Maternity Leave Duration and Postpartum Mental and Physical Health: Implications for Leave Policies

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Abstract This study examines the association of leave duration with depressive symptoms, mental health, physical health, and maternal symptoms in the first postpartum year, using a prospective cohort design. Eligible employed women, eighteen years or older, were interviewed in person at three Minnesota hospitals while hospitalized for childbirth in 2001. Telephone interviews were conducted at six weeks ($N = 716$), twelve weeks ($N = 661$), six months ($N = 625$), and twelve months ($N = 575$) after delivery. Depressive symptoms (Edinburgh Postnatal Depression Scale), mental and physical health (SF-12 Health Survey), and maternal childbirth-related symptoms were measured at each time period. Two-stage least squares analysis showed that the relationship between leave duration and postpartum depressive symptoms is U-shaped, with a minimum at six months. In the first postpartum year, an increase in leave duration is associated with a decrease in depressive symptoms until six months postpartum. Moreover, ordinary least squares analysis showed a marginally significant linear positive association between leave duration and physical health. Taking leave from work provides time for mothers to rest and recover from pregnancy and childbirth. Findings indicate that the current leave duration provided by the Family and

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Medical Leave Act, twelve weeks, may not be sufficient for mothers at risk for or experiencing postpartum depression.

Introduction

Giving birth constitutes a critical life course transition for most women and their families. At this stage of life, employed women experience a shift in their household composition, family responsibilities, and work demands, as well as changes in their childbirth-related health status. Frankenhaeuser's (1986) psychobiological model of stress posits that an individual's well-being is jeopardized when environmental demands exceed an individual's resources. It is reasonable to expect this kind of stress-triggering situation or imbalance between demands and resources to arise in the months after childbirth, when women have to juggle multiple roles (worker, partner, and mother) while physically recovering from childbirth, providing around-the-clock infant care, and adapting to their "new normal." Struggling to fit the prevailing cultural ideals, the "good mother" and the "good worker" (Moen and Orrange 2002), women might experience high levels of stress, the persistence of which might jeopardize their health. Taking time off from work after childbirth is one strategy that mothers may use to adjust the imbalance between the demands and resources of this transitional period. This study examines the impact of leave duration on maternal health during the first year after childbirth.

Women's share of the US labor force is expected to reach 47 percent by the year 2020 (Toossi 2012). Mothers of infants have significantly contributed to the dramatic rise in women's labor force participation over the past few decades. For example, in comparison with a labor force participation rate of 38 percent in 1980, mothers of infants under three had a 61 percent participation rate in 2010 (US Bureau of Labor Statistics 2012). Despite the relatively high participation rates of working mothers in the workforce, the United States stands out among industrialized nations as having a national childbirth-related leave policy that provides the shortest duration of leave after childbirth and no wage replacement (Kamerman 2000). The Family and Medical Leave Act (FMLA) of 1993 is the only federal policy providing job-protected leave after childbirth. However, it is unpaid and provides only twelve weeks of unpaid leave to eligible employees working for covered employers. In a national US study of employed first-time mothers who gave birth between 2005 and 2007, 58.6 percent were back to work by three months postpartum (Laughlin 2011). Given

these relatively short maternity leaves in the United States, it is important to study their effects on maternal postpartum health. This study examines the impact of leave duration on four health outcomes over the first year after childbirth: postpartum depressive symptoms, maternal mental and physical health, and maternal childbirth-related symptoms.

Policies Pertaining to Postpartum Women

While relatively few policies directly address maternal postpartum health, family, parental, and maternity leave policies indirectly address it, as childbirth-related leave from work provides new mothers with time at home to rest and recover from childbirth and adjust to caring for their infant. The nature and scope of childbirth-related leave policies varies, as revealed in the definitions provided by the Clearinghouse on International Developments in Child, Youth and Family Policies (2002: 2). It defines maternity leaves as "job-protected leaves from employment for employed women at the times they are due to give birth and following childbirth (or adoption in some countries)." Parental leaves are "gender-neutral, job-protected leaves from employment that usually follow maternity leaves and permit either men or women to share the leaves or choose which of them will use it" (ibid.). Paternity leaves are "job-protected leaves from employment for fathers, for many of the same purposes as maternity and parental leaves, but especially for reasons of gender equity" (ibid.). Finally, family leaves are defined as "job- and benefit-protected leaves for working parents including maternity (birth or adoption), paternity, parental, child-rearing, care for an ill-child, time to accompany a child to school for the first time, or to visit a child's school, personal leaves" (ibid.). These policies will be discussed in relation to international and national provisions.

The United States in an International Context

According to article 11 of the 1981 United Nations Convention on the Elimination of All Forms of Discrimination against Women, countries must provide paid maternity leave with protection of seniority and benefits, but the duration of leave that each country should guarantee was not specified (Tinker 1981). A total of 185 countries have signed this convention, but not the United States (Sundbye and Hegewisch 2011). In 1992, the European Union (EU) Pregnant Workers' Directive was issued (Council Directive 1992), under which each of the twenty-seven member

states of the EU[1] must guarantee a minimum of fourteen weeks of paid, job-protected maternity leave as a "health and safety measure," and compensation has to be at least at the statutory sick pay rate.[2] In 1997, the Amsterdam Treaty on European Union was signed by all EU member states and included a directive that mandated all states to provide job- and benefits-protected parental leave of three months duration to men and women employees who had worked a minimum of one year with their employers (Haas 2003). However, individual states were given the discretion as to whether the leave is paid or not, part time or full time, whether one parent is able to transfer it to the other, and whether small employers may be exempt (Haas 2003).

In a comparative study of twenty-one member countries of the Organisation for Economic Co-operation and Development (OECD), Ray, Gornick, and Schmitt (2010) found that the United States lags well behind other industrialized countries in terms of the generosity of parental leave policies. In fact, a recent international comparison spanning 181 countries found that the United States is one of four countries in the world (the others are Papua New Guinea, Swaziland, and Australia) that do not provide paid maternity leave as a statutory right (Heymann and Earle 2010). In January 2011, Australia joined the rest of the industrialized countries (except the United States) in providing paid leave after childbirth (Mahon and Brennan 2012). The Australian law provides eighteen weeks of paid leave at the minimum adult wage for parents who worked at least ten hours per week in the preceding year (Mahon and Brennan 2012).

United States Context

The Family and Medical Leave Act. The primary federal policy that provides support to working US mothers of infants is the FMLA. It was signed into law by President Bill Clinton on February 5, 1993, and has been in effect for most employees since August 5, 1993 (Wisensale 2003). Under this act, the employee is provided a maximum of twelve weeks unpaid, job-protected leave per year for giving birth; taking care of a newborn, a newly adopted child, or a foster child; or attending to an immediate family member with a serious health condition or the employee's own

1. The twenty-seven member states of the European Union are Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

2. All European Union countries have mandatory paid sick leave as a statutory policy.

serious health condition (Public Law 103-3, 107 Stat. 6 [29 U.S.C. 2601 et seq.]). The law also provides for protected job benefits, including health insurance, while the employee is on leave. However, only employees who have worked in the public sector or for a private employer with fifty or more employees for a minimum of 1,250 hours in the previous year are eligible for leave (Public Law 103-3, 107 Stat. 6 [29 USC 2601 et seq.]). These eligibility criteria are satisfied by only 11 percent of private workplaces in the United States and are applicable to only 58 percent of the worker population in private establishments (Cantor et al. 2001). Moreover, females mostly worked in the service industry, which is predominantly composed of small companies (Elison 1997). This meant that a sizable proportion of the female workforce, which the FMLA was initially designed to protect, would not be covered by the law. An additional provision of the FMLA allows the employee to take intermittent leave or leave on a reduced schedule basis under particular circumstances (Public Law 103-3, 107 Stat. 6 [29 U.S.C. 2601 et seq.], section 102 [b]). This leave can be taken in the instances of a serious medical condition experienced by the employee or an immediate family member, and upon certification by a medical provider. However, taking intermittent leave on a reduced-schedule basis after childbirth, to care for a newborn, is allowed only if the employer agrees to it. The FMLA is gender neutral and applies to both mothers and fathers in the United States, in comparison with other industrialized countries, where there are often separate laws for maternity and paternity leave.

The length of leave, specified in the FMLA as twelve weeks, was the result of years of compromise between the stakeholders involved in the FMLA debate. Initially, the bill was drafted to allow for a parental leave of eighteen weeks and a medical leave of twenty-six weeks (Elving 1995). A Harvard pediatrics professor, Berry Brazelton, testified that four months of parental leave were needed for a healthy parent-child relationship because it allowed adequate time for bonding (Elison 1997). However, the medical viewpoint regarding the duration of leave as it affects the mother's recovery from childbirth did not enter into the main discussions of the bill. Rather, the central arguments focused on whether businesses would suffer from a longer duration of leave, especially given the strong opposition of businesses to the passage of such a law (Elving 1995). This contrasts with the policy debates in European countries, where the discussions around the duration of maternity leave were mainly concerned with the physical health of the mother and needs of the child (Galtry and Callister 2005; Kamerman 2000).

The unpaid leave benefit provided by the FMLA was a concession made by sponsors of the bill to ensure its survival in Congress, especially in the Reagan era of "small government" and "neo-laissez-faire" politics

(Elving 1995). The sponsors knew that a mandate on private businesses to grant leave with compensation would be unacceptable to employers. Thus the bill was drafted from the start to provide for unpaid leave even though feminist groups such as the Women's Legal Defense Fund (WLDF) and the National Organization for Women (NOW) would have preferred a paid leave law (Elison 1997; Elving 1995). Women, rather than men, are still the primary child caregivers when time off work is needed (Bianchi 2011; US Department of Labor 2005). Moreover, women contribute 35 percent of combined household income for households with median income earners (US Department of Commerce 2001); thus taking unpaid leave could seriously threaten the family finances. Women also head about 80 percent of single-parent households (which constitute 27 percent of all households), and the loss of paid work could result in no family income at all (Naples 2001). McGovern and colleagues (2000) found that women's duration of maternity leave was primarily determined by access to employers' voluntary paid leave benefits or higher partner earnings. Thus, many working women may not take the duration of leave they need or prefer given that the FMLA benefits are unpaid. This, in turn, may adversely affect maternal recovery from pregnancy and childbirth and may affect mental and physical postpartum health. Many states have laws that expand on some aspect of leave associated with childbirth, such as the Parental Leave Act of Minnesota, the state in which our study was conducted.

