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ORIGINAL ARTICLE

Postpartum depressive symptoms and the combined load of paid and unpaid work: a longitudinal analysis

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Abstract
Purpose To investigate the effects of total workload and other work-related factors on postpartum depression in the first 6 months after childbirth, utilizing a hybrid model of health and workforce participation.
Methods We utilized data from the Maternal Postpartum Health Study collected in 2001 from a prospective cohort of 817 employed women who delivered in three community hospitals in Minnesota. Interviewers collected data at enrollment and 5 weeks, 11 weeks, and 6 months after childbirth. The Edinburgh Postnatal Depression Scale measured postpartum depression. Independent variables included total workload (paid and unpaid work), job flexibility, supervisor and coworker support, available social support, job satisfaction, infant sleep problems, infant irritable temperament, and breastfeeding.
Results Total average daily workload increased from 14.4 h (6.8 h of paid work; 7.1% working at 5 weeks postpartum) to 15.0 h (7.9 h of paid work; 87% working at 6 months postpartum) over the 6 months. Fixed effects regression analyses showed worse depression scores were associated with higher total workload, lower job flexibility, lower social support, an infant with sleep problems, and breastfeeding.
Conclusions Working mothers of reproductive years may find the study results valuable as they consider merging their work and parenting roles after childbirth. Future studies should examine the specific mechanisms through which total workload affects postpartum depressive symptoms.

Keywords Total workload · Postpartum depression · Occupational health · Maternal health

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Introduction

Postpartum depression is a debilitating mental disorder that has negative effects on a mother's quality of life (Beck 2002), close relationships (Burke 2003), and maternal–infant interaction during the infant's first year of life (Righetti-Veltema et al. 2002). This disorder begins within four weeks after childbirth (American Psychiatric Association 1994); however, multiple studies have shown that depression onset may start as late as 3 or 6 months postpartum (Beeghly et al. 2002; Goodman 2004). Postpartum

depression crosses cultural and national boundaries as it affects 10 to 15% of postpartum women from both developing and developed countries (Halbreich and Karkun 2006; Robertson et al. 2004). However, the United States constitutes a unique setting to study this disorder. First, it has a high labor force participation rate among mothers of infants that has increased substantially from 38% in 1980 to 54% in 2003 (U.S. Bureau of Labor Force Statistics 2004). Second, recent US statistics show that 58% of employed first-time mothers returned to work by three months after childbirth (Dye 2005). In the United States, women are potentially eligible for family leave from work under the federal Family and Medical Leave Act, which provides job-protected, unpaid leave of 12-week duration per year for eligible women.[1] However, estimates reveal that only 58% of the American workforce is covered by the FMLA (U.S. Department of Labor 2001), raising questions about the combined workload of paid and unpaid responsibilities experienced by new mothers and the associated implications for serious medical conditions such as postpartum depression.

Kahn (1991) defined "total workload" as the total load from paid and unpaid work responsibilities including paid employment, overtime, household chores, care of children, elderly or sick relatives, and work in voluntary organizations. Despite women's greater participation in the US labor force, work is still structured around a traditional "male breadwinner/homemaker model" that mainly flourished after the industrial revolution (Moen and Orrange 2002). Whether in "work hours, work effort or work continuity" (p. 234), workplace organization and policies in the United States still assume the presence of a homemaker to take care of family matters, housework, and childcare. However, this has not been compensated by men increasing their share of unpaid work to the same extent, especially in the realm of childcare (Greenstein 1996; Berntsson et al. 2005). All these factors may exacerbate women's total workload especially in the period after childbirth when she is integrating the care of a new infant with her other roles (worker, spouse, or partner) while recovering from pregnancy and delivery. Although multiple roles have been associated with positive health outcomes for women (Waldron et al. 1998), there is also evidence of the presence of upper limits for these beneficial effects when the number of roles or the hours spent in one or more roles become excessive, at which psychological well-being is jeopardized (Barnett and Hyde 2001).

