty in taking care of their infants (Halpern, Brand, & Malone, 2001). Furthermore, health problems during pregnancy and cesarean birth were related to lower general health postpartum (Hamilton, Brooten, & Youngblut, 2002).

A sense of mastery acts as a protective psychological resource and has beneficial effects on mental health (Pearlin & Schooler, 1978). However, studies on the impact of maternal employment and preterm birth on postpartum health through a sense of mastery are limited. Younger, Kendell, and Pickler (1997) found that the majority of mothers

of preterm infants had not achieved a sense of mastery over the preterm birth in the postpartum period. Moreover, higher levels of mastery were related to fewer depressive symptoms in mothers of preterm infants (Younger et al.).

Although preterm birth introduces additional stressors and demands that may change the effects of employment on mothers' physical and mental health and role function (Gennaro & Krouse, 1996), studies of postpartum health have focused largely on employed mothers of full-term infants with conflicting results (Grice et al., 2007; Killien, Habermann, & Jarrett, 2001; McGovern et al., 1997). While employed mothers who deal with multiple roles are likely to experience better physical and mental health in general (Bullers, 1994), the health effects of the mother's return to employment early in the postpartum period may differ because of the need to adjust to parenting a new infant and the possible role strain or conflict that multiple roles might cause.

In summary, preterm birth is likely to increase a mother's distress and slow her physical recovery postpartum due to having to care for a preterm infant with greater health care needs. Maternal employment may also have negative effects on the mother's postpartum health due to multiple role burden. Other factors found to be related to postpartum health include the infant's temperament, social support, family income, and the mother's sense of mastery over the maternal role. However, little research attention has been paid to the predictors of postpartum health with regard to these factors. This study extends the nursing knowledge base by broadening the limited focus of postpartum health, examining the effect of maternal employment on mothers of preterm and full-term infants, and identifying the contextual factors that may influence maternal health. This repeated measures correlational study was designed to examine the relationships among employment, gestational group, family income, infant temperament, and sense of mastery on women's physical health, mental health, and role performance at 6 weeks and 3 months postpartum.

METHODS

Sample

Mothers with newborn infants were recruited from postpartum units at four hospitals in Midwestern and Southern United States and followed for 3 months postpartum. Inclusion criteria for mothers were: (a) live birth of an infant without congenital anomaly; (b) older than 20 years of age; (c) married or living with a partner who performs the role of a father; (d) able to understand and speak English. Mothers who had been hospitalized due to pregnancy complications, who had had a previous preterm delivery or a multiple gestation pregnancy were excluded. Inclusion criteria for preterm infants were: (a) born between 28 and 36 weeks of gestation; (b) birth weight between 1000 and 2500 g; (c) hospitalized in the neonatal intensive care unit (NICU) for less than 1 month so that the infant would be at home before the first data collection point. Inclusion criteria for full-term infants were: (a) born between 37 and 42 weeks of gestation; (b) weight \geq 2500 g at birth; (c) discharged home with the mother following delivery.

Calculated sample size was 130 based on selected statistical method requiring at least 10 subjects per independent variable for regression analysis (Munro, 2005) and extra 30% of expected attrition rate for 3 months' follow-up. Although 216 mothers were recruited in the postpartum unit, 60 could not be found at 6 weeks postpartum, and four mothers were dropped from the study (three whose infants were hospitalized in the NICU for more than 4 weeks and one whose baby died). The final sample included 152 mothers (80 with full-term babies, 72 with preterm babies) at 6 weeks postpartum (T1) and 131 mothers (72 with full-term babies, 59 with preterm babies) at 3 months postpartum (T2). Mothers who dropped out were more likely to be African-American, single but living together, with less education, lower family income, and have a greater number of children compared to the study participants.

Most of the 152 mothers were white, married, and had some education beyond high school. About

two thirds of the mothers had a family income of more than US\$30,000 and most had vaginal deliveries (Table 1). Regardless of the attrition rate from postpartum unit through 3 months postpartum, the characteristics of the mothers and their infants at each time point were very similar, except for the race distribution, marital status and employment rate which were different.