Parental Leave Act of Minnesota. Minnesota leads the nation in female labor force participation at 71.2 percent, compared with the national estimate of 59.6 percent according to the Institute for Women's Policy Research (IWPR) (2004). It was one of the first states to promulgate a parental leave law and thus may serve as a model for other states on work-family issues. Additionally, similarities exist between the distribution of Minnesota's employed women and national estimates of occupation, educational preparation, and earnings (IWPR 2004), increasing the relevance of the proposed study findings to other states. For example, the proportion of Minneapolis–St. Paul metropolitan area women in managerial and professional occupations at 33 percent is comparable with that for the nation, at 34 percent. On average, Minnesota women earned $31,900 per year relative to $30,100 nationally. Twenty-six percent of Minnesota women earned a college degree, versus national estimates at 23 percent (IWPR 2004).

The Minnesota Parental Leave Act of 1987 provided eligible employees with six work weeks of unpaid parental leave for care of a newborn or an adopted child and ensured restoration to the same position on return to work (Minn. Stat. Sec. 181.941). This law applies to employers with

twenty-one or more employees, but the employee had to have worked at least on a part-time basis in the twelve consecutive months that immediately precede the leave request. The Minnesota Parental Leave Act requires the employer to reinstate the benefits received before the employee's leave. Although this includes continued coverage for health care premiums, the employer has the discretion to require the employee to pay full costs; by contrast, the FMLA does not give the employer such an option. A state-specific study of a disproportionate random sample of 654 women obtained from the Minnesota Department of Health in 1991 and 1992 found that 75 percent of Minnesota mothers had returned to work at twelve weeks postpartum, and 95 percent had returned to work at six months postpartum (McGovern et al. 1997). Among these Minnesota mothers the average duration of total time off after childbirth for women with paid leave (any combination of paid maternity, vacation, or sick leave) benefits was approximately 10.5 weeks, and for those without any paid leave benefits it was approximately 6.5 weeks (McGovern et al. 2000). Moreover, the mothers lacking paid leave benefits were younger and poorer than their peers with paid leave benefits, suggesting their economic vulnerability to unpaid leave. The discussions during the legislative hearings of the Minnesota Parental Leave Act mainly focused on the impact of leave on employer costs, the importance of job protection for the mother, and only briefly on the need for bonding with the baby (McGovern and Segal 1987). However, there was no mention of the mother's health in any of these discussions.

In 1997, Minnesota enacted an At-Home Infant Care (AHIC) program, which provides partial wage replacement to low-income, working parents for the first year of a child's life (National Partnership for Women and Families 2005). This program provides funding to eligible caretaking parents (i.e., those who are working, looking for work, or going to school in the nine months preceding the application) whose earnings do not exceed 175 percent of the federal poverty level, to stay at home and care for their infants. The maximum amount of subsidy is usually around 90 percent of Minnesota's maximum rate of payment to a licensed family child care provider for providing full-time infant care. Only one parent qualifies for this cash assistance, and the child should be less than one year old (National Partnership for Women and Families 2005). These AHIC programs (also enacted in Montana and New Mexico) are typically limited to employed parents, making AHIC less like the Temporary Assistance for Needy Families (TANF) program and more like paid family and medical leave (National Partnership for Women and Families 2005). In its first thirteen months of implementation, the Minnesota AHIC program served fifty-four

families for five months on average (Minnesota Department of Children, Families, and Learning 1999). Preliminary findings from the evaluation of the Montana AHIC program showed that it resulted in child care cost savings of $114,388 for the state, $90,351 of which stemmed from enhanced ability of parents to care for their other children while at home taking care of their infants (Annie E. Casey Foundation 2003).

The availability of paid leave policies—maternity, family, and parental leave—may influence women's decisions regarding the timing of return to work after childbirth, but there is a need for studies to determine whether such an association exists. Studies that examined the impact of paid and unpaid leave policies on leave duration are described next.

Impact of Leave Policies on Leave Duration

A national US study of employed first-time mothers who had their child delivered between 2005 and 2007 found that 58.6 percent were back at work by three months postpartum, 14.3 percent between three and six months, and 6.3 percent between six and twelve months (Laughlin 2011). A study of the impact of the FMLA and other unpaid state leave policies on leave taking of parents after childbirth, using 1991–1999 data from the Survey of Income and Program Participation, found that these unpaid leave laws (number of job-protected leave weeks allowed by each state) were associated with increased probability of leave taking as well as longer leaves among mothers (these associations disappeared when controlling for state fixed effects), but not among fathers (Han and Waldfogel 2003). By contrast, another study of the impact of the FMLA on mothers' employment patterns, using longitudinal data (1984–1997) from the Panel Study of Income Dynamics, found that working mothers who gave birth after the passage of the FMLA returned to work more quickly and were more likely to go back to the same employer than those who delivered in the pre-FMLA period (Hofferth and Curtin 2006). This finding was interpreted by the authors as implying that instead of women taking longer leaves and searching later for new jobs, as they did before the FMLA was passed, they have an incentive to take shorter leaves and return to their same job. National survey data of covered establishments show that 52 percent of employees who utilized FMLA leave in 2000 did so because of personal ill health and that only 18.5 percent took leave to care for a newborn or a newly adopted child (Cantor et al. 2001). Over half of the leaves taken for child care were for ten days or less. The unpaid nature of the FMLA appears to make it less feasible for parents to take longer periods of leave.

Next is a discussion of the literature examining the impact of leave duration on women's health after childbirth.

Impact of Leave Duration on Postpartum Health

Taking time off after childbirth is one of the "adaptive strategies" (Moen and Wethington 1992) that women may use in response to the mismatch between resources and demands typical of this transition period. The first year after childbirth holds a high risk of depression for women. The most frequently cited postpartum depression prevalence is from a 1996 meta-analysis by O'Hara and Swain, suggesting an average of 13 percent among all pregnancies. This disorder is characterized by a number of debilitating symptoms similar in clinical presentation to other major depressive disorders (Wisner, Parry, and Piontek 2002). According to the *Diagnostic and Statistical Manual of Mental Disorders-IV* (*DSM-IV*), postpartum depression begins within four weeks after childbirth (American Psychiatric Association 2000). However, multiple studies have shown that the first three months after childbirth carry the highest risk of postpartum depression (Horowitz and Goodman 2004; Stowe, Hostetter, and Newport 2005), that depression may start as late as three to six months postpartum (Beeghly et al. 2002; Goodman 2004; Stuart et al. 1998), and that it may last beyond the first year after childbirth if untreated (Cooper and Murray 1998). Moreover, a number of longitudinal studies contested the traditional medical perspective of a six-week postpartum period, the time required for women's reproductive organs to go back to their nonpregnant state, as they found that most women continue to experience several minor to moderate physical discomforts for many weeks and months after childbirth (e.g., fatigue, back or neck pain, respiratory symptoms, headaches, breast soreness, cesarean section or episiotomy discomfort, constipation, and sexual concerns) (Brown and Lumley 1998; Killien, Habermann, and Jarrett 2001; McGovern et al. 2011). Thus women may need longer periods than the conventional six weeks to recover from delivery and childbirth.

A number of studies investigated the impact of leave taken from work after childbirth and women's mental health outcomes. A study of 436 white, married, first-time mothers who delivered in one of two hospitals in St. Paul, Minnesota, found, using the Mental Health Inventory, that taking more than twenty-four weeks of leave after childbirth, in comparison with nine weeks of leave or less, was associated with better mental health at nine and twelve weeks postpartum (Gjerdingen and Chaloner 1994). Another study of a sample of 266 partnered and mostly white women from Wisconsin followed through four months postpartum found, using the Center

for Epidemiologic Studies Depression Scale (CES-D), that taking six weeks of leave versus twelve weeks was related to higher depression scores only among mothers reporting high marital concerns and unrewarding jobs (Hyde et al. 1995). A similar study that used follow-up data at one year postpartum of the sample studied by Hyde and colleagues (1995) found that longer leaves were associated with higher depression scores among mothers with higher ranking on work role involvement than family role involvement (Klein et al. 1998). Another study of 123 partnered/married, primiparous, and mostly white women from the Pacific Northwest found an association between longer leave duration and increased gratification with maternal role at eight months after childbirth. However, no associations were found between leave duration and parental stress or with maternal separation anxiety (Killien 1998). A study by McGovern and colleagues (1997) that used a disproportionate random sample of 654 women from the Minnesota Department of Health data found that leave duration of more than fifteen weeks after childbirth was associated with better mental health at seven months postpartum, as measured by the Mental Health Index (Short-form) from the Medical Outcomes Study (Stewart, Hays, and Ware 1988). In contrast to the previously mentioned studies, this study controlled for the potential endogeneity of maternity leave duration using instrumental variables (McGovern et al. 1997). A study that used a large and nationally representative sample of 1,762 mothers from the National Maternal and Infant Health Survey of 1988 reported that a one-week increase of maternity leave duration was associated with a 6–7 percent decrease in depressive symptoms (CES-D) six to twenty-four months postpartum, using state-level leave policies and labor market conditions as identifying instruments for leave duration (Chatterji and Markowitz 2005). However, the two-stage least squares (2SLS) coefficient for leave was only marginally significant. A more recent study by the same authors (Chatterji and Markowitz 2012) using national data from the Early Childhood Longitudinal Study Birth Cohort (ECLS_B) on 3,350 mothers found in ordinary least squares (OLS) regression results that taking less than twelve weeks of maternity leave increases postpartum depressive symptoms (as measured by the CES-D) by 15 percent, and increases the likelihood of being categorized as severely depressed by two points, at nine months after childbirth. However, there were no significant associations between leave duration and depressive symptoms in 2SLS analyses. In addition, a secondary analysis that limited the sample to 2,200 married mothers showed that fathers' leave taking was not significantly associated with maternal depressive symptoms or depression severity and that including paternity

leave taking in the models did not change the relationship between maternity leave and depressive symptoms (Chatterji and Markowitz 2012).

The above-mentioned studies point to a potential association between duration of leave taken from work after childbirth and maternal mental health outcomes. However, these studies have limited generalizability, as most of them focus on married and first-time mothers. In addition, only four of these studies have examined the association between duration of maternity leave and postpartum depression; these were at four months (Hyde et al. 1995), one year (Klein et al. 1998), six to twenty-four months (Chatterji and Markowitz 2005), and nine months (Chatterji and Markowitz 2012) after childbirth. All four studies used the Center for Epidemiological Studies Depression Scale, which is not specifically designed to measure postpartum depressive symptoms. Moreover, only two of these studies controlled for the potential endogeneity of leave duration (Chatterji and Markowitz 2005, 2012). The present article investigates the impact of duration of leave taken from work after childbirth on employed women's postpartum depressive symptoms over the first year after childbirth, using the Edinburgh Postnatal Depression Scale and controlling for the endogeneity of leave duration. In addition, this study examines the impact of leave duration on women's mental health, using the Short Form-12 (SF-12) Mental Summary Score (Ware et al. 2002).