[1] Under the FMLA, employees are eligible if they have worked for a covered employer for at least one year, for 1,250 h over the previous 12 months (approximately a 60% effort), and if at least 50 employees are employed by the employer within 75 miles. (http://www.dol.gov/whd/regs/statutes/fmla.htm).

Swedish studies on employed women have found an interdependent relationship between stress arising from paid work and stress arising from unpaid tasks at home. One study that researched 501 male and 679 female full-time Swedish workers found that women had a greater total workload and more experiences of stress and role conflicts than men (Lundberg et al. 1994). Krantz and Ostergren (2001) found that increased domestic responsibilities and higher job strain were independently associated with increased mental and physical symptoms among employed Swedish women. No studies have examined the association between total workload and postpartum depression, but other health outcomes were examined. A meta-analysis of 19 studies revealed a small correlation between hours of work and psychological health measures (e.g., depression, anxiety, exhaustion) (Sparks et al. 1997). A more recent study of 211 dual-earner couples found a U-shaped relationship between wives' changes in work hours and changes in their psychological distress (Barnett et al. 2009). Women who worked more than average hours experienced increases in psychological distress when their work hours increased; on the other hand, those who worked fewer hours than average experienced more distress when their work hours decreased.

Women's risk of postpartum depression may be influenced by multiple factors such as history of depression (Da Costa et al. 2000; Horowitz et al. 2005), stressful life events (Da Costa et al. 2000; Robertson et al. 2004), difficult infant temperament (Beck 2001; McGrath et al. 2008), social support (Beck 2001; Logsdon and Usui 2001), and breastfeeding (McCoy et al. 2006; Sharma and Corpse 2008). The objective of this paper is to extend previous research by longitudinally investigating the effects of total workload and other work-related factors (e.g., workplace support, job satisfaction, job flexibility) on postpartum depression in the first 6 months after childbirth.

Theoretical framework

The theory guiding this study constitutes of a hybrid model of health and workforce participation adapted from Becker's (1965) household production theory and Grossman's (1972) health production function. Becker's theory emphasizes the dynamics of women's choices to allocate time between paid work and work at home. It assumes that the sum of time women spend in producing commodities such as their own health and care for their family and household and time spent in paid employment must equal the total time available (24 h a day). This model assumes that individuals and households produce these commodities to maximize personal preference subject to time and budget constraints and "the production technology", or the process used to make the commodities. One example is the

health production technology. Formulated by Grossman (1972), this theory establishes that an individual's level of health partially depends on the resources allocated to its production or maintenance (e.g., sleep, work, leisure, exercise, nutrition, and doctor visits). Grossman's theory also establishes that individuals' ability to produce good health is constrained by their financial resources (e.g., income). In the specific case of postpartum health of employed women, the limited availability of other resources such as social support at work (Leathers et al. 1997) and at home (Da Costa et al. 2000) and job flexibility (Dagher et al. 2009) may constrain a woman's ability to produce and maintain her postpartum mental health. The main assumption of the hybrid model is that health is determined by genetic endowment, other "predetermined factors" (e.g., demographics, personal and household characteristics), and personal choices, which are endogenous variables determined within the model. Applied to this study, women's postpartum depression is a function of predetermined explanatory factors such as demographics, social support, job flexibility, job satisfaction, infant sleep patterns, and infant temperament, in addition to personal choices. Women may choose a certain combination of paid work and unpaid duties at home (i.e., total workload), use of health services, and whether to breastfeed as inputs to the production of their postpartum health.

Methods

Data

This study utilizes data from the Maternal Postpartum Health Study collected in 2001 from three community hospitals in Minneapolis-Saint Paul, Minnesota. The study population consisted of all women who were 18 years or older delivering a live, singleton infant at selected hospitals. Vital statistics data revealed that the study population was representative of all birth mothers delivering at non-study hospitals in terms of maternal demographics and infants' average gestational age and birth weight. Sample selection criteria were that women spoke English, had been employed for at least 20 h per week in the three months preceding delivery, planned to continue employment after childbirth, and had a generally healthy infant. Institutional review boards for protection of human subjects at the participating hospitals and the University of Minnesota reviewed and approved this study.