About half of the infants were male (55.1%) and first borns (44%). At birth, 15 (21%) preterm infants weighed less than 1500 g and 57 (79%) preterm infants weighed between 1500 and 2500 g. The mean length of stay in the NICU was 12.2 days (standard deviation, 8.4 days; range, 2–33 days). As expected, compared with the full-term group, the preterm group had a significantly lower mean gestational age and birth weight. Compared with mothers of full-term babies, the mothers of preterm babies were younger, had more maternal complications, and reported lower family incomes. In addition, mothers of preterm babies were more likely to be single living with a male partner and to have had a cesarean birth. Therefore, these five variables were controlled for gestational group difference in the regression analysis.

Measures

Dependent variables

The dependent variables were physical health (physical symptoms, fatigue), mental health (positive and negative affect), and role functional status measured at 6 weeks and 3 months postpartum. It is known that 6 weeks is the traditional definition of the postpartum period during which physiologic changes occur to restore the woman's body to its pre-pregnancy status (Cunningham et al., 2005), and 3 months is the time that 60–80% of mothers return to work after childbirth (Killien, Habermann, & Jarrett, 2001). The reason these time points were chosen was so that we could evaluate if this was enough time for women to recover their health status and to identify the significant predictors at each time point.

Physical symptoms were measured with a checklist of 27 physical symptoms or problems (Jones &

Table 1

*Demographic Characteristics and Descriptive Statistics for Study Variables at 6 Weeks and 3 Months Postpartum**

	6 weeks postpartum (N = 152)	3 months postpartum (N = 131)
Age (years)	30.2 ± 5.4	30.5 ± 5.4
Race		
White	102 (67.1)	93 (71.0)
African-American/Hispanic/Asian/Native American	50 (32.9)	38 (29.0)
Marital status		
Married	125 (82.2)	110 (84.0)
Single, living together	27 (17.8)	21 (16.0)
Educational level		
Lower than high school	8 (5.3)	6 (4.6)
High school	23 (15.1)	16 (12.2)
Some college	54 (35.5)	47 (35.9)
College	39 (25.7)	36 (27.5)
Above college	28 (18.4)	26 (19.8)
Number of children	1.8 ± 1.0	1.8 ± 0.9
Annual family income		
< \$10,000	14 (9.2)	11 (8.4)
~ \$29,999	23 (15.1)	19 (14.5)
~ \$49,999	36 (23.7)	29 (22.1)
~ \$69,999	21 (13.8)	18 (13.7)
~ \$89,999	23 (15.1)	22 (16.8)
≥ \$90,000	35 (23.0)	32 (24.4)
Number of maternal complications	3.4 ± 1.8	3.3 ± 1.8
Type of delivery		
Vaginal delivery	112 (73.7)	97 (74.0)
Cesarean section	40 (26.3)	34 (26.0)
Gestational group		
Full-term infant	80 (52.6)	72 (55.0)
Preterm infant	72 (47.4)	59 (45.0)
Employment status		
Unemployed	132 (86.8)	75 (57.3)
Employed	20 (13.2)	56 (42.7)
Physical health (range)		
Fatigue in the morning (0–100)	58.0 ± 24.3	46.7 ± 23.9
Fatigue in the afternoon (0–100)	55.9 ± 24.2	49.4 ± 23.9
Number of physical symptoms (0–27)	3.7 ± 2.4	3.0 ± 2.3
Mental health (range)		
General positive affect (11–66)	41.2 ± 9.7	43.5 ± 10.9
General negative affect (13–78)	30.6 ± 10.7	27.8 ± 10.7

(Contd.)

Table 1

(Continued)

	6 weeks postpartum (N = 152)	3 months postpartum (N = 131)
Role function (range, 4–16)	13.3 ± 1.3	14.1 ± 1.2
Sense of mastery (range, 7–35)	28.3 ± 5.2	28.4 ± 5.8
Infant temperament (range, 16–112)	48.9 ± 11.0	44.5 ± 11.4
Received social support (range, 0–238)	87.1 ± 51.8	76.0 ± 56.0

*Data are presented as mean ± standard deviation or n (%).