Very little literature examines the association between leave duration and physical health after childbirth. In general, the few studies that examined these relationships found no association between taking time off after childbirth and physical health measures. For example, Killien, Habermann, and Jarrett (2001) studied 149 employed, partnered women residing in an urban area in the northwestern United States and found no associations between week of return to employment and a summary indicator of health status (including clinical health/symptom experiences, role performance, and global perception of health) at four months, eight months, and twelve months postpartum. Similarly, Romito, Saurel-Cubizolles, and Cuttini (1994) studied 141 employed Italian first-time mothers and found no associations between length of leave and extreme tiredness, backache, or lack of sleep. Along the same line, Chatterji and Markowitz (2005) did not find in their analyses of the National Maternal and Infant Health Survey any associations between leave duration and other health indicators (number of outpatient physician or clinic visits) in the first six months postpartum. In contrast, the study by McGovern and colleagues (1997) showed a U-shaped association between time off work and maternal health: women who took twelve weeks of leave or more had greater vitality at seven months after childbirth, and those who took twenty weeks of leave or more had fewer

limitations to their daily roles. This study examines the association of leave duration with two measures of physical health, the SF-12 Physical Summary Score (Ware et al. 2002) and maternal childbirth-related symptoms, over the first postpartum year.

Theoretical Framework

The theoretical framework guiding this study is a hybrid model of health and workforce participation adapted from Becker's (1965) household production theory and Grossman's (1972) health production function theory. Becker's theory emphasizes the dynamics of women's choices to allocate time between market work and work at home, and Grossman's theory establishes that an individual's level of health partly depends on the resources allocated to its production and the efficiency with which it is produced. The main assumption of the hybrid model is that health is determined by genetic endowment, other "predetermined factors," and personal choices. For example, women's postpartum health status (e.g., postpartum depression) is a function of predetermined factors, such as demographics, in addition to personal choices. Women may choose the duration of leave from work after childbirth as an input to the production of their postpartum health subject to constraints such as income and employer leave policies.

Methods

Study Design and Population

This study utilizes data from the Maternal Postpartum Health Study, a nonrandomized, prospective cohort study (McGovern et al. 2006). The study population consisted of all women, eighteen years or older, who delivered a live, singleton infant at three community hospitals in the Twin Cities (Minneapolis and St. Paul) metropolitan area of Minnesota in 2001. Two of these hospitals were private, nonprofit, tertiary-care hospitals from the St. Paul area; one was urban and the other was suburban. The third was a private, nonprofit hospital, located in a Minneapolis suburb characterized by an ethnically diverse, working-class population.

Analyses comparing the demographics and birth factors for the 3,465 birth mothers at study hospitals to the 22,470 birth mothers at other hospitals in 2001, using vital statistics data, showed the following factors to be comparable between the study population and all birth mothers, age eighteen years and older, residing in the general Twin Cities metropolitan community: age at childbirth, marital status, average number of previous

live births, the average gestational age for infants, and birth weight. However, the study hospitals included more Asian mothers, a slightly lower proportion of African American mothers, and a lower proportion of mothers having cesarean deliveries relative to other hospitals in the Twin Cities. While statistically significant, group differences were negligible in practical terms.

Sample Selection and Data Collection

Sample selection criteria included the following. Women must have given birth to a live infant at the participating hospitals and have kept the infant rather than giving it up for adoption. Other infant-related criteria included having a generally healthy infant—that is, having a pregnancy that lasted no less than thirty-two weeks, and an infant who weighed more than 1,500 grams and had no reported serious neonatal complications or congenital anomalies. Moreover, women had to have been continuously employed a minimum of twenty hours per week for three months in the year before childbirth and had to have planned to return to work after childbirth. Women also had to be able to speak English because of the prohibitive costs of translating the study instruments.

All mothers from the three selected hospitals who met the sample selection criteria were invited to participate in the study. A total of 2,736 women who gave birth at these hospitals in 2001 were approached. Among those, 581 women were ineligible because they did not meet demographic or health criteria of the study, and 998 were ineligible because of employment-related criteria. Out of an eligible population of 1,157, a sample of 817 women agreed to participate and were interviewed during early stages of labor or prior to hospital discharge, constituting a 71 percent enrollment rate. Refusals were mainly because of women's time constraints or lack of interest.

This study was approved by the institutional review boards for the protection of human subjects at all three participating hospitals and the University of Minnesota before data collection began. Hospital labor and delivery nurses screened the medical charts for all maternal admissions. For those women who met study selection criteria, the nurses abstracted selected prenatal, labor, and delivery information from the medical chart. Out of 340 nonparticipants, 295 women consented to the use of their medical chart data for comparison purposes. Comparisons of participants to refusals using chi-square analyses and *t*-tests showed no differences in regard to infant birth weight, duration of gestation, maternal age, marital

status, duration of employment for the participants' main employer, and number of hours worked per week before childbirth.

Telephone interviews were conducted with the 817 women enrollees at six weeks, twelve weeks, six months, and twelve months after childbirth, with cooperation rates of 88 percent ($N = 716$), 81 percent ($N = 661$), 77 percent ($N = 625$), and 70 percent ($N = 575$) for each time period, respectively. The interviews were conducted using four-week and three-month windows (i.e., four to eight weeks postpartum; ten to fourteen weeks postpartum; five to seven months postpartum; and eleven to thirteen months postpartum); the windows of time for measurement reflected clinically meaningful intervals for new mothers. The interviewers used structured questionnaires that included reliable and valid measures for the different concepts. Each telephone interview lasted around forty-five minutes.

The rationale for collecting data at the selected time periods related to changes in women's work patterns after childbirth and the potential impact of these changes on their health. First, parental leave law in the state of Minnesota grants six weeks of unpaid leave to eligible women working at qualifying firms, and most temporary disability insurance policies provide six weeks of paid leave to covered individuals. Next, the federal Family Medical and Leave Act grants eligible women at qualifying firms the right to twelve weeks of unpaid leave. Thus both six weeks and twelve weeks after childbirth constitute critical intervals for women concerning return to work and changing workloads. In addition, six months after childbirth is another critical interval, as previous research in Minnesota revealed that 95 percent of all women returned to work at six months after childbirth (McGovern et al. 1997). Data collection at twelve months aimed to evaluate whether Gjerdingen and colleagues' (1993, 1994) findings of health effects associated with postpartum recovery and return to work at twelve months after childbirth for a sample of married, first-time mothers could be replicated in more diverse samples such as this sample, which includes single and multiparous mothers.

Analytical Sample

We limited our analyses to study participants who filled out the six-week questionnaire in order to have baseline survey data on all women included in these analyses. Thus out of 817 enrollees in the study, 101 cases were dropped from the analyses because they had no survey data at six weeks. Statistical comparisons of the analytical sample ($N = 716$) to the dropped cases ($N = 101$) showed no differences in regard to parity, duration of gestation, and number of hours worked per week before childbirth. Dropped

cases were significantly younger (27.7 vs. 29.9 years), had lower infant birth weight (3,390 g vs. 3,506 g), had a shorter duration of employment for their main employer (2.9 vs. 4.2 years), and had a lower household income ($65,055 vs. $73,244). They also were significantly more likely to be single (48.5 percent vs. 25.8 percent), less likely to have a college degree (22.8 percent vs. 46.2 percent), and less likely to be white (65.3 percent vs. 85.9 percent). Moreover, dropped cases compared with six-week study participants were significantly less likely to return to work at six weeks (2.0 percent vs. 7.2 percent), twelve weeks (18.4 percent vs. 39.5 percent), six months (11.2 percent vs. 41.5 percent), and twelve months (4.1 percent vs. 4.8 percent); moreover, they were more likely to never return to work (64.3 percent vs. 7.1 percent). However, there were no significant differences between dropped cases[3] and six-week participants in postpartum depression scores, mental health, physical health, and childbirth-related symptoms at twelve weeks, six months, and twelve months postpartum. The size of the analytical sample at each period was 716 at six weeks, 638 at twelve weeks, 603 at six months, and 554 at twelve months after childbirth.

Measures

Data on the dependent and explanatory variables were collected using telephone interviews at six weeks, twelve weeks, six months, and twelve months after childbirth. Data for potentially confounding covariates (control variables) were collected at enrollment or five weeks postpartum as detailed below.

Maternal Postpartum Depressive Symptoms. This is one of the dependent variables in this study, measured at each of the study periods using the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, and Sagovsky 1987). This scale consists of ten short statements about how the mother felt during the past seven days, with four response categories ranging from 0 to 3 according to increased severity of the symptoms. At six weeks, twelve weeks, six months, and twelve months this measure had internal consistency reliabilities (Cronbach's alpha) of 0.82, 0.83, 0.84, and 0.86, respectively. The EPDS has been found to have satisfactory validity in identifying mothers with postpartum depression, where a threshold score of 12 to 13 identified women with Definite Major Depressive Illness

3. We had data on health outcomes for only 30 out of 101 of the dropped cases; thus our reporting of no differences in health outcomes between dropped cases and six-week participants is based on available data on only 29.7 percent of the dropped cases.

according to Research Diagnostic Criteria (Cox, Holden, and Sagovsky 1987). A recent study comparing identification rates of maternal postpartum depression using the EPDS scale versus routine clinical evaluation found a significantly higher likelihood of identification by the former (Fergerson, Jamieson, and Lindsay 2002).

Maternal Physical and Mental Health. Physical and mental health were two dependent variables measured at each of the study periods using the SF-12 (Version 2), a twelve-item measure of general health that does not target a specific age or disease group. This measure includes the Physical Component Summary (PCS) and Mental Component Summary (MCS) scales (Ware et al. 2002). The PCS consists of six items that address four content domains of general physical health: physical functioning (two items), bodily pain (one item), general health (one item), and role limitations because of physical health (two items). The MCS consists of six items that address four content domains of general mental health: social function (one item), mental health (two items), vitality (one item), and role limitations because of emotional health (two items) (Ware et al. 2002). The MCS and PCS item sets can each be summed into a score that ranges from 0 to 100. These measures are internationally recognized for their validity and reliability (Ware et al. 2002). Because the SF-12 is standardized and norm-based, scores above and below 50 are above and below the average, respectively, in the general US population, and higher scores denote better health (Ware et al. 2002).

Maternal Childbirth-Related Symptoms. In this study maternal childbirth-related symptoms comprised a dependent variable that was measured at each of the study periods using a physical problem checklist adapted from Gjerdingen and colleagues (1993). It asks women to report the presence of problems such as breast symptoms, vaginal discomfort, hemorrhoids, and fatigue. It is scored as a simple summation of symptoms experienced in the preceding four weeks, consistent with the recall period of the SF-12 v.2. The summary score evaluated the presence of twenty-eight symptoms frequently experienced during the postpartum period, representative of the major body systems or constitutional in nature (e.g., skin, respiratory, cardiovascular, gastrointestinal, genito-urinary, musculoskeletal, and endocrine).