Out of the eligible population ($N = 1{,}157$), a sample of 817 women enrolled in the study (71% response rate). Statistical comparisons between participants and non-participants showed no differences in regard to infant birth weight, duration of gestation, maternal age, marital status, and duration of employment for main employer. Enrolled women were interviewed by telephone at 5 weeks, 11 weeks, and 6 months after delivery, with 88% ($N = 716$), 81% ($N = 661$), and 76% ($N = 625$) response rates, respectively. We limited the analyses to study participants who filled out the 5-week questionnaire to have baseline survey data. Thus, out of 817 enrollees in the study, 101 women were excluded from the analyses because they did not participate in the 5-week interview. Comparisons of the analytical sample ($n = 716$) with the excluded mothers ($n = 101$), showed no differences in regard to parity, duration of gestation, and number of work hours/week pre-childbirth. Excluded cases were significantly younger, had shorter employment duration with their current employer, and a lower household income. They also were more likely to be single, less likely to have a college degree, and less likely to be white than those who completed the 5-week interview. The size of the analytical sample at each period was 716 at 5 weeks, 638 at 11 weeks, and 603 at 6 months after childbirth. We conducted unbalanced panel data analyses (i.e., we included study participants with missing data) on a total of 1957 observations. This type of analysis allows us to retain all available observations on these women at each time period.

Measures

Data on the dependent and independent variables were collected using telephone interviews at 5 weeks, 11 weeks, and 6 months after childbirth. The measures for these variables are detailed below.

Postpartum depression, the dependent variable for this study, was measured as a continuous variable at each of the study periods using the Edinburgh Postnatal Depression Scale (Cox et al. 1987). This scale consists of 10 short statements about how the mother felt during the past 7 days, with 4 response categories ranging from 0 to 3 according to increased severity of the symptoms. At 5 weeks, 11 weeks, and 6 months, this measure had internal consistency reliabilities (Chronbach's Alpha) of 0.82, 0.83, and 0.84, respectively.

Total workload, adapted from Mårdberg et al. (1991), was defined as the total hours spent on paid duties (employment or work for pay) and unpaid duties (travel to and from paid work and day care; domestic chores; running errands outside of the home; yard work; and family care including infant cares). Not included in total workload was time spent sleeping, performing personal cares, or leisure activities (e.g., visiting friends, exercising). Women self-reported their time in increments of one-half or one hour. Mothers who had returned to work reported hours from their most recent workday, while mothers who were still on leave reported information from "yesterday".

Job flexibility consisted of three items taken from Quinn and Staines (1979): "if you were working and needed to temporarily take care of personal or family matters, how hard would it be to: (1) take time off during the workday, (2) change the hours you begin and end work, and (3) take work home". Each item was evaluated on a Likert scale ranging from 1 (*very hard*) to 4 (*not at all hard*). At 5 weeks, 11 weeks, and 6 months, this measure had internal consistency reliabilities of 0.58, 0.63, and 0.65, respectively. Deletion of the item measuring the ability to take work home increased the internal consistency reliabilities to 0.74, 0.74, and 0.80, respectively. Thus, job flexibility was treated in the analysis as two variables, one representing "time control" by summing the first two items (score = 2–8) and a separate variable representing "ability to take work home" (score = 1–4).

Supervisor and coworker support were adapted from Bond et al. (1991). Supervisor support consisted of one item: "My supervisor has been helpful to me when I have had to take care of personal or family matters". Coworker support consisted of one item: "My coworkers have been supportive of me when I have had to take care of personal or family matters". Both constructs were evaluated on a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Evidence of construct validity was reported for coworker support (McGovern et al. 2006) and supervisor support (Dagher 2007).

