

# Association of Specific Negative Life Events with Depression Severity One Month After Childbirth in Community-Dwelling Mothers

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## Abstract

**Background:** Although there is a consensus view that stressful life events *in general* are associated with the onset of depression, it is still unclear whether specific events are linked to depression at a particular life stage. The purpose of this study was to identify hassle events specifically related to postpartum depression. **Method:** In a two-wave study (Wave 1 was at 5 days and Wave 2 was at 1 month after childbirth) we used the Maternity Blues Questionnaire (MBQ) and the Edinburgh Postnatal Depression Scale (EPDS) and asked participants whether they had experienced each of 41 daily negative life events (NLEs) in different domains since childbirth. The 758 women who returned the questionnaires at both 5 days and 1 month after childbirth were studied. **Results:** After controlling for the effects of the MBQ scores and the participants' and partners' ages, the Wave 2 EPDS score correlated with 3 (23%) items in the Physical Symptoms and Body Image domain, 3 (30%) items in the Lifestyle Changes and Financial Problems domain, 3 (30%) items in the Interpersonal Relationships and Out-of-Home Activities domain, and 6 (75%) items in the Parenting and Newborn Behaviours domain. The Wave 2 EPDS scores were linked significantly with most infant- and parenting-related items, and moderately with interpersonal items. **Conclusion:** Women caring for infants are more vulnerable to NLEs related to infant care and interpersonal relationships than to those related to physical conditions. Clinicians should pay more attention to events related to infant care during the postpartum period.

## Keywords

Postnatal Depression, Life Events, Content Specificity

## 1. Introduction

It has been repeatedly demonstrated that psychiatric disorders and depression in particular occur after negative life events (NLEs) (e.g., Andrews, 1978; Brown, & Harris, 1978; Kendler, Karkowski, & Prescott, 1999; Paykel, et al., 1969). Most of these studies have focused on major events such as serious illnesses, injuries, deaths of loved ones, marital separations, break-ups of steady relationships, onset of unemployment, major financial crises, and problems with the

police (e.g., Brugha, Bebbington, Tennant, & Hurry, 1985; Brugha, & Cragg, 1990; Rosmalen, Bos, de Jonge, 2012). These events, though strongly linked to the onset of psychiatric illness, are not frequently observed in non-clinical populations. Less severe but more frequently observed events, called "hassles", have been reported to predict psychological maladjustment (Kanner, Coyne, Schaefer, & Lazurus, 1981; Nakano, 1989).

Depression is one of the most prevalent psychiatric disorders occurring after childbirth. Referred to as postnatal

depression (PND) or postpartum depression, it has a prevalence of about 5% (Kitamura, *et al.*, 2006; O'Hara, & Swain, 1996). Research has shown that PND occurs after NLEs (Dennis, Janssen, & Singer, 2004; O'Hara, Rehm, & Campbell, 1983; Paykel, Emms, Fletcher, & Rassaby, 1980; Righetti-Veltema, Conne-Perreard, Bousquet, & Manzano, 1998; Seguin, Potvin, St-Denis, & Loisele, 1999; Whiffen, 1988). NLEs investigated in conjunction with PND were major (serious) life events. One study (Dennis, & Ross, 2005) investigated infants' irregular sleep patterns, considered a minor daily NLE, and showed that this NLE, along with maternal fatigue, strongly predicted the onset of depressive symptoms in the postpartum period. Similarly, one Japanese study showed that the poor rhythmicity of infants' sleep and feeding patterns at 6 months after childbirth predicted maternal depression at 12 months (Sugawara, Kitamura, Toda, & Shima, 1999). Few studies, however, have evaluated other daily events.