Leave Duration

Number of days on leave after childbirth was measured using the question "How long were you on leave after the baby was born, including any

part-time leave?" This question was asked at each of the four periods after childbirth. The measure was originally adapted from Cantor and colleagues (2001). This is an endogenous variable, as it is a choice made by the woman contingent on her employer's policy, her financial status, and her health status. This variable was coded in the analysis in a cumulative fashion. For example, someone who had been on leave for sixty days was coded as having had forty-two days of leave at six weeks after childbirth, even though this person's leave extends to the twelve-week period, where they would be coded as having had sixty days of leave. The squared form of this leave variable was also included in the analyses to determine whether the relationships between leave duration and the dependent variables were nonlinear.

Control Variables. Based on a priori causal assumptions, several covariates that could confound the relationship between leave duration and maternal postpartum health outcomes were included as control variables. These control variables included maternal sociodemographic characteristics and prenatal moods of depression and anxiety.

Maternal Sociodemographic Characteristics. Age was abstracted from the medical chart. The measure of race was adapted from a measure of the US Census Bureau (2001) and subsequently coded as (1 = white; 0 = nonwhite). Measures of education (1 = college graduate; 0 = not a college graduate), annual household income, and parity (1 = multiparous; 0 = primiparous) were adapted from the National Health Interview Survey (Ries 1991). Household income was defined as income from all sources in the year before childbirth. Data on all of these variables were collected in person at enrollment. The measure of marital status was adapted from the National Health Interview Survey (Ries 1991) and assessed at six weeks postpartum. It was subsequently coded as (married = 1, else = 0; partnered = 1, else = 0; single = reference). Occupation was classified with reference to Alphabetical Index of Industries and Occupations (1990) three-digit occupational codes. Ultimately, occupation was coded as a dummy variable in the analyses (blue-collar/service = 1, else = 0; clerical = 1, else = 0; professional = reference). All of these variables are considered predetermined.

Prenatal Moods. This predetermined variable was created by Dr. Dwenda Gjerdingen and validated by McGovern and colleagues (1997). It consists of one item: "During this pregnancy did you ever have a problem with your

mood, such as feeling depressed or anxious?" Data on this variable were collected in person at enrollment.

Estimation and Empirical Models

There are two potential sources of bias in our estimates of the effect of leave on the dependent variables: (1) omitted variables and (2) reverse causality. Duration of leave is, in part, a choice made by the mother; however, this choice may be influenced by a number of factors, including the employer's leave policy, the mother's financial status, and how much support she has with child care. If one or more of these variables affects both leave duration and any of the dependent variables in the analysis and is not controlled, the result is "omitted variable bias" (spurious correlation). Reverse causality arises if a dependent variable (e.g., postpartum depression) exerts a causal influence on leave duration.

We first tested for the endogeneity of leave duration using the Hausman test. The Hausman test requires a variable or "instrument" that predicts leave duration but is not correlated with the error term in the dependent variable equation. We allowed for a nonlinear relationship between leave duration and women's postpartum health by adding the square of leave duration to each equation. Since squared leave may also be endogenous, two instruments are required.

We have two instruments in our data: the maximum available duration of all paid leave according to employer policy including vacation, sick, maternity, or disability leave (Mean $_{\text{days}}$ = 46.38, SD = 39.73, Range = 0–273 days) and the maximum available duration of job-protected leave according to employer policy (Mean $_{\text{days}}$ = 124.97, SD = 134.80, Range = 0–1,825 days). These two variables have been shown to predict duration of leave (McGovern et al. 1997, 2000). We conducted a joint significance test for these two instruments, and the F-statistic was 50.37 (p = 0.000). Thus these instruments are good predictors of leave duration. Moreover, these instruments are not theoretically related to women's postpartum health except through the actual duration of leave after childbirth. These instruments would be invalid if women chose workplaces because of leave policies and based on prior health status. However, these women have worked an average of four years (Mean = 4.2, SD = 4.0) with their employer before childbirth (87 percent of the women worked one year or more), so it is unlikely that they were making short-term employment decisions.

The Durbin-Wu-Hausman test rejected the null hypothesis of exogenous leave duration and exogenous squared leave in the postpartum depression

equation (Chi-sq (2) = 17.15; $p = 0.00019$); however, it was not significant for the mental health, physical health, and childbirth-related symptoms equations. Thus we estimated the postpartum depression equation with two-stage least squares (2SLS) regression using the two instruments discussed above, and used ordinary least squares (OLS) regression to estimate the remaining health outcome equations. However, we show both 2SLS and OLS regression coefficients in all the tables to allow the reader to compare the results for all outcome variables.

Results

Descriptive Statistics

Table 1 shows the demographic characteristics of the participants for all study periods. These variables were measured once at baseline, and the statistics represent the demographics of those who answered the survey at each time period.[4] The majority of women in the study sample ($N = 716$) were white (85.9 percent) and married (73.2 percent), with annual household incomes of $50,000 or higher (72 percent). The sample mean age was thirty years (SD = 5.3), 46.2 percent had a college degree or higher, 46.5 percent were first-time mothers, and 46.5 percent reported prenatal moods. Women had worked an average of 4.2 years (SD = 4.0; Range = 0.04–21) for their current employer, and 38.1 hours per week (SD = 8.5; Range = 20–80) before delivery. In the first year after childbirth, 7.1 percent ($N = 51$) of the women had returned to work by six weeks, 46.2 percent ($N = 331$) by twelve weeks, 87.3 percent ($N = 625$) by six months, and 92.0 percent ($N = 659$) by twelve months postpartum. The mean duration of leave taken over the twelve-month period after childbirth was 72.51 days (SD = 40.57, Range = 2–365).

Table 2 shows the mean scores for each of the dependent variables. On average, over all the study periods ($N = 2,511$), the mean postpartum depression score was 4.36 (SD = 4.03, Range = 0–24). The proportion of women who met the threshold of 12.5 for the Edinburgh Postnatal Depression Scale was 5.6 percent ($N = 40$) at six weeks, 4.7 percent ($N = 30$)

4. Logistic regression, with response status at each time period as the dependent variable and demographics as the explanatory variables, was used to estimate attrition from the sample. At twelve weeks postpartum, attrition did not differ by demographic characteristics, while at six months postpartum those who responded to the survey were significantly more likely to be in a professional occupation and to be married or partnered. At twelve months postpartum, responders were significantly more likely to be in a professional occupation and to have reported no prenatal moods.

Table 1 Participant Demographics at Each of the Study Periods

Variable	6 Weeks (N = 716)	12 Weeks (N = 638)	6 Months (N = 603)	12 Months (N = 554)
Age				
Mean (SD)	29.90 (5.28)	30.05 (5.26)	30.13 (5.13)	30.20 (5.13)
Range	18–45	18–45	18–45	18–45
Marital Status (%)				
Single	10.5	10.0	8.1	8.4
Partnered	16.3	15.4	15.3	14.3
Married	73.2	74.6	76.6	77.3
College Degree (%)				
1 = Yes	46.2	48.7	49.6	51.3
Income (%)				
$0–24,999	6.4	6.3	5.8	4.5
$25,000–49,999	21.6	20.4	19.4	20.0
$50,000–74,999	25.3	24.6	24.9	25.5
$75,000–99,999	29.1	30.4	30.7	31.4
> $100,000	17.6	18.3	19.2	18.6
Race (%)				
1 = White	85.9	87.0	87.6	88.4
Occupation (%)				
Blue-Collar	14.4	13.5	12.6	13.4
Clerical	39.2	37.8	37.3	34.8
Professional	46.4	48.7	50.1	51.8
Parity (%)				
1 = Multiparous	53.5	54.2	53.9	53.8
Prenatal Moods (%)				
1 = Yes	46.5	46.1	44.8	44.4

Source: Authors' calculations

at twelve weeks, 4.1 percent (N = 25) at six months, and 5.8 percent (N = 32) at twelve months postpartum. On average, over all the study periods (N = 2,713), the mean mental health score was 50.32 (SD = 7.49, Range = 9.24–71.27), and the mean physical health score was 54.38 (SD = 6.31, Range = 9.31–72.90). Moreover, the mean maternal symptoms score averaged 4.72 (SD = 3.47, Range = 0–18) over all the study periods (N = 2,511).

Multivariate Analyses

Ordinary least squares and two-stage least squares regressions were conducted to examine the impact of leave duration on each of the dependent

Table 2 Descriptive Characteristics of the Dependent Variables at Each of the Study Periods

Health Outcome Variables (Theoretical scores)	6 Weeks	12 Weeks	6 Months	12 Months
Postpartum Depressive Symptoms (0–30)				
Mean (SD)	4.86 (3.91)	4.19 (3.95)	4.21 (4.03)	4.04 (4.27)
Range	0–21	0–23	0–23	0–24
Maternal Mental Health (0–100)				
Mean (SD)	49.42 (7.58)	50.43 (7.33)	50.42 (7.47)	51.08 (7.51)
Range	15.05–65.97	9.24–63.02	14.80–71.27	19.11–64.78
Maternal Physical Health (0–100)				
Mean (SD)	51.38 (7.20)	55.79 (5.16)	55.16 (5.86)	55.41 (5.69)
Range	19.16–67.68	19.82–72.90	9.31–67.78	20.01–68.80
Maternal Symptoms (0–28)				
Mean (SD)	6.11 (3.46)	4.17 (3.20)	4.65 (3.39)	3.62 (3.28)
Range	0–18	0–16	0–17	0–17

Source: Authors' calculations

variables: postpartum depressive symptoms, mental health, physical health, and maternal childbirth-related symptoms (tables 4 to 7, respectively). Table 3 presents the results of first-stage regressions of instrumental variables predicting leave duration.

Dependent Variable: Postpartum Depressive Symptoms. OLS analyses showed no significant association between leave duration and postpartum depression scores; however, 2SLS[5] analyses showed that the estimated relationship between leave duration and postpartum depressive symptoms is significant and U-shaped, with a minimum at 180 days, or approximately six months (table 4). In general, significant effects of leave duration in OLS analyses become nonsignificant in 2SLS analyses because the estimated coefficients become smaller and the associated standard errors become larger. The postpartum depression equation results showed an exception to this pattern: both the estimated coefficients and the associated standard errors became larger, suggesting the presence of an omitted confounder in the OLS analyses that was positively associated with leave duration and

5. A three-stage least squares analysis was also conducted, as it provides more efficient estimates when both omitted variables and simultaneity bias exist. The estimated coefficients and standard errors of leave duration and leave squared were the same as those estimated by 2SLS for postpartum depressive symptoms.