Parks, 1990) that represented a comprehensive review of systems, including gynecological, breast, and respiratory systems. At each time point, subjects were asked to check any physical problems they had experienced within the past 2 weeks. Higher scores indicated a greater number of physical symptoms. Correlation between the 6-week and 3-month reports was .48.

Fatigue was measured using a 10-cm visual analog scale to indicate mothers' perception of fatigue severity in the morning (AM) and afternoon (PM) during the past 2 weeks at each time point. Higher scores indicated greater levels of fatigue. Correlations between the 6-week and 3-month reports were .54 for AM fatigue and .50 for PM fatigue. Correlations between AM fatigue and PM fatigue were .61 at T1 and .65 at T2.

Positive and negative affect were assessed by two factors from the Mental Health Inventory (Veit & Ware, 1983): general positive affect (11 items) and negative affect (13 items). On a 6-point Likert scale, respondents indicated how much/often they had experienced each item during the past 2 weeks. Higher scores indicated greater positive affect and greater negative affect. Alpha reliabilities in the original study (Veit & Ware) were .92 for positive affect and .92 for negative affect. In this study, internal consistency was .86 and .91 for positive affect and .94 and .94 for negative affect at T1 and T2, respectively.

Role functional status was measured with the Inventory of Functional Status After Childbirth

(IFSAC) (Fawcett, Tulman, & Myers, 1988). The IFSAC measures a mother's readiness to assume infant care responsibilities and to resume usual self-care, household, social and community, and occupational activities. Mothers rated each of the 36 items on a 5-point Likert scale, indicating how much/often they had performed each of the role functional activities during the past 2 weeks. Mothers do not respond to activities that they have never experienced. In addition, the items referring to occupational activities were omitted because only the employed mothers would have had valid responses for those items. Thus, a mean of the valid items was used as the IFSAC score. Higher mean scores indicated higher role performance after childbirth. Internal consistency was .76 for total IFSAC in the original study (Fawcett, Tulman, & Myers) and .98 at T1 and .94 at T2 in this study.

Independent variables

The independent variables in this study were a sense of mastery, received social support, complications of childbirth, and infant temperament.

Sense of mastery was measured with the Mastery scale (Pearlin & Schooler, 1978) at T1 and T2. This seven-item, 5-point Likert scale assessed the mother's perception of the extent of control she has over the course of her life. Higher scores indicated a higher level of mastery. Froelicher, Li, Mahrer-Imhof, Christopherson, and Stewart (2004) reported a reliability

of .72. In this study, the validity of the instrument was .84, and its internal consistency was .84.

Received social support was assessed with the Postpartum Support Questionnaire (Logsdon, McBride, & Birkimer, 1994), which measured the degree of support received specific to the postpartum situation. Mothers rated the 34 items on an 8-point Likert scale ranging from "no support" to "a lot of support". Higher scores indicated greater social support received during the past 2 weeks. Reported reliability for the instrument was .93 for postpartum adolescents (Logsdon, McBride, & Birkimer). In this study, the internal consistency was .96 at T1 and .97 at T2.

Complications of childbirth were measured with a 30-item checklist (Gjerdingen & Froberg, 1991) of complications experienced during pregnancy, labor and delivery, including gestational diabetes, preeclampsia, abnormal bleeding due to placenta previa, fetal distress, and prolapsed umbilical cord. The checklist of complications was completed through review of the mother's hospital chart by the investigators. Complications experienced received a score of 1, and complications not experienced were scored zero. Higher summative scores indicated that more complications had been experienced.

Infant temperament was measured with the revised Infant Characteristics Questionnaire (Gennaro, Tulman, & Fawcett, 1990). This 16-item instrument contains four subscales: fussy-difficult, unadaptable, unpredictable, and dull. At T1 and T2, mothers rated how they perceived their infants' temperaments to be during the past 2 weeks on a 7-point Likert scale. Total scores were calculated by summing the ratings on all 16 items, with higher scores indicating more difficult temperament. In this study, internal consistency was .83 at T1 and .85 at T2 for the total scale.