Social support from family and friends was taken from Sherbourne and Stewart (1991). It is a five-item scale that assesses how often various kinds of functional support were available for the woman if she needed them, including positive social interaction (e.g., someone to get together with for relaxation), emotional (e.g., someone to confide in), informational (e.g., someone to turn to for suggestions regarding a personal problem), affectionate (e.g., someone to love and make you feel wanted), and tangible support (e.g., someone to help with daily chores if one is sick). Response options vary from 1 (*none of the time*) to 5 (*all of the time*) and were summed (scoring = 5–25). At 5 weeks, 11 weeks, and 6 months, this measure had internal consistency reliabilities of 0.82, 0.84, and 0.84, respectively.

Job satisfaction was taken from Quinn and Staines (1979). The woman was asked "In general, how satisfied are you with your job?" Response options vary from 1 (*very dissatisfied*) to 4 (*very satisfied*).

Infant sleep problems and infant irritable temperament were measured as part of a set of questions: "Please tell me if your baby has had any of the following problems during the past 4 weeks". One type of problem was: "problems sleeping, e.g. on an average night your baby is awake 2 or more hours/night". Another type of problem was: "Fussy, irritable behavior that lasts for at least 2 days or colic". The response categories were 1 (*yes*) or 0 (*no*). These measures of irritable temperament and infant sleep problems have been validated (Dagher 2007; McGovern et al. 2006).

Breastfeeding was taken from McGovern et al. (2006) and asked: "Which of the following are you feeding your baby: breast milk, formula, milk (cow or soy), other?" Multiple response options were allowed; any breastfeeding was scored 1.

Estimation

The empirical model for testing the impact of total workload and other factors on women's postpartum depression scores in the first 6 months after childbirth was a fixed effects panel regression written as:

$$\mathrm{PPD}_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 T + \gamma_3 D + \delta_{it}.$$

PPD_{it} measures the postpartum depression score for the ith individual at time t (i.e., at 5 weeks, 11 weeks, and 6 months). X_{it} represents total workload and other work and personal characteristics for the ith individual at time t. T represents a vector of time dummy variables that captures time-specific effects on postpartum depression scores which are common to all individuals. D represents a vector of dummy variables for each woman minus one, which controls for any time invariant observed or unobserved individual-specific effects on postpartum depression scores, and δ_{it} is the unobserved error term.

Inclusion of a fixed effect for each woman controls for all the observed (including baseline age, race, education, occupation, marital status, parity status, income, as well as number of hours worked pre-childbirth, whether the pregnancy was planned, delivery type, and prenatal depression) and unobserved variables that are constant over time. Unobserved time invariant personal characteristics such as negative affectivity, a global and stable trait of the individual that is characterized by "the tendency to experience negative emotions across time/situations" (Denollet 2005, p. 89), could affect both total workload and postpartum depression, resulting in biased estimates. Inclusion of a fixed effect for each woman controls for that potential source of bias.

The primary focus of this paper is on the time-varying variables (total workload, time control, ability to work from home, supervisor and coworker support, available social support, job satisfaction, fussy infant, infant sleep problems, and breastfeeding) measured for each woman at 3 time periods (5 weeks, 11 weeks, and 6 months). As described by Allison (2006), interpretation of regression coefficients in fixed effects regression involves estimation of the difference between an individual's baseline mean value of the variables relative to their value at subsequent time periods to test the null hypotheses that the differences across time periods relative to baseline are significantly