Table 3 Results of the First-Stage Regressions of Instrumental Variables Predicting Leave Duration

Explanatory Variables	β (PPD)	SE (PPD)	95% CI (PPD)		β (MPC)	SE (MPC)	95% CI (MPC)	
Total Paid Leave Policy (days)	0.0919***	0.0174	0.0577	0.1261	0.1124***	0.0169	0.0793	0.1455
Total Job-Protected Leave Policy (days)	0.0403***	0.0048	0.0310	0.0497	—	—	—	—
Prenatal Moods	0.8577	1.2919	−1.6756	3.3911	0.8923	1.2770	−1.6118	3.3963
Age (years)	0.6369***	0.1482	0.3463	0.9275	0.6738***	0.1442	0.3911	0.9564
Education (1 = College educated)	−0.9784	1.5811	−4.0787	2.1220	0.5185	1.5657	−2.5517	3.5886
Race (1 = White)	3.2855	2.0712	−0.7760	7.3470	3.6681†	2.0331	−0.3185	7.6546
Income								
$0–24,999 (Reference)	—	—	—	—	—	—	—	—
$25,000–49,999	−3.9938	3.1312	−10.1339	2.1462	−3.3555	3.0450	−9.3264	2.6154
$50,000–74,999	−1.4292	3.4718	−8.2373	5.3788	0.4396	3.3769	−6.1821	7.0613
$75,000–99,999	−1.1314	3.6386	−8.2665	6.0037	−0.3311	3.5371	−7.2669	6.6046
>$100,000	0.4698	3.8364	−7.0532	7.9929	−0.2100	3.7415	−7.5465	7.1265
Occupation								
Professional (Reference)	—	—	—	—	—	—	—	—
Blue-Collar	−8.9098***	2.1715	−13.1679	−4.6518	−10.6971***	2.1445	−14.9022	−6.4920
Clerical	−2.3775	1.5699	−5.4559	0.7010	−4.1170**	1.5433	−7.1432	−1.0907

Table 3 (*continued*)

Explanatory Variables	β (PPD)	SE (PPD)	95% CI (PPD)		β (MPC)	SE (MPC)	95% CI (MPC)	
Marital Status								
Single (Reference)	—	—	—	—	—	—	—	—
Married	3.6448	2.7006	−1.6509	8.9404	4.2533	2.6276	−0.8991	9.4057
Partnered	3.0148	2.6711	−2.2231	8.2527	3.2062	2.5893	−1.8712	8.2835
Parity (1 = Multiparous)	−3.0465*	1.3408	−5.6758	−0.4172	−2.8261*	1.3205	−5.4154	−0.2366
Time Period								
6 weeks (Reference)	—	—	—	—	—	—	—	—
12 weeks	23.9440***	1.7051	20.6003	27.2877	23.6189***	1.7154	20.2553	26.9826
6 months	33.7924***	1.7317	30.3968	37.1881	33.5483***	1.7366	30.1431	36.9536
12 months	37.0234***	1.7625	33.5673	40.4795	36.5526***	1.7319	33.1566	39.9486

Source: Authors' calculations

Notes: β = unstandardized coefficient; SE = standard error;$_{(PPD)}$ = first equation estimates generated for the postpartum depression equation; $_{(MPC)}$ = first equation estimates generated for Mental health, Physical health, and Childbirth-related symptoms equations.

†$p < 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

$N_{(PPD)} = 2{,}455$, $F_{(PPD)} = 48.57$, Prob > $F_{(PPD)} = 0.0000$, adjusted R-squared $_{(PPD)} = 0.2587$; $N_{(MPC)} = 2{,}645$, $F_{(MPC)} = 47.28$, Prob > $F_{(MPC)} = 0.0000$, adjusted R-squared $_{(MPC)} = 0.2293$

Table 4 Results of OLS and 2SLS Analyses of the Association between Leave Duration and Postpartum Depressive Symptoms (N = 2,455)

Explanatory Variables	$\beta_{(OLS)}$	$SE_{(OLS)}$	95% $CI_{(OLS)}$		$\beta_{(2SLS)}$	$SE_{(2SLS)}$	95% $CI_{(2SLS)}$	
Leave Duration	−0.0018	0.0054	−0.0123	0.0088	−0.1075***	0.0311	−0.1685	−0.0465
Leave Squared	$-3.93e^{-06}$	0.00002	−0.00004	0.00003	0.0003*	0.0001	0.0001	0.0005
Prenatal Moods	2.0563***	0.1597	1.7431	2.3695	2.1878***	0.1787	1.8374	2.5382
Age (years)	0.0182	0.0181	−0.0173	0.0538	0.0543*	0.0223	0.0107	0.0980
Education (1 = College educated)	−0.0931	0.1944	−0.4743	0.2882	0.0286	0.2130	−0.3892	0.4463
Race (1 = White)	−1.0317***	0.2555	−1.5327	−0.5307	−0.9175***	0.2775	−1.4617	−0.3733
Income								
$0–24,999 (Reference)	—	—	—	—	—	—	—	—
$25,000–49,999	1.0103**	0.3857	0.2541	1.7666	1.1285**	0.4222	0.3007	1.9563
$50,000–74,999	−0.6026	0.4284	−1.4426	0.2375	−0.1841	0.4865	−1.1381	0.7698
$75,000–99,999	−0.2288	0.4479	−1.1071	0.6495	0.2714	0.5161	−0.7406	1.2834
> $100,000	−0.5509	0.4720	−1.4764	0.3747	0.0744	0.5524	−1.0089	1.1577
Occupation								
Professional (Reference)	—	—	—	—	—	—	—	—
Blue-Collar	0.1336	0.2701	−0.3961	0.6633	−0.6571†	0.3584	−1.3598	0.0457
Clerical	−0.1249	0.1934	−0.5042	0.2544	−0.2487	0.2123	−0.6650	0.1676

Table 4 (*continued*)

Explanatory Variables	β (OLS)	SE (OLS)	95% CI (OLS)		β (2SLS)	SE (2SLS)	95% CI (2SLS)	
Marital Status								
Single (Reference)	—	—	—	—	—	—	—	—
Married	−0.4066	0.3339	−1.0614	0.2482	−0.3207	0.3648	−1.0360	0.3946
Partnered	−0.9989**	0.3297	−1.6455	−0.3524	−0.8854*	0.3606	−1.5926	−0.1783
Parity (1 = Multiparous)	0.2671	0.1652	−0.0569	0.5910	0.0416	0.1876	−0.3263	0.4096
Time Period								
6 weeks (Reference)	—	—	—	—	—	—	—	—
12 weeks	−0.5800*	0.2271	−1.0254	−0.1347	1.0830*	0.5017	0.0992	2.0668
6 months	−0.4615†	0.2391	−0.9304	0.0074	1.5811**	0.5931	0.4181	2.7441
12 months	−0.6631**	0.2410	−1.1357	−0.1905	1.1716*	0.5629	0.0678	2.2754

Source: Authors' calculations

Notes: β = unstandardized coefficient; SE = standard error; (OLS) = estimates generated using ordinary least squares regression; (2SLS) = estimates generated using two-stage least squares regression; adjusted R-squared (OLS) = 0.1147

†$p < 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

negatively associated with postpartum depression scores or vice versa, and using 2SLS corrected the bias. The results of 2SLS analyses can be illustrated in the following equation, where PPD stands for the dependent variable postpartum depressive symptoms, and LD stands for leave duration: PPD = −0.108 LD + 0.0003 LD-squared. To find the postpartum depressive symptoms minimizing value of leave duration (LD), we need to differentiate PPD with respect to LD and set the derivative equal to zero. This results in the equation −0.108 + 0.0006 LD = 0. Thus LD = 180 days, which is approximately six months. This is a minimum because the second derivative of PPD with respect to LD is positive (0.0006).

Therefore, on average, in the first postpartum year every additional day of leave results in a decrease in postpartum depressive symptoms until six months postpartum. After six months, the relationship reverses and every additional day of leave results in an increase in postpartum depressive symptoms. However, we acknowledge that while we measured leave continuously, we measured postpartum depression at discrete intervals; thus there is a possibility that the relationship between leave duration and postpartum depression symptoms may not be continuous. To illustrate this relationship we depicted the variation of postpartum depressive symptoms by leave duration over the first year after childbirth, using predicted values from the regression, in a graph (fig. 1). *T*-tests showed that women who were back to work in the first six months after childbirth (i.e., by six weeks, twelve weeks, or six months) had higher depressive symptoms than those who were still on leave (Mean $_{6\ \text{weeks}}$ = 6.51 vs. 4.74, *p*-value = 0.000; Mean $_{12\ \text{weeks}}$ = 5.24 vs. 3.30, *p*-value = 0.000; Mean $_{6\ \text{months}}$ = 4.41 vs. 3.43, *p*-value = 0.0012). However, at twelve months postpartum this relationship reversed: those who were back to work had lower depressive symptoms than those who were still on leave (Mean $_{12\ \text{months}}$ = 3.97 vs. 4.90, *p*-value = 0.0012). However, these results should be interpreted with caution, as 87.3 percent (*N* = 625) of the women returned to work by six months postpartum, and 92.0 percent (*N* = 659) were back to work by twelve months. Thus it is difficult to make accurate predictions of the impact of leave durations that are longer than six months on women's postpartum depression scores.

Significant findings in the 2SLS regression also emerged from control variables (see table 4). Women who experienced prenatal moods of anxiety and depression had an increase of 2.2 points in their postpartum depression score (worse outcome) compared with those who did not experience those moods. Older age was associated with increased depression scores. White

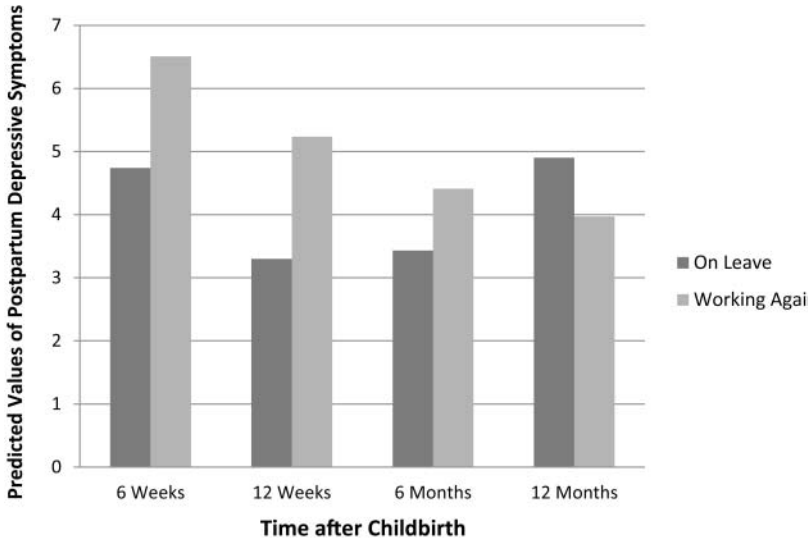

Figure 1 Employment Status (On Leave/Working Again) and Predicted Values of Postpartum Depressive Symptoms over Four Time Periods in the First Year after Childbirth

women had lower depression scores (almost one point lower) than non-whites. Moreover, partnered women had lower depression scores than single women. Women with household incomes of $25,000 to $50,000 had significantly higher depression scores than those with incomes less than $25,000, but there were no differences in postpartum depression scores for women with incomes higher than $50,000 as compared with those with incomes less than $25,000. Time was significantly associated with increased postpartum depression scores. Each time period—twelve weeks, six months, and twelve months—was associated with significantly higher depression scores relative to the reference period at six weeks postpartum, with the highest increase in depression scores at six months after childbirth (see table 4).