Data collection and analysis

After receiving approval from the human subjects institutional review boards of the university and the four hospitals that served as recruitment sites, the investigators visited the postpartum units at each hospital to recruit potential participants. After obtaining informed consent, the mothers provided

demographic data and contact information. Data were collected by mail at 6 weeks (T1) and 3 months (T2) postpartum. The investigators called each of the mothers to verify their mailing address and then mailed the study packet containing the instruments and a stamped self-addressed envelope to them. Completion of the study packet took about 1 hour. Mothers received a free gift set (diaper, toy, or formula) in the postpartum unit and a \$5 gift certificate at T1 and T2 as a token of appreciation. The data were analyzed by descriptive statistics, χ^2 test, and a series of simultaneous multiple regression analyses.

RESULTS

The means and standard deviations for all study variables are presented in Table 1. Overall, the mothers experienced moderate levels of fatigue in the morning and fatigue in the afternoon as well as three to four physical symptoms over the first 3 months postpartum. They reported moderate levels of positive affect and low levels of negative affect. In addition, mothers resumed pretty much of their role functions. The mothers' sense of mastery was relatively high. They perceived their infants as pretty easy to take care of. They received a low level of social support. The number of physical symptoms and their negative affect declined while their role functional status gradually improved as time progressed. However, fatigue and positive affect showed a fluctuating pattern throughout the 3 months postpartum.

A series of simultaneous multiple regression equations were used to examine significant predictors among independent variables of maternal employment and gestational group, infant temperament, received social support and sense of mastery as well as five demographic variables (age, marital status, income, maternal complications, type of delivery) controlling for gestational group differences (Table 2). All of the regression equations were significant except for fatigue in the afternoon (result not shown), and the independent variables

Table 2
Predictors of Postpartum Health Status at 6 Weeks and 3 Months Postpartum

	Morning fatigue		Physical symptoms		Negative affect		Positive affect		Role function	
	6 wk	3 mo	6 wk	3 mo	6 wk	3 mo	6 wk	3 mo	6 wk	3 mo
Age	-.08	.05	.01	.11	-.06	.04	-.03	-.13	-.21*	-.29**
Income	-.02	-.09	-.18	-.32**	-.23**	-.26**	.22**	.24**	.24*	.37**
Marital status	-.16	-.07	-.08	.07	.19*	.17	-.08	-.22**	-.03	-.29**
Type of delivery	-.03	.18*	.05	.02	.07	.07	-.04	-.07	.02	-.05
Maternal complications	.09	.03	.14	.07	.16*	-.02	-.12	-.07	.03	-.09
Received social support	-.16*	-.23**	-.02	.06	-.05	-.01	.12	.09	-.25**	-.13
Infant temperament	.26**	.15	.14	-.06	.15*	.17*	-.17*	-.21**	-.04	-.05
Sense of mastery	-.23*	-.20*	-.26**	-.19*	-.44**	-.43**	.48**	.45**	.20*	.17*
Employment	-.03	.06	.02	.04	-.06	.05	.07	-.06	.01	.09
Gestational group	.18*	.14	-.07	.03	-.02	-.01	-.09	-.01	-.08	-.05
F value	3.23**	2.75**	2.71*	2.33*	13.22**	9.73**	11.14*	11.10**	3.66*	6.31**
Adjusted R ²	.13	.12	.11	.10	.46	.40	.41	.44	.16	.29

* $p < .05$, ** $p < .01$. Dummy variables: marital status (1 = single, 0 = married), type of delivery (1 = cesarean birth, 0 = vaginal birth), employment (1 = employed, 0 = not employed), gestational group (1 = preterm, 0 = full term).

accounted for between 10% and 46% of the variance in the outcome measures.

Physical health

Employment was not related to any of the physical health measures at 6 weeks or 3 months postpartum. At 6 weeks postpartum, higher AM fatigue was related to having a preterm infant, more difficult infant temperament, less received social support and a lower sense of mastery. More physical symptoms were related to a lower sense of mastery. At 3 months postpartum, higher AM fatigue was related to having had a cesarean birth, less received social support and a lower sense of mastery. More physical symptoms were related to lower income and a lower sense of mastery. There were no significant predictors of PM fatigue at 6 weeks or 3 months.