Although there is a consensus view that NLEs *in general* are associated with the onset of depression, it is still unknown whether specific events are linked to depression in particular life situations. Based on the evolutionary hypothesis that normal depressive symptoms are a response to different stressful situations and are thus shaped by natural selection, Keller and colleagues (Keller, Neale, & Kendler, 2007; Keller, & Nesse, 2006) classified depressive symptoms into 11 categories, including "emotional pain", "pessimism", "fatigue", "anhedonia", "rumination", "crying", "sadness", "desire for social support", and "guilt". They found that failed efforts preceded "guilt", "rumination", "fatigue", and "pessimism", whereas social losses preceded "crying", "sadness", and "desire for social support". Comparing unipolar and bipolar depressions, Hosang *et al.* (2012) reported that various events were associated equally with these two types of depression, whereas financial crises were more strongly linked to the bipolar type. Comparing elderly individuals with depression to those with anxiety, De Beurs *et al.* (2001) found that the life event predicting the onset of depression was death of a partner or other relatives, while the life event predicting the onset of anxiety was a partner's major illness. These studies suggest specific associations between depressive symptomatology in particular life situations and various types of NLEs. Few detailed studies have examined the association between specific life stages and the onset of depressive symptoms. The same type of event may precede the onset of depressive symptoms in one life stage but not in another. Furthermore, life events perceived as similarly stressful may have different impacts on the onset of depressive symptoms, and this difference may be specific to the life situation in which the events occur. As one such life situation, we focused in this study on the postpartum period.

The postpartum period involves highly challenging and stressful life transitions. Women must take on the role of new mother (or for multiparas, mother to more than one child) (Welles-Nyström, & de Château, 1987) and adapt to physical changes and altered relationships with spouses, other children, coworkers, or significant others. Due to the physical and

psychological difficulties encountered during the perinatal period, women require more support from their partners (Power, & Parke, 1984). However, it has been reported that marital satisfaction is decreased after childbirth (Burr, 1970; Rollins, & Collins, 1974; Rollins, & Feldman, 1970). Hock, Schirtzinger, Lutz, and Widaman (1995) noted that levels of maternal depression after childbirth were associated with postnatal changes in sex roles. The impact of poor perceived social support on mothers' marital satisfaction was found to be particularly strong when their adult attachment was insecure (Rholes, Simpson, Campbell, & Grich, 2001). Poor support from a partner mediated the impact of insecure adult attachment on postpartum depression (Feeney, Alexander, Noller, & Hohaus, 2003; Simpson, Rholes, Campbell, Tran, & Wilson, 2003).

After childbirth, mothers suddenly enter into an extremely close relationship with their newborn, whose care is often their only responsibility throughout the neonatal period. A traditional division of labour between spouses may place more of a burden on mothers, which can be exacerbated if the infant has a difficult temperament.

Therefore, interpersonal conflicts with partners and other family members as well as responsibility of child care may be more likely to occur during this period of a woman's life than any other. These conflicts may be specifically linked to the severity of PND. The purpose of this study was to identify hassles (minor life events) occurring during the puerperal period that were specifically related to PND.

## 2. Methods

### 2.1. Participants

We solicited women who gave birth during a 6-month period at one of the five obstetric clinics in Okayama, Japan. One of them (Hospital A) is a general hospital with an out-patient gynaecology department, while the remaining four (Clinics B, C, D, and E) are antenatal clinics. Pregnant women who were admitted to a hospital were excluded. All women were included other than lack of reading capacity and autonomous declining from the study. Hence, though this was a convenience sample, it consisted of women receiving different types of obstetrical services in Japan. The number of eligible women was 1530, and we successfully distributed a set of questionnaires to 1200 (78%). Of these, 758 (63%) returned the questionnaires at two examination waves (5 days and 1 month after childbirth: Waves 1 and 2). For ethical reasons, we were unaware of the demographic data of the women who did not return the questionnaires.

### 2.2. Measurements

#### 2.2.1. Negative Life Events

We selected 41 events related to childbirth and parenting (Table 2) based on the report of Arizmendi & Affonso (1987). We added a few items specific to the Japanese culture, such as "Satogaeri" (staying at the home of the family of origin for a short time after childbirth). On a theoretical basis, these NLEs

were classified into four life domains: (a) Physical Symptoms and Body Image (13 items), including “fatigue” and “reduced appetite”; (b) Lifestyle Changes and Financial Problems (10 items), including “Satogaeri” and “crowded house”; (c) Interpersonal Relationships and Out-of-Home Activities (10 items), including “parents’ reaction” and “parents-in-law’s reaction”, and (d) Parenting and Newborn Behaviours (8 items) such as “difficult parenting” and “difficult feeding”. The participants were asked whether they had experienced any of these events since the childbirth, and if so, were asked to use a 100-point scale to indicate how undesirable the event was. If the event did not occur after the childbirth, or if it did occur but caused no negative impact, it was rated as zero (0).