Dependent Variable: Maternal Mental Health. Neither 2SLS regression analyses nor OLS analyses showed a significant association between leave duration[6] and maternal mental health (table 5). This is consistent with the results of the Hausman test, which failed to reject the hypothesis of

6. We dropped leave squared from the regression analyses because it was not significant in OLS or in 2SLS analyses.

Table 5 Results of OLS and 2SLS Analyses of the Association between Leave Duration and Postpartum Mental Health (N = 2,645)

Explanatory Variables	$\beta_{(OLS)}$	$SE_{(OLS)}$	95% $CI_{(OLS)}$		$\beta_{(2SLS)}$	$SE_{(2SLS)}$	95% $CI_{(2SLS)}$	
Leave Duration	0.0063	0.0044	−0.0022	0.0149	0.0280	0.0213	−0.0138	0.0697
Prenatal Moods	−3.8560***	0.2874	−4.4195	−3.2926	−3.8667***	0.2889	−4.4332	−3.3002
Age (years)	0.0195	0.0322	−0.0436	0.0826	0.0013	0.0368	−0.0709	0.0734
Education (1 = College educated)	0.1385	0.3520	−0.5517	0.8286	0.1123	0.3545	−0.5829	0.8074
Race (1 = White)	−0.3149	0.4565	−1.2101	0.5803	−0.3700	0.4617	−1.2754	0.5354
Income								
$0–24,999 (Reference)	—	—	—	—	—	—	—	—
$25,000–49,999	−1.6372*	0.6829	−2.9762	−0.2982	−1.6063*	0.6867	−2.9528	−0.2597
$50,000–74,999	−0.0061	0.7581	−1.4927	1.4805	−0.0559	0.7632	−1.5525	1.4406
$75,000–99,999	−0.0100	0.7916	−1.5622	1.5423	−0.0611	0.7968	−1.6236	1.5013
> $100,000	0.0180	0.8367	−1.6226	1.6586	−0.0429	0.8426	−1.6952	1.6094
Occupation								
Professional (Reference)	—	—	—	—	—	—	—	—
Blue-Collar	0.6418	0.4847	−0.3086	1.5921	0.8941	0.5442	−0.1730	1.9612
Clerical	0.2298	0.3479	−0.4525	0.9121	0.3130	0.3586	−0.3902	1.0163

Table 5 (*continued*)

Explanatory Variables	β (OLS)	SE (OLS)	95% CI (OLS)		β (2SLS)	SE (2SLS)	95% CI (2SLS)	
Marital Status								
Single (Reference)	—	—	—	—	—	—	—	—
Married	0.3001	0.5921	−0.8608	1.4611	0.1983	0.6029	−0.9839	1.3804
Partnered	1.3045*	0.5823	0.1626	2.4463	1.2103*	0.5920	0.0494	2.3712
Parity (1 = Multiparous)	−1.0308***	0.2965	−1.6121	−0.4495	−0.9509**	0.3076	−1.5541	−0.3476
Time Period								
6 weeks (Reference)	—	—	—	—	—	—	—	—
12 weeks	0.9344*	0.3999	0.1503	1.7186	0.4229	0.6357	−0.8236	1.6694
6 months	0.7351†	0.4175	−0.0836	1.5538	0.0104	0.8144	−1.5865	1.6072
12 months	1.4637***	0.4214	0.6373	2.2900	0.6727	0.8715	−1.0361	2.3816

Source: Authors' calculations

Notes: β = unstandardized coefficient; SE = standard error; (OLS) = estimates generated using ordinary least squares regression; (2SLS) = estimates generated using two-stage least squares regression; adjusted R-squared (OLS) = 0.0894

†$p < 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

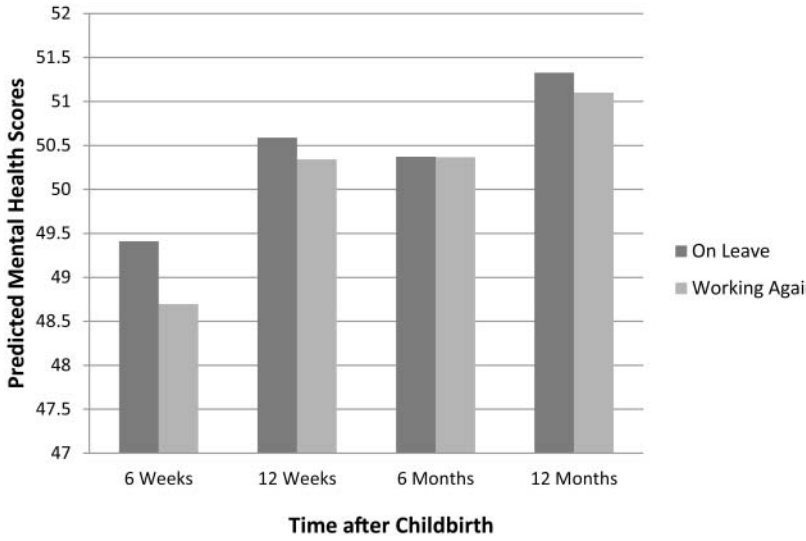

Figure 2 Employment Status (On Leave/Working Again) and Predicted Values of Maternal Mental Health Scores over Four Time Periods in the First Year after Childbirth

exogenous leave duration, so correction for endogeneity by utilizing 2SLS did not have an effect. To illustrate this relationship we depicted the variation of maternal mental health scores by leave duration over the first year after childbirth, using predicted values from the regression, in a graph (fig. 2). *T*-tests showed no differences in predicted mental health scores between women who were back to work and those still on leave at twelve weeks, six months, and twelve months. However, women who were back to work at six weeks after childbirth had worse mental health scores than those who were still on leave (Mean $_{6\ \text{weeks}}$ = 48.69 vs. 49.41, *p*-value = 0.026).

A review of the control variables in the OLS model reveals that women who experienced prenatal moods of depression and anxiety scored approximately four points lower on the mental health measure (poorer mental health) than women with no prenatal moods (see table 5). Women with household incomes of $25,000 to $50,000 had better mental health scores than those with incomes less than $25,000. Partnered women had better mental health than single women. Multiparous women had poorer mental health scores than primiparous women. Time was significantly associated with better mental health. For the time periods twelve weeks and twelve

months, time was associated with significantly better mental health relative to the reference period at six weeks postpartum, with the highest improvement in mental health at twelve months after childbirth (see table 5).

Dependent Variable: Maternal Physical Health. Both OLS and 2SLS analyses showed a marginally significant linear association between leave duration[7] and maternal physical health, where longer leaves were associated with better physical health (table 6). These similar findings between OLS and 2SLS analyses are in line with the Hausman test results, which failed to reject the hypothesis of exogenous leave duration with respect to physical health. To illustrate this relationship we depicted the variation of maternal physical health scores by leave duration over the first year after childbirth, using predicted values from the regression, in a graph (fig. 3). *T*-tests showed that women who were back to work at six weeks or twelve weeks after childbirth had slightly worse, although statistically significant, physical health scores than those who were still on leave during those periods (Mean $_{6\ \text{weeks}}$ = 51.00 vs. 51.39, *p*-value = 0.004; Mean $_{12\ \text{weeks}}$ = 55.54 vs. 55.95, *p*-value = 0.000). However, there were no differences in predicted physical health scores between women who were back to work and those still on leave at six months and twelve months after childbirth.

In terms of control variables, OLS regression showed that women with prenatal moods of depression and anxiety had poorer physical health than those with no prenatal moods (see table 6). Moreover, older age was associated with poorer physical health. White women had better physical health scores (1.62 points higher) than nonwhites. Women with household incomes of $100,000 or higher had better physical health scores than those with incomes less than $25,000. Time was significantly associated with better physical health. Each time period—twelve weeks, six months, and twelve months—was associated with significantly better physical health relative to the reference period at six weeks postpartum, with the highest improvement in physical health at twelve weeks after childbirth (see table 6).

Dependent Variable: Maternal Childbirth-Related Symptoms. OLS analyses showed no significant association between leave duration[8] and maternal childbirth-related symptoms, while 2SLS analyses showed a

7. We dropped leave squared from the regression analyses because it was not significant in OLS or in 2SLS analyses.

8. We dropped leave squared from the regression analyses because it was not significant in OLS or in 2SLS analyses.

Table 6 Results of OLS and 2SLS Analyses of the Association between Leave Duration and Postpartum Physical Health (N = 2,645)

Explanatory Variables	$\beta_{(OLS)}$	$SE_{(OLS)}$	95% $CI_{(OLS)}$		$\beta_{(2SLS)}$	$SE_{(2SLS)}$	95% $CI_{(2SLS)}$	
Leave Duration	0.0063†	0.0037	−0.0008	0.0135	0.0297†	0.0179	−0.0055	0.0648
Prenatal Moods	−0.5180*	0.2413	−0.9911	−0.0449	−0.5295*	0.2433	−1.0065	−0.0525
Age (years)	−0.0895***	0.0270	−0.1425	−0.0366	−0.1092***	0.0310	−0.1699	−0.0484
Education (1 = College educated)	0.2491	0.2955	−0.3304	0.8285	0.2208	0.2985	−0.3646	0.8062
Race (1 = White)	1.6248***	0.3833	0.8732	2.3764	1.5655***	0.3888	0.8030	2.3279
Income								
$0–24,999 (Reference)	—	—	—	—	—	—	—	—
$25,000–49,999	−0.0604	0.5733	−1.1846	1.0638	−0.0271	0.5783	−1.1610	1.1068
$50,000–74,999	1.2126†	0.6365	−0.0355	2.4607	1.1589†	0.6427	−0.1014	2.4191
$75,000–99,999	0.5793	0.6646	−0.7239	1.8825	0.5241	0.6710	−0.7916	1.8399
> $100,000	1.4863*	0.7024	0.1089	2.8637	1.4206*	0.7095	0.0292	2.8120
Occupation								
Professional (Reference)	—	—	—	—	—	—	—	—
Blue-Collar	0.0025	0.4069	−0.7954	0.8003	0.2745	0.4583	−0.6241	1.1731
Clerical	0.1783	0.2921	−0.3946	0.7511	0.2680	0.3020	−0.3242	0.8602