Table 1 Participant demographic characteristics at each of the study periods

Variable	5 weeks ($n = 716$)	11 weeks ($n = 638$)	6 months ($n = 603$)
Age			
Mean (SD)	29.90 (5.28)	30.05 (5.26)	30.13 (5.13)
Range	18–45	18–45	18–45
Marital status (%)			
Single	10.5	10.0	8.1
Partnered	16.3	15.4	15.3
Married	73.2	74.6	76.6
College degree (%)			
1 = Yes	46.2	48.7	49.6
Income (%)			
$0–24,999	6.4	6.3	5.8
$25,000–49,999	21.6	20.4	19.4
$50,000–74,999	25.3	24.6	24.9
$75,000–99,999	29.1	30.4	30.7
$>100,000	17.6	18.3	19.2
Race (%)			
1 = White	85.9	87.0	87.6
Occupation (%)			
Blue collar	14.4	13.5	12.6
Clerical	39.2	37.8	37.3
Professional	46.4	48.7	50.1
Parity (%)			
1 = Multiparous	53.5	54.2	53.9
Prenatal Moods			
1 = Yes	46.5	46.1	44.8

less than zero. Thus, each individual serves as her own control. This is accomplished by making comparisons from different time periods for the same individual and then averaging those differences across all individuals in the sample.

Results

Descriptive statistics

Demographic characteristics of the analytical sample are provided in Table 1. The majority of women in the study sample ($n = 716$) were white (86%) and married (73%). Out of 567 married or partnered women, 96% had employed partners or husbands who worked on average 42 h per week. The women's mean age was 30 years (SD = 5.3), 46% had a college degree or higher, and 46.5% were first-time mothers (Table 1). Logistic regression, with response status at each time period as the outcome variable and demographics as the explanatory variables, was used to estimate attrition from the sample. At 11 weeks postpartum, attrition did not differ by demographic characteristics, while at 6 months postpartum, non-participants were slightly but significantly more likely to be in a professional occupation and to be married or partnered.

The combined load from paid and unpaid work duties (total workload) ranged from an average of 14.4 h at 5 weeks postpartum to an average of 15.0 h at 6 months postpartum (Table 2). Among all women, time devoted to paid work increased from an average of 0.6 h at 5 weeks to 7.4 h at 6 months after childbirth (Table 2). Among those who returned to work by 5 weeks postpartum (7.1% of women), time devoted to paid work averaged 6.8 h (SD = 2.5) and it increased to an average of 7.9 h (SD = 1.74) among those who returned to work by 6 months postpartum (87% of women). Conversely, care of the infant and other family members declined from 10.5 h to 4.7 h, and recreational activities declined from 1.5 h to 0.8 h from 5 weeks to 6 months postpartum. Performance of domestic chores decreased from 2.0 h at 5 weeks postpartum to 1.4 h at 6 months postpartum (Table 2).

The mean postpartum depression scores were 4.9 (SD = 3.9; range = 0–21) at 5 weeks, 4.2 (SD = 3.9; range = 0–23) at 11 weeks, and 4.2 (SD = 4.0; range = 0–23) at 6 months postpartum. The proportion of women who met the threshold of 12.5 for the Edinburgh Postnatal Depression Scale (i.e., had a higher likelihood of being diagnosed with clinical depression) was 5.6% ($N = 40$) at 5 weeks, 4.7% ($N = 30$) at 11 weeks, and 4.1% ($N = 25$) at 6 months.

Fixed effects regression results

Since the presence of serial correlation in the error terms in linear panel data models results in biased standard errors and causes the resulting coefficient estimates to be inefficient, we conducted the Wooldridge test (Wooldridge 2002, p. 282–283) using all the explanatory variables and the outcome variable. This test entails a null hypothesis (H_0) of no first-order autocorrelation, where not rejecting H_0 indicates the presence of time series autocorrelation. The resulting F-test was non-significant [$F(1, 570) = 1.80$; $p = 0.1803$]. Thus, there was no need to correct for time series autocorrelation in the fixed effects regression analyses.