Mental health

Employment and preterm birth were not related to the mental health measures at 6 weeks or 3 months postpartum. At 6 weeks postpartum, greater negative affect was related to lower family income, being single, having a greater number of maternal complications, more difficult infant temperament, and a lower sense of mastery. Greater positive affect was related to higher family income, less difficult infant temperament, and a greater sense of mastery. At 3 months postpartum, greater negative affect was related to lower family income, more difficult infant temperament, and a lower sense of mastery. Greater positive affect was related to higher family income, being married, less difficult infant temperament, and a greater sense of mastery.

Role functional status

Employment and preterm birth were not related to role functional status at 6 weeks or 3 months postpartum. At 6 weeks postpartum, better functional status was related to being younger, having higher family income, less received social support and a greater sense of mastery. At 3 months postpartum, better functional status was related to being younger, having higher family income, being married, and a greater sense of mastery.

DISCUSSION

This study found that a sense of mastery, infant temperament, and received social support were significant predictors of postpartum health, supporting previous studies on related factors of postpartum health (Beck, 2001; Robertson et al., 2004). First of all, a sense of mastery played an important role as an internal coping mechanism for positive health outcomes in postpartum mothers. This is consistent with previous study findings. During the transition to parenthood, a sense of mastery, the belief that one has control over the situation, is an important way of coping as one adapts to parenthood, producing better maternal health outcomes, as shown in a study of mothers with preterm infants (Younger, Kendell, & Pickler, 1997). When infants are less interactive, more difficult to feed, smile less or vocalize less, mothers expend much more energy in parenting and perceive difficulty in caring for their infants (Halpern, Brand, & Malone, 2001). Mothers may doubt their feelings of being in control over the situation and this may negatively affect the mother's coping system and health outcomes (Honjo et al., 1998).

Since the measure of received social support includes material support as well as informational, emotional and comparison support (Logsdon, McBride, & Birkimer, 1994), a greater amount of received support may help mothers save energy and provide rest time, in turn decreasing the level of fatigue and improving role function. This is consistent with the finding that amount of social support was a significant predictor of postpartum self-rated health (Schytt & Waldenström, 2007). However, some mothers who report higher role functional status at 3 months might not require greater received social support. Family income was also a significant predictor in most health outcomes in this study, which is similar to other studies (Gjerdingen & Froberg, 1991; Robertson et al., 2004). Because higher income permits greater accessibility to or availability of other resources such as adequate childcare or additional help with household tasks (Bullers, 1994), postpartum recovery may be slower

in mothers from lower socioeconomic groups because they may not have access to resources that would make things easier.

Mothers of preterm infants reported higher levels of fatigue in the morning than mothers of full-term infants at 6 weeks. This is consistent with the results from the study of Schytt and Waldenström (2007), that an infant's prematurity was a risk factor for poor self-rated health at 2 months after childbirth. This is likely to be due to the often greater physical demands of caring for a preterm infant right after the birth. Mothers often describe their preterm infant as being difficult to care for because the infant spends most of its waking hours crying or fussing (Chapieski & Evankovich, 1997). Since these behaviors may be caused by prematurity, especially an immature neurological system, mothers might perceive their infant as being more demanding, and experience more physical stress on a daily basis as a result (Halpern et al., 2001). The sleep patterns of preterm infants might be more disruptive, and preterm infants might wake up more frequently during the night compared with full-term infants, resulting in more postpartum fatigue (Gennaro, Grisemer, & Musci, 1992). Therefore, fatigue due to fragmented sleep may be an important component of the stress felt by mothers of preterm infants. Prematurity affected maternal fatigue when the baby was 6 weeks old but not 3 months later. This suggests that the strain related to having a preterm baby, due to separation, worry and the special conditions of becoming a mother under such circumstances, has decreased or disappeared, or that the mother has adapted to the situation by 3 months postpartum.