Table 6 (*continued*)

Explanatory Variables	β (OLS)	SE (OLS)	95% CI (OLS)		β (2SLS)	SE (2SLS)	95% CI (2SLS)	
Marital Status								
Single (Reference)	—	—	—	—	—	—	—	—
Married	−0.1237	0.4971	−1.0984	0.8511	−0.2335	0.5077	−1.2290	0.7620
Partnered	−0.3361	0.4889	−1.2947	0.6226	−0.4376	0.4985	−1.4152	0.5400
Parity (1 = Multiparous)	−0.0172	0.2489	−0.5053	0.4708	0.0690	0.2591	−0.4390	0.5770
Time Period								
6 weeks (Reference)	—	—	—	—	—	—	—	—
12 weeks	4.2288***	0.3358	3.5704	4.8872	3.6773***	0.5353	2.6276	4.7270
6 months	3.5550***	0.3506	2.8676	4.2424	2.7735***	0.6858	1.4288	4.1182
12 months	3.7519***	0.3538	3.0581	4.4456	2.8991***	0.7339	1.4600	4.3381

Source: Authors' calculations

Notes: β = unstandardized coefficient; SE = standard error; (OLS) = estimates generated using ordinary least squares regression; (2SLS) = estimates generated using two-stage least squares regression; adjusted R-squared (OLS) = 0.0994

†$p < 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

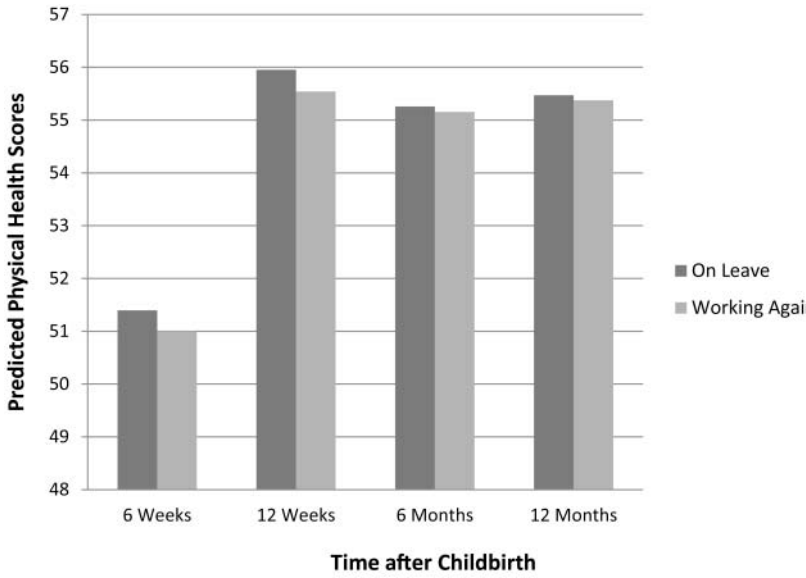

Figure 3 Employment Status (On Leave/Working Again) and Predicted Values of Maternal Physical Health Scores over Four Time Periods in the First Year after Childbirth

marginally significant linear association; as leave duration increased, maternal childbirth-related symptoms decreased (table 7). Whereas the signs and magnitude of the coefficients did not change much across OLS and 2SLS analyses, there was a minor change in statistical significance; thus these findings are consistent with the results of the Hausman test, which failed to reject the hypothesis of exogenous leave duration in the equation for maternal childbirth-related symptoms. To illustrate this relationship we depicted the variation of maternal childbirth-related symptoms by leave duration over the first year after childbirth, using predicted values from the regression, in a graph (see fig. 4). *T*-tests showed no differences in predicted childbirth-related symptoms between women who were back to work and those still on leave at six weeks, six months, and twelve months. However, women who were back to work at twelve weeks after childbirth had a lower score on childbirth-related symptoms than those who were still on leave (Mean $_{12\ \text{weeks}} = 4.07$ vs. 4.23, p-value = 0.019).

In OLS regression, control variables significantly associated with fewer childbirth-related symptoms (better health) included an absence of prenatal mood problems, a household income of $50,000–74,999 or

Table 7 Results of OLS and 2SLS Analyses of the Association between Leave Duration and Maternal Childbirth-Related Symptoms (N = 2,455)

Explanatory Variables	β (OLS)	SE (OLS)	95% CI (OLS)		β (2SLS)	SE (2SLS)	95% CI (2SLS)	
Leave Duration	−0.0013	0.0021	−0.0054	0.0028	−0.0165†	0.0099	−0.0360	0.0030
Prenatal Moods	1.4030***	0.1358	1.1366	1.6693	1.4079***	0.1373	1.1386	1.6772
Age (years)	0.0548***	0.0154	0.0245	0.0850	0.0677***	0.0176	0.0331	0.1023
Education (1 = College educated)	0.3636*	0.1654	0.0393	0.6880	0.3765*	0.1674	0.0482	0.7048
Race (1 = White)	0.6125**	0.2175	0.1860	1.0389	0.6536**	0.2214	0.2195	1.0878
Income								
$0–24,999 (Reference)	—	—	—	—	—	—	—	—
$25,000–49,999	−0.0716	0.3282	−0.7151	0.5720	−0.0971	0.3321	−0.7484	0.5542
$50,000–74,999	−0.8622*	0.3641	−1.5762	−0.1483	−0.8476*	0.3682	−1.5695	−0.1257
$75,000–99,999	−0.6608†	0.3805	−1.4069	0.0853	−0.6426†	0.3848	−1.3972	0.1119
> $100,000	−0.9646*	0.4007	−1.7504	−0.1789	−0.9265*	0.4058	−1.7223	−0.1308
Occupation								
Professional (Reference)	—	—	—	—	—	—	—	—
Blue-Collar	−0.1217	0.2286	−0.5699	0.3266	−0.2913	0.2552	−0.7917	0.2092
Clerical	−0.1195	0.1647	−0.4424	0.2033	−0.1689	0.1694	−0.5011	0.1632

(*continued*)

Table 7 Results of OLS and 2SLS Analyses of the Association between Leave Duration and Maternal Childbirth-Related Symptoms (N = 2,455) (*continued*)

Explanatory Variables	β (OLS)	SE (OLS)	95% CI (OLS)		β (2SLS)	SE (2SLS)	95% CI (2SLS)	
Marital Status								
Single (Reference)	—	—	—	—	—	—	—	—
Married	0.1157	0.2842	−0.4416	0.6732	0.1816	0.2904	−0.3878	0.7510
Partnered	−0.0964	0.2807	−0.6468	0.4540	−0.0251	0.2873	−0.5886	0.5383
Parity (1 = Multiparous)	0.2289	0.1405	−0.0466	0.5044	0.1738	0.1463	−0.1131	0.4607
Time Period								
6 weeks (Reference)	—	—	—	—	—	—	—	—
12 weeks	−1.9991***	0.1863	−2.3644	−1.6339	−1.6349***	0.2993	−2.2218	−1.0480
6 months	−1.4525***	0.1954	−1.8357	−1.0694	−0.9389*	0.3830	−1.6899	−0.1879
12 months	−2.5177***	0.2010	−2.9118	−2.1236	−1.9528***	0.4141	−2.7649	−1.1407

Source: Authors' calculations

Notes: β = unstandardized coefficient; SE = standard error; (OLS) = estimates generated using ordinary least squares regression; (2SLS) = estimates generated using two-stage least squares regression; adjusted R-squared (OLS) = 0.1338

†$p < 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

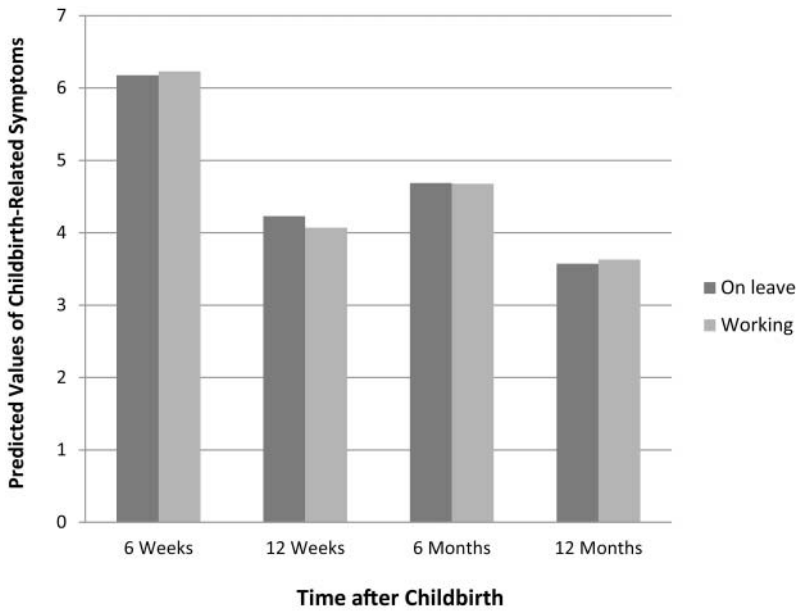

Figure 4 Employment Status (On Leave/Working Again) and Predicted Values of Maternal Childbirth-Related Symptoms over Four Time Periods in the First Year after Childbirth

$100,000 or higher (vs. $0–24,999), younger age, and being nonwhite (see table 7). Women with a college degree experienced more childbirth-related symptoms (worse health) than those who did not have a college degree. At each time period, time was associated with significantly decreased maternal childbirth-related symptoms (better health) relative to the reference period at six weeks postpartum, with the highest decrease in symptoms at twelve months after childbirth (see table 7).

Discussion

Taking time off from work after childbirth may help mothers to recover emotionally from pregnancy, labor, and delivery. This study found a significant nonlinear relationship between the duration of leave from work after childbirth and postpartum depressive symptoms. Additional days of leave up to six months after childbirth decreased postpartum depressive symptoms. Thus taking less than six months of leave (approximately twenty-six weeks) may increase the risk of postpartum depression for

some working women. This finding of a beneficial effect of longer leave duration in relation to postpartum depressive symptoms is consistent with the findings of other studies that examined leave duration and postpartum depressive symptoms (Chatterji and Markowitz 2005, 2012; Hyde et al. 1995; Klein et al. 1998). However, the present study adds to the literature by showing a nonlinear relationship between leave duration and postpartum depressive symptoms and specifying a maximum period, six months after childbirth, when taking leave can protect against depressive symptoms. Moreover, in this study postpartum depressive symptoms were measured with the Edinburgh Postnatal Depression Scale, a more specific measure of depressive symptoms experienced after childbirth than the more general Center for Epidemiological Studies Depression Scale used in previous studies (Chatterji and Markowitz 2005, 2012; Hyde et al. 1995; Klein et al. 1998).