Fixed effects regression analyses showed that postpartum depressive symptoms were positively associated with total workload, infant sleep problems, and breastfeeding and negatively associated with time control and social support from friends and family (Table 3). On average, across the three time periods, a one-point (1 h) increase in total daily workload increased the postpartum depression score by 0.11, a small effect. Time was

Table 2 Descriptive statistics for the different components of total average daily workload in the study sample by postpartum time period

Daily activities	5 weeks ($n = 716$) Mean hours (SD)	11 weeks ($n = 638$)	6 months ($n = 603$)
Paid work	0.61 (1.96)	3.95 (4.05)	7.40 (2.53)
Job-related travel	0.08 (0.33)	0.37 (0.38)	0.89 (0.59)
Sleep	6.6 (1.53)	6.93 (1.34)	6.80 (1.33)
Personal hygiene, eating, and dressing	1.47 (0.89)	1.49 (0.75)	1.37 (0.65)
Domestic chores	2.01 (1.42)	1.84 (1.42)	1.45 (1.12)
Errands outside the house	1.17 (1.31)	0.80 (1.08)	0.57 (0.91)
Gardening and yard maintenance	0.13 (0.41)	0.13 (0.42)	0.03 (0.29)
Family care (including infant care)	10.49 (3.28)	7.24 (3.37)	4.68 (2.41)
Recreation	1.49 (1.59)	1.22 (1.65)	0.78 (1.16)
Other	0.01 (0.17)	0.00 (0.00)	0.00 (0.00)
Total Workload Mean (SD)	14.44 (2.48)	14.36 (2.46)	15.05 (1.97)

This table is adapted from the manuscript by McGovern et al. (2011)

Table 3 Fixed effects panel regression of the determinants of postpartum depressive symptoms

Postpartum depression score	Coefficient	SE	[95% CI]	t	$P > \|t\|$
Total workload	0.1137	0.0363	[0.0424, 0.1850]	3.13	0.002
Time control	−0.2048	0.0686	[−0.3394, −0.0702]	−2.98	0.003
Ability to work from home	0.0203	0.0850	[−0.1465, 0.1871]	0.24	0.812
Supervisor support	0.0568	0.1474	[−0.2324, 0.3460]	0.39	0.700
Coworker support	0.1530	0.1835	[−0.2070, 0.5130]	0.83	0.405
Social support	−0.2448	0.0340	[−0.3114, −0.1781]	−7.21	0.000
Job satisfaction	−0.2432	0.1350	[−0.5079, 0.0215]	−1.80	0.072
Fussy infant	0.4256	0.2271	[−0.0200, 0.8713]	1.87	0.061
Infant sleep problems	0.4996	0.2210	[0.0661, 0.9332]	2.26	0.024
Breastfeeding (1 = yes)	0.5269	0.2462	[0.0439, 1.0099]	2.14	0.033
Time period					
5 weeks (reference)					
11 weeks	−0.4303	0.1470	[−0.7187, −0.1419]	−2.93	0.003
6 months	−0.3768	0.1645	[−0.6996, −0.0540]	−2.29	0.022
Constant	8.9084	1.1635	[6.6257, 11.1912]	7.66	0.000
R-squared within = 0.0899					
R-squared between = 0.2552					
R-squared overall = 0.2089					

associated with a statistically significant decrease in postpartum depressive symptoms, comparing scores at 6 months and 11 weeks postpartum to the reference period at five weeks postpartum. Our fixed effects regression model explained 21% of the overall variation in postpartum depressive symptoms.

Discussion

Working women encounter unique challenges after childbirth as they try to balance work and family roles, learn the needs and cues of their infant, integrate infant care into ongoing family commitments, and arrange adequate child care. Women's hours of paid work increased over the 6 months after childbirth, while their unpaid work hours and their recreational time decreased. The total workload of these women involved limited time for rest and recovery from childbirth and for integrating infant demands with their roles as workers and partners.

This is the first study to examine the longitudinal association between total workload and postpartum depressive symptoms. We found that the higher the total workload, the higher the women's depressive symptoms. This finding is consistent with the general literature on total workload and psychological health (Krantz et al. 2005; Lindfors and

Lundberg 2002). It is also in line with Becker's (1965) and Grossman's (1972) production function theories. The woman chooses a combination of paid and unpaid duties that best suits her needs and preferences, and those of her family, subject to constraints such as family income, time (24 h per day), and her job schedule. Primary care and occupational health providers could discuss with expectant mothers their plans to return to work after childbirth and explore options for modifying total workload to allow increased time for rest and role adaptation. For example, one strategy could be having husbands/partners provide more help with infant care or household chores.