Employment was not a significant predictor of health outcomes at 6 weeks or 3 months postpartum, even after other important variables were controlled. The rate of employment at 6 weeks was very low (13%), and could have obscured the effects of maternal employment. However, 43% of mothers were employed at 3 months postpartum, and employment itself was not a predictor of health outcomes. Although there are conflicting findings regarding the effects of employment on maternal

health in the postpartum period (Chen, 2001; Nichols & Roux, 2004), managing multiple roles did not adversely affect the mothers' postpartum health in this study. One reason might be the benefits that mothers receive through their employment. While employed and away from their infants, mothers may experience some relief from the stress of caring for their infant or may receive emotional social support from their coworkers (Grice et al., 2007). Another reason could be the relationship between role quantity and role quality. Bullers (1994) suggested that the quality of each role is a more important predictor than the role occupancy itself in the health of employed women. Future studies should evaluate the relationship of maternal health with role quality as well as role quantity.

As a study limitation, this study had a high, 30%, attrition rate from the recruitment at the postpartum unit to 6 weeks at home (T1). Especially, the attrition rate for mothers of preterm babies was higher than that of mothers of full-term babies, and it was also higher for single but living together, low education, low income, and African-American mothers. Since preterm infants are often born to families who are poor, the attrition group represents an important portion of the women who experience preterm birth and limits the study's generalizability. Since these characteristics were related to health outcomes, the effects may be stronger if the attrition group had been included. A strategy to limit attrition, such as monetary compensation, more frequent contact and effective communication with subjects, needs to be developed and implemented.

With regard to clinical implications, this study has increased understanding of postpartum health in mothers of preterm infants and suggests that nurses need to provide anticipatory guidance to improve the postpartum health of expectant mothers who have a high-risk pregnancy or to mothers of preterm infants. During the postpartum period, nurses can start to assess the health problems and concerns of postpartum mothers during follow-up calls and/or home visits, and provide additional information on health management over time. Nursing interventions that provide support and

guidance, and that enhance mothers' sense of mastery in their adjustment to parenthood, can prevent or minimize negative health outcomes, and, in turn, optimize mothers' postpartum health.

CONCLUSION

This study examined significant predictors of postpartum health during the first 3 months after delivery. The findings indicated that a sense of mastery, infant temperament, received social support, and family income were significant predictors of postpartum health. Some aspects of preterm birth and caring for a preterm baby, but not the mother's employment status, also had an effect on maternal health outcomes. This study suggests that mothers caring for infants may need support and guidance, and additional postpartum follow-up with their health care providers beyond the traditional 6-week recovery period in order to promote their postpartum health. Perinatal nurses should make it a practice to let mothers of infants know that it might take months for their health to return to normal. In addition, they need to encourage these mothers to form health-promoting lifestyle habits and remind them that they need to receive regular health care rather than ignore their health care needs. Further study is needed to develop and examine nursing interventions that can provide support and guidance to mothers, and enhance mothers' sense of mastery in their adjustment to parenthood, so that negative health outcomes may be prevented or minimized, and the postpartum health of mothers optimized.