The present study also found a marginally significant positive linear association between leave duration and maternal physical health, especially during the first twelve weeks after childbirth. This finding of a beneficial effect of longer leave duration in relation to postpartum physical health is consistent with McGovern and colleagues' (1997) findings in relation to vitality and role function, except in the present study we did not find a U-shaped association between leave duration and physical health. Moreover, our findings are not consistent with a few other studies that examined leave duration and physical health after childbirth and found no associations (Chatterji and Markowitz 2005; Killien, Habermann, and Jarrett 2001; Romito, Saurel-Cubizolles, and Cuttini 1994). However, these studies did not use the SF-12 Physical Summary score to measure physical health; instead they used a summary indicator of health status (Killien, Habermann, and Jarrett 2001), proxy measures such as extreme tiredness, backache, and lack of sleep (Romito, Saurel-Cubizolles, and Cuttini 1994), and other health indicators such as number of outpatient physician or clinic visits (Chatterji and Markowitz 2005).

Future studies should examine the mechanisms through which leave duration after childbirth influences postpartum depressive symptoms, including postpartum fatigue, a risk factor for postpartum depression (Corwin et al. 2005). Moreover, additional studies should ascertain the relationship between leave duration and maternal physical health and determine which mechanisms mediate this association. Finally, future research should investigate the impact of paternity leave on maternal mental and physical health outcomes and find out whether it acts as a mediator or moderator in the relationship between maternity leave duration and maternal health outcomes.

Limitations

The findings of this study should be interpreted in light of the study limitations. Although study findings are internally valid, they can mainly be generalized to employed women of similar racial and ethnic backgrounds, income levels, and comparable health insurance coverage. The study population for this study was limited to Minnesota mothers, aged eighteen years and older. In comparison with available national data, Minnesota mothers had a lower probability of being married (77 percent) than new mothers aged twenty-five to twenty-nine years (83 percent) (Bachu and O'Connell 2001), and a lower probability of giving birth by cesarean section (17 percent vs. 24 percent, respectively) (Martin et al. 2002). Moreover, Minnesota mothers had a higher probability of having completed high school (94 percent) in comparison with data on new mothers aged twenty-five to thirty-four years nationwide (84 percent to 90 percent) (National Center for Health Statistics 2005). In terms of racial composition, the study population contained similar proportions of white and Native Americans as national data (78 percent and 1 percent, respectively) but had relatively fewer African American mothers (9 percent vs. 15 percent) and more Asian mothers (11 percent vs. 5 percent) (National Center for Health Statistics 2005). Because of the demographic distribution of the residents of the Twin Cities area, Minnesota, and the restriction of the study sample to English-speaking women, the racial and ethnic representation of study participants may underrepresent racial minorities and immigrant populations relative to many urban areas in the United States. Future research should include a more racially and ethnically diverse sample and should be replicated in other states in the United States to assess the generalizability of study findings to other populations of women.

Postpartum depressive symptoms were measured by self-report and were not validated by medical diagnoses or clinical evaluations. Thus interpretation of the findings should be specific to postpartum depressive symptoms and not to postpartum depression diagnosis. However, Mirowsky and Ross (1989: 12) recommended "eliminating diagnosis from research on the nature, causes, and consequences of mental, emotional, and behavioral problems." These authors consider diagnoses of mental disorder ill suited to research on the impact of social and interpersonal arrangements.

Other limitations pertain to the data. The present study had a minor limitation related to the distribution of women's responses by time at each data collection period, which resulted in small inaccuracies regarding the

precision of how we reported the time periods in this article. Women generally completed their telephone interviews early in the windows of potential response periods for each data collection period. For example, on average, women completed the six-week interview at 4.8 weeks (SD = 0.9); the twelve-week interview at 11.2 weeks (SD = 1.2); the six-month interview at 23.5 weeks (SD = 1.8); and the twelve-month interview at 50.1 weeks (SD = 2.1). Thus the reporting of health outcomes at six and twelve weeks and six and twelve months was slightly earlier than the nominal period of data collection and should be noted by investigators who wish to compare their results with ours. In addition, 87.3 percent ($N = 625$) of the women were back to work by six months postpartum, and 92.0 percent ($N = 659$) returned by twelve months postpartum. Therefore, it is difficult to get an accurate estimate of the impact on women's postpartum health of leave durations that are longer than six months. Finally, our analytical sample excluded 101 cases that did not fill out the six-week interview. However, there were no significant differences in the four health outcomes between 30 percent of the excluded cases we had data on and the six-week respondents at twelve weeks, six months, and twelve months postpartum. The data on the excluded cases suggest that these women did not participate in the six-week interview because of economic factors rather than health concerns: the average excluded case was less educated, had lower family income and shorter employment history with the current employer, and was less likely to return to work during the first year after childbirth than mothers retained in the study. It may be that the costs of working (substitute infant care, transportation, etc.) were greater than the costs of unemployment and staying home to care for their infant, but additional research is needed to determine why women leave the workforce in the year after childbirth.

Study Implications for US Leave Policy

The primary federal policy that provides support to working US mothers of infants is the FMLA, which has been in effect since 1993. Under this act, the employee is provided a maximum of twelve weeks of unpaid, job-protected leave per year for giving birth; taking care of a newborn, a newly adopted child, or a foster child; or attending to an immediate family member with a serious health condition or to the employee's own serious health condition. Our findings on leave duration and postpartum depressive symptoms have implications for two key aspects of the FMLA: (1)

the twelve-week duration benefit it provides and (2) the lack of a wage replacement benefit.

The main policy debates surrounding the FMLA did not consider the effects of leave duration on maternal health. The twelve-week leave duration provided by this law was a result of years of compromise between sponsors of the bill, including women's organizations, and its opponents from business groups. Stakeholders such as the US Chamber of Commerce and the Economic Policy Council insisted that longer leaves would harm businesses. Thus the discussions regarding duration of leave focused on what businesses could afford rather than the health and productivity of the employees benefiting from the law. Additionally, in an effort to make the policy relevant to a larger proportion of the population—for equity considerations as well as to garner the political support of a larger lobbying body—the objectives of the FMLA were to address leave for a variety of reasons (e.g., illness of a spouse, a child, or parent). Thus, the historical context of providing leave as a benefit for women in association with pregnancy and childbirth, as is the case in most European countries, was diminished.[9]

The findings of effects of leave duration on postpartum depressive symptoms and physical health in this study provide additional evidence consistent with other studies (Chatterji and Markowitz 2005, 2012; Gjerdingen and Chaloner 1994; Hyde et al. 1995; McGovern et al. 1997) that future leave policy debates should consider maternal health implications. The finding that taking additional leave days up to six months after childbirth may help decrease postpartum depressive symptoms provides a specific leave duration that proponents of longer leave durations can present in their future testimonies on leave policies. The current leave duration provided by the FMLA, twelve weeks, may not be sufficient for mothers who are at risk for postpartum depression. Ideally, leave policies should acknowledge health protection for postpartum women; however, this special treatment of women may risk jeopardizing political support that has usually existed when the policy is applicable to a larger population.

Thus an alternative approach that presents the advantages to postpartum women's health as well as to the welfare of other populations, such as newborns, may be more politically feasible. For example, the World Health Organization recommends exclusive breastfeeding of infants for the infant's first six months of life, suggesting another reason for a longer

9. For example, the 1992 directive issued by the European Union that requires member states to provide fourteen weeks of paid maternity leaves was mainly based on health and safety considerations pertaining to mothers and their newborns.

period of leave (Eidelman and Schanler 2012). The health effects of breastfeeding for the infant are well documented by the American Academy of Pediatrics in its Policy Statement on Breastfeeding and the Use of Human Milk and include a decreased risk of respiratory, ear, and gastrointestinal tract infections; a decreased risk of clinical asthma, atopic dermatitis, and eczema; and a reduced risk of Sudden Infant Death Syndrome (SIDS), in addition to health benefits for the mother (Eidelman and Schanler 2012).

A related issue is the paid/unpaid nature of the leave law. Although the FMLA provided twelve weeks of leave for eligible women, it did not require employers to compensate women while they are on leave. The unpaid leave benefit provided by the FMLA was a concession made by the bill's sponsors to ensure its survival in Congress, especially in the Reagan era of "small government" and "neo-laissez-faire" politics (Elving 1995). National survey data of covered establishments show that 52.4 percent of employees who utilized FMLA leave in 2000 did so because of personal ill health, and only 18.5 percent took leave to care for a newborn or a newly adopted child (Cantor et al. 2001). Over half of the leaves taken for child care were for ten days or less. The unpaid nature of the FMLA appears to make it harder for parents to take longer periods of leave. In fact, the few studies conducted on this issue have shown that unpaid leave policies result in women taking short durations of leave (Hofferth and Curtin 2006; McGovern et al. 2000). In this study, the total number of days of paid leave provided by employer policy predicted the number of leave days women took after childbirth.[10] More studies are needed to ascertain this association, especially studies that compare duration of leave between women with access to only unpaid leave policies and women with access to paid leave policies and that include larger samples of women of color and low-income women. This is important given the possibility that longer leave durations may provide protective effects for new mothers who are at risk for postpartum depression.

However, the politics of any policy change are challenging. The 2012 Republican presidential debates showed that a significant and vocal portion of the public favors less regulation and increased state or local (versus federal) control over public policy decisions, in addition to the current concern about the country's national debt and a general resistance to tax increases. The public sentiment suggests the need for advocates of leaves

10. This finding came about in the first-stage equation testing number of days of paid leave provided by employer policy as an instrument for the actual number of days of leave taken by women in this study.

that are longer and paid to employ creative political strategies that favor incremental change at the state or local level with financing mechanisms that do not involve public taxes but could involve tax incentives for employers and contributions from employees and employers. Broad coalitions motivated by a values-based ideology will be needed to develop a legislative strategy and a readiness to seize opportune moments when the political winds favor these issues.

Conclusion

This is the first longitudinal study to investigate the effects of leave duration on women's postpartum mental and physical health over the first twelve months after childbirth. New mothers taking leaves from work less than six months after childbirth appear to have an increased risk of postpartum depressive symptoms. Longer leaves also had a protective effect on general maternal physical health in the first twelve weeks after childbirth. While the national political discourse favors less governmental regulation, and policy implementation at state and local levels as opposed to the national level, the study findings suggest the importance of leave as a protective factor for women's mental and physical health at a critical time in the life course of women and their families. Given the twentieth anniversary of the FMLA this year, our study findings can inform family leave discussions among policy makers, employers, and families with the ultimate goal of positively influencing the health of new mothers and their choices about work and family.

■ ■ ■

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