### 2.2.2. Depression

We used the Maternity Blues Questionnaire (MBQ; Stein, 1980) and the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) as measures of depression at Waves 1 and 2, respectively. The MBQ is a self-report measure of “maternity blues”. It consists of eight items rated on a 4-point scale and five items rated on a 2-point scale. Its score ranges between 0 and 26, with higher scores indicating greater severity of symptoms. The MBQ was translated into Japanese by Okano et al. (1996). The EPDS is a self-report of PND with 10 items rated on a 4-point scale. It has good psychometric properties (Cox, et al., 1987). The EPDS was translated into Japanese and validated (Okano, et al., 1996). Although the EPDS was originally developed as a screening instrument of postnatal depression, it has frequently used as a measure to reflect the severity of depression in research (e.g., Chabrol, & Teissedre, 2004) as well as clinical settings (e.g., Wickberg, Tjus, & Hwang, 2005). In this study, we used the EPDS as a measure of severity because we were mainly interested in the correlation between the degree of live event impacts and the severity of depression rather than identifying cases of clinical depression.

### 2.2.3. Demographic Variables

The participants were asked about their age, their partner’s age, their infant’s gender and weight, and the type of delivery.

### 2.3. Procedure

After explaining the purpose and nature of this investigation as well as confirmation of the autonomy of their decision-making, participants were asked to fill in two sets of questionnaires: the first at 5 days after delivery (Wave 1), and the second at 1 month after delivery at the time of outpatient clinic check-up (Wave 2). We selected these two time points because, in Japan, women usually stay in a hospital for 5 days as well as they routinely receive a health check-up 1 month after childbirth. The questionnaire distributed at Wave 1 included the MBQ as well as other instruments. The questionnaire distributed at Wave 2 contained the NLE scale and the EPDS.

The present study was approved by the Ethical Committee of Kumamoto University School of Medical Sciences, where

the corresponding author conducted the present research.

### 2.4. Data Analysis

Ninety-seven women were enrolled from Hospital A, and 115, 100, 252, and 194 from Clinics B, C, D, and E, respectively. The EPDS and MBQ scores did not differ significantly between the five institutions (EPDS,  $F(4,735) = 0.533$ ,  $P = .711$ ; MBQ,  $F(4,735) = 0.525$ ,  $P = .717$ ). Therefore the following analyses were conducted using the combined data from the five institutions. We calculated the means and SDs of the EPDS and MBQ scores, along with the women’s and husbands’ ages, and correlated all of them. The Wave 2 EPDS score was then correlated with each NLE score. We calculated the partial correlation between the Wave 2 EPDS score and each NLE score, and partialled out the Wave 1 MBQ score and the participants’ and partners’ ages. This is because of the evidence that maternity blues in the early postnatal stage predict the severity of later postnatal depression (Hannah, Adams, Lee, Glover, & Sandler, 1992; Hapgood, Elkind, & Wright, 1988; Henshaw, Foreman, & Cox, 2004; Watanabe, Wada, Sakata, Aratake, Kato, Ohta, & Tanaka, 2008).

### 3. Result

The mean (SD) age of the participants was 28.7 (4.1) years and the mean (SD) age of their partners was 30.7 (5.2) years (Table 1). About half (47%) of the infants were boys. The mean (SD) body weight of the infants was 3050 (347) grams. About 85% of the women gave birth vaginally, while 7%, and 7% required delivery by vacuum extraction, and Caesarian section, respectively. The mean Wave 1 EPDS score was not significantly associated with the baby’s birth weight and gender, or the type of delivery. Hence they were not considered as covariates in the following statistical analyses.

The Wave 2 EPDS scores ranged between 0 and 29 with a mean (SD) of 5.0 (4.1). Eighteen percent of the women were rated “positive” using the cut-off of 8 or more for a Japanese population (Okano, et al., 1996). The Wave 2 EPDS scores correlated significantly with the Wave 1 MBS scores ( $r = .35$ ,  $P < .001$ ) and the women’s age ( $r = .11$ ,  $P < .01$ ). However, it did not correlate with the partner’s age (Table 1).

Among the 41 NLEs, “Decrease in social opportunities” (32.7 points), “Fatigue” (29.3), “Collapsed body shape” (28.0), “Not getting back into shape” (24.3), “Excessive expenses” (20.7), “Change of lifestyle pattern” (20.6), “Night feeding” (18.8), “Other pains” (18.7), and “Insomnia” (18.4) were rated 10 points or more (Table 2).

After controlling for the effects of the Wave 1 MBQ scores and the participants’ and partners’ ages, the NLE scores were differentially correlated with the Wave 2 EPDS scores. Significant ( $P < .001$ ) partial correlation coefficients were found with the Wave 2 EPDS score for “Partner’s reaction” (partial  $r = .25$ ), “Parents-in-law’s reaction” (.24), “Night crying of the bay” (.22), “Change of lifestyle pattern” (.21), “Relationships with in-laws and relatives” (.21), “Difficult parenting” (.21), “Difficult feeding” (.20), “Night

feeding” (.20), “Fatigue” (.19), “Insomnia” (.19), “Difficulty falling sleep” (.18), “Persistent crying easily” (.17), “Decrease in social opportunities” (.16), “Excessive expenses” (.16), and “Reduced appetite” (.15). Thus, the NLEs which significantly correlated with the Wave 2 EPDS were 3 (23%) items in the Physical Symptoms and Body Image domain, 3 (30%) items in the Life Style Changes and Financial Problems domain, 3 (30%) items in the Interpersonal Relationships and Out-of-Home Activities domain, and 6 (75%) items in the Parenting and Newborn Behaviours domain. This shows that the Wave 2 EPDS scores were linked substantially with most of the infant- and parenting-related items, and moderately with interpersonal items. It was least linked to items related to

physical symptoms.

**Table 1.** Means, SDs, and inter-correlations of EPDS and MBQ scores and ages of mothers and partners (N = 758)

	Mean (SD)	1	2	3
1: Wave 2 EPDS	5.0 (4.1)	—		
2: Wave 1 MBS	7.1 (2.0)	.35***	—	
3: Mother’s age	28.7 (4.1)	-.11**	-.19***	—
4: Partner’s age	30.7 (5.2)	-.07	-.15***	-.71***

\*\*  $P < .01$ ; \*\*\*  $P < .001$ ; EPDS, Edinburgh Postnatal Depression Scale; MBS, Maternity Blues Scale.

**Table 2.** Means, SDs, and skewness of all NLEs items and their zero-order and partial correlations with the EPDS score at 1 month after childbirth (N = 758)

Items	Negative impact			Correlation with the EPDS	Partial correlation with the EPDS	
	Mean	SD	Skewness			
Physical Symptoms and Body Image						
1	Fatigue	29.3	27.5	-0.6	.21***	.19***
2	Increased appetite	4.8	13.8	-3.7	.03	.03
3	Reduced appetite	4.0	15.4	-4.7	.22***	.15***
4	Nausea/vomiting	3.0	15.2	-5.7	.11**	.07
5	Pain due to episiotomy	13.1	24.6	-2.0	.09*	.05
6	Pain due to Caesarean section	3.1	15.0	-5.5	.04	.01
7	Other pains	18.7	28.3	-1.5	.09*	.07
8	Insomnia	18.4	28.1	-1.4	.23***	.19***
9	Incontinence	3.7	14.4	-4.8	.02	.01
10	Mastitis	5.1	19.1	-4.0	.09*	.06
17	Not getting back into shape	24.3	32.7	-1.1	.04	.03
18	Collapsed body shape	28.0	32.0	-1.0	.08*	.06
19	Physical marks on body	14.5	26.7	-2.0	.06	.05
Life Style Changes and Financial Problems						
11	Satogaeri (coming back to the home of origin)	2.6	12.6	-5.6	.07	.07
12	Crowded house	8.4	19.2	-3.0	.07*	.05
13	Change of house interior	2.9	12.1	-5.7	.11**	.06
14	Change of lifestyle pattern	20.6	25.8	-1.3	.23***	.21***
15	Moving	2.8	15.5	-5.8	.06	.02
16	Decrease in social opportunities	32.7	31.6	-0.6	.18***	.16***
20	Excessive expenses	20.7	27.4	-1.4	.18***	.16***
21	Going into debt	2.7	15.2	-5.8	.06	.02
22	Worry about medical fees	6.2	18.6	-3.5	.14***	.10*
23	Reduced salary	11.8	25.7	-2.2	.07	.07
Interpersonal Relationships and Out of Home Activities						
24	Parents’ reaction	1.3	9.5	-8.3	.09*	.07
25	Parents-in-law’s reaction	4.0	16.8	-4.6	.24***	.24***
26	Partner’s reaction	2.0	11.2	-6.7	.24***	.25***
27	Changed sexual life	5.6	19.2	-3.9	.13***	.11**
28	Relationships with in-law and relatives	2.7	12.6	-5.7	.21***	.21***
29	Relationship with friends	7.1	18.5	-3.1	.12**	.08*
30	Time for hobbies	14.8	25.1	-1.8	.13***	.11**
31	Returning to work	2.0	12.8	-7.0	.05	.04
32	Change of job content	2.3	13.7	-6.4	.04	.02
33	Resuming school	1.4	11.1	-8.5	.04	.01
Parenting and Newborn Behaviours						
34	Difficult parenting	13.1	24.2	-2.0	.26***	.21***
35	Difficult feeding	12.3	24.7	-2.2	.23***	.20***
36	Night feeding	18.8	26.3	-1.5	.23***	.20***
37	Persistent crying	10.4	22.3	-2.4	.21***	.17***
38	Night crying of the baby	9.3	22.2	-2.7	.24***	.22***
39	Difficult falling sleep	12.9	23.6	-2.0	.22***	.18***
40	Infant’s diseases	5.7	18.6	-3.8	.15***	.12**
41	Twins, triplets	1.3	10.9	-9.0	.11**	.03

\*  $P < .05$ ; \*\*  $P < .01$ ; \*\*\*  $P < .001$ ;

**Table 3.** NLEs correlated significantly with the EPDS score at 1 month after childbirth

Item No.		1	3	8	14	16	20	25
1	Fatigue	---						
3	Reduced appetite	.04	---					
8	Insomnia	.43***	.17***	---				
14	Change of lifestyle pattern	.38***	.08*	.35***	---			
16	Decreased social opportunities	.41***	.02	.30***	.53***	---		
20	Excessive expenses	.34***	.02	.23***	.38***	.44***	---	
25	Parents-in-law's reaction	.08*	.07	.06	.12**	.05	.10**	---
26	Partner's reaction	.05	.13***	.06	.13***	.03	.12**	.39***
28	Relationships with in-law and relatives	.04	.31***	.10**	.12**	.03	.10**	.31***
34	Difficult parenting	.27***	.06	.24***	.34***	.30***	.29***	.12**
35	Difficult feeding	.27***	.10**	.25***	.35***	.26***	.24***	.08*
36	Night feeding	.36***	.03	.37***	.44***	.35***	.35***	.06
37	Persistent crying	.27***	.05	.27***	.30***	.25***	.22***	.07*
38	Night crying of the baby	.22***	.14***	.30***	.27***	.20***	.21***	.11**
39	Difficulty falling sleep	.31***	.03	.30***	.37***	.28***	.25***	.05

**Table 3.** Continued

Item No.		26	28	34	35	36	37	38
1	Fatigue							
3	Reduced appetite							
8	Insomnia							
14	Change of lifestyle pattern							
16	Decreased social opportunities							
20	Excessive expenses							
25	Parents-in-law's reaction							
26	Partner's reaction	---						
28	Relationships with in-law and relatives	.34***	---					
34	Difficult parenting	.18***	.07*	---				
35	Difficult feeding	.11**	.06	.44***	---			
36	Night feeding	.07	.05	.45***	.55***	---		
37	Persistent crying	.10**	.05	.45***	.33***	.43***	---	
38	Night crying of the baby	.18***	.14***	.41***	.34***	.48***	.53***	---
39	Difficulty falling sleep	.09*	.12**	.44***	.38***	.44***	.62***	.53***

\*  $P < .05$ ; \*\*  $P < .01$ ; \*\*\*  $P < .001$ .

Further bivariate analyses revealed that physical symptoms such as "Fatigue", "Reduced appetite", and "Insomnia" were significantly correlated with "Night crying of the baby" ( $r = .22, .14, \text{ and } .30$ , respectively); "Fatigue" and "Insomnia" were correlated with "Change of life pattern", "Difficult parenting", "Difficult feeding", "Night feeding", and "Night crying of the baby". Lifestyle Changes and Financial Problems items, including "Change of lifestyle pattern", "Decrease in social opportunities", and "Excessive expenses" were also significantly correlated with "Night crying of the baby", "Difficult parenting", "Difficult feeding", and "Night feeding" (Table 3). Thus these physical as well as life style events may be a part of Parenting and New-born Behaviours domain of NLE.

#### 4. Discussion

This study reported that the occurrence of the postpartum depression was preceded by daily hassle events. These NLEs are less striking than major stressful events listed in previous studies (e.g., Holmes & Rahe, 1967). Our results are in line with previous investigations revealing the relations between

hassles and both health problems and psychological maladaptation in the general public (Kanner, Coyne, Schaefer, & Lazurus, 1981; Nakano, 1989). Kanner et al. (1981) reported that hassles were more predictive of psychological symptoms than major life events.

Unique to our study was the finding that after controlling for MBQ scores at Wave 1, Wave 2 depression severity was associated with the negative impact of most items categorised as Parenting and Newborn Behaviours and some of those categorised as either Lifestyle Changes and Financial Problems or Interpersonal Relationships and Out-of-Home Activities. Wave 2 depression severity was associated much less with items belonging to Physical Symptoms and Body Image domain. These findings are not necessarily in concordance with the hypothesis that items with greater impact would be associated with greater severity of depression. Thus, NLEs with moderate negative impact, such as "Not getting back into shape" and "Collapsed body shape" (negative impact scores of 24.3 and 28.0, respectively) were only minimally associated with depression severity (partial  $r_s = .03 \text{ and } .06$ , respectively), while NLEs with negative impact scores of 10 points or less, such as "Worry about medical fees",

“Parents-in-law’s reaction”, “Partner’s reaction”, “Changed sexual life”, “Relationships with in-laws and relatives”, “Relationships with friends”, and “Infant’s diseases” (negative impact scores = 6.2, 4.0, 2.0, 5.6, 2.7, 7.1, and 5.7, respectively) were significantly associated with Wave 2 depression severity (partial  $r_s$  = .14, .24, .24, .13, .21, .12, and .15, respectively). Women’s physical symptoms (the types usually noticed by medical professionals) were not linked to Wave 2 depression severity.

Specific to the postnatal period is the link between parenting-related events and severity of depression. The infant’s crying and irregular sleep-wake cycle, and difficulty in soothing are such examples. Mothers of newborns may be particularly sensitive and vulnerable to such hassles, and they may therefore be likely to cause psychological as well as physical burdens. In Japan, most maternity clinics and local-governments hold “mothers’ classes” which prepare women for postbirth tasks by instructing them on infant bathing, changing clothes, and feeding. The results of our study suggest that advanced parenting classes focussing on specifically psychological aspects of the postbirth period are necessary for pregnant women. These should include education about the physical conditions of newborn babies, their sleep-wake patterns, and how to care for crying babies, as well as means of relaxing, seeking social support from family members and friends, and using social resource.

NLEs related to interpersonal issues, such as those associated with Lifestyle Changes and Financial Problems as well as Interpersonal Relationships and Out-of-Home Activities, showed moderate correlations with greater depression severity. Our findings suggest that women caring for infants are more sensitive and vulnerable to NLEs related to infant care and interpersonal relationships than to those related to physical conditions. As explained earlier, the postpartum period can be framed as a dynamic role transition focussing on parental role and altered relationships with significant others (Feeney, Alexander, Noller, & Hohaus, 2003; Rholes, Simpson, Campbell, & Grich, 2001; Hock, Schirtzinger, Lutz, Widaman, 1995