REFERENCES

- Beck, C. T. (2001). Predictors of postpartum depression: An update. *Nursing Research, 50*, 275–285.
- Brown, S., & Lumley, J. (2000). Physical health problems after childbirth and maternal depression at six to seven months postpartum. *British Journal of Obstetrics & Gynecology, 107*, 1194–1201.
- Bullers, S. (1994). Women's roles and health: The mediating effect of perceived control. *Women & Health, 22*, 11–30.
- Chapieski, M. L., & Evankovich, K. D. (1997). Behavioral effects of prematurity. *Seminars in Perinatology, 21*, 221–239.
- Chen, C. H. (2001). Association of work status and mental well-being in new mothers. *Kaohsiung Journal of Medical Science, 17*, 570–575.
- Cunningham, G., Leveno, K. J., Bloom, S. L., Hauth, J. C., Gilstrap, L. C., & Wenstrom, K. D. (2005). *Williams Obstetrics* (22nd ed.). New York: McGraw-Hill Professional.
- Fawcett, J., Tulman, L., & Myers, S. T. (1988). Development of the inventory of functional status after childbirth. *Journal of Nurse-Midwifery, 33*, 252–260.
- Finello, K. M., Litton, K. M., deLemos, R., & Chan, L. S. (1998). Very low birth weight infants and their families during the first year of life: Comparisons of psychosocial outcomes based on after-care services. *Journal of Perinatology, 18*, 266–271.
- Froelicher, E. S., Li, W. W., Mahrer-Imhof, R., Christopherson, D., & Stewart, A. L. (2004). Women's initiative for non-smoking VI: Reliability and validity of health and psychosocial measures in women smokers with cardiovascular disease. *Heart & Lung, 33*, 162–175.
- Gennaro, S., Grisemer, A., & Musci, R. (1992). Expected versus actual life-style changes in mothers of preterm low birth weight infants. *Neonatal Network, 11*, 39–45.
- Gennaro, S., & Krouse, A. (1996). Patterns of postpartum health in mothers of low birthweight infants. *Health Care for Women International, 17*, 35–45.
- Gennaro, S., Tulman, L., & Fawcett, J. (1990). Temperament in preterm and full-term infants at three and six months of age. *Merill-Palmer Quarterly, 36*, 201–215.
- Gjerdingen, D. K., & Froberg, D. G. (1991). Predictors of health in new mothers. *Social Science of Medicine, 33*, 1399–1407.
- Grice, M. M., Feda, D., McGovern, P., Alexander, B. H., McCaffrey, D., & Ukestad, L. (2007). Giving birth and returning to work: The impact of work-family conflict on women's health after childbirth. *Annals of Epidemiology, Aug 22*; [Epub ahead of print].
- Halpern, L. F., Brand, K. L., & Malone, A. F. (2001). Parenting stress in mothers of very-low-birth-weight (VLBW) and full-term infants: A function of infant behavioral characteristics and child-rearing attitudes. *Journal of Pediatric Psychology, 26*, 93–104.
- Hamilton, M. S., Brooten, D., & Youngblut, J. M. (2002). High-risk pregnancy: Postpartum rehospitalization. *Journal of Perinatology, 22*, 566–571.

- Honjo, S., Mizuno, R., Ajiki, M., Suzuki, A., Nagata, M., Goto, Y., et al. (1998). Infant temperament and child-rearing stress: Birth order influences. *Early Human Development*, *51*, 123–135.
- Jones, L. C., & Parks, P. (1990). Frequency of illness in mother–infant dyads. *Health Care for Women International*, *11*, 461–475.
- Killien, M. G., Habermann, B., & Jarrett, M. (2001). Influence of employment characteristics on postpartum mothers' health. *Women & Health*, *33*, 63–81.
- Lee, K. A., & Zaffke, M. (1999). Longitudinal changes in fatigue and energy during pregnancy and the postpartum period. *Journal of Obstetrics, Gynecologic, & Neonatal Nursing*, *28*, 183–191.
- Logsdon, M. C., McBride, A. B., & Birkimer, J. C. (1994). Social support and postpartum depression. *Research in Nursing & Health*, *17*, 449–457.
- Munro, B. H. (2005). *Statistical methods for health care research* (2nd ed.). Philadelphia: Lippincott Williams & Wilkins.
- Nichols, M. R., & Roux, G. M. (2004). Maternal perspectives on postpartum return to the workplace. *Journal of Obstetrics, Gynecologic, & Neonatal Nursing*, *33*, 463–471.
- Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior*, *19*, 2–21.
- Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry*, *26*, 289–295.
- Saurel-Cubizolles, M. J., Romito, P., Lelong, N., & Ancel, P. Y. (2000). Women's health after childbirth: A longitudinal study in France and Italy. *British Journal of Obstetrics & Gynecology*, *107*, 1202–1209.
- Schytt, E., & Waldenström, U. (2007). Risk factors for poor self-rated health in women at 2 months and 1 year after childbirth. *Journal of Women and Health (Larchmt)*, *16*, 390–405.
- Veit, C. T., & Ware, J. E. (1983). The structure of psychological distress and wellbeing in general populations. *Journal of Consulting and Clinical Psychology*, *51*, 730–742.
- Younger, J. B., Kendell, M. J., & Pickler, R. H. (1997). Mastery of stress in mothers of preterm infants. *Journal of the Society of Pediatric Nurses*, *2*, 29–35.