Having less time control at work was associated with higher postpartum depression scores. This result is consistent with Bond et al.'s (2004) finding of a negative association between more workplace flexibility (traditional and non-traditional flextime) and employees' depression. It is also in line with Kossek et al.'s (2006) results on the association between increased control over where, when and how one works, and lower depression scores. Application of our research model suggests that constraining a resource such as time control may result in less-than-optimal maternal health. Although flexibility at work usually contributes to job satisfaction and health, being able to work at any place and at any time, for example with e-mail, mobile phones, and computers, could also make the distinction between work and other parts of life more diffuse. It is then up to the individual worker to set the limits, which could be difficult in some cases (Allvin et al. 2011; Lundberg and Cooper 2011). This is consistent with our finding that being able to work from home had no significant association with postpartum depressive symptoms.

Although supervisor and coworker support did not have a significant association with postpartum depressive symptoms, social support from family and friends was found to be inversely related to postpartum depression scores over the 6 months after childbirth. The frequency of having someone available, if needed, for positive social interaction and emotional, tangible, affectionate, and instrumental support appears to have a protective effect on the risk of postpartum depression, consistent with the literature (Beck 2001; Logsdon and Usui 2001) and our theoretical model. Qualitative data from this study revealed that women reported sources of support to include mothers, husbands or partners, and older children, but for women who lack those resources, a primary care provider inquiring about the mothers' support and helping them identify community resources may be an option.

Having an infant with sleep problems had a positive association with postpartum depressive symptoms over the first 6 months after childbirth. This is consistent with other studies on postpartum depression (Beck 2001; Dennis and Ross 2005). It may be that having an infant with sleep problems increases the amount of fatigue a woman experiences after childbirth, which in turn depresses her mood. Some studies have shown an association between infant difficulty and sleep disturbances with postpartum fatigue (Wambach 1998) and between postpartum fatigue and postpartum depression (Corwin et al. 2005).

Limitations

The findings of this study should be interpreted in light of the study limitations. Results can mainly be generalized to employed women with similar demographic and employment characteristics as those studied. Many women in this study had resources sufficient to purchase meals out, if needed, to help when they were too tired or too busy to prepare meals. These resources are not readily available for many new mothers in the United States especially those from poorer socioeconomic backgrounds, suggesting the importance of replicating this study on a more diverse sample of mothers. Postpartum depressive symptoms were measured by self-report and were not validated by medical diagnoses. Thus, interpretation of the findings should be specific to postpartum depressive symptoms and not postpartum depression diagnosis. The length of the survey instrument precluded inclusion of multi-item measures of coworker support, supervisor support, and job satisfaction. Multi-item measures of these constructs would have been more reliable, stable, and precise according to measurement theory (Streiner and Norman 2003). Finally, according to our conceptual model derived from health production theory, women use health services to improve their postpartum health. However, less than five percent of the subjects used health care services during the 6-month observation period, so there was not enough variation in health services use to include this variable in our analyses.

Conclusions

This study constitutes an important contribution to the literature on employed postpartum women especially since the few studies conducted on this population have generally utilized small sample sizes and focused on married, first-time mothers. Working mothers of reproductive years may find the study results valuable as they consider merging their work and parenting roles after childbirth. Intervention studies are needed to assess whether mothers will be better prepared to evaluate their personal and employment situation and take steps that help protect and promote their postpartum health if they first learn about psychosocial risk factors (total workload, infant sleep problems) and protective factors (time control and social support) for postpartum depression. Future studies should

replicate this study on a racially and socioeconomically more diverse sample, examine the specific mechanisms through which total workload affects postpartum depressive symptoms, and evaluate workplace interventions that implement flexible work policies on employed women's risk of postpartum depression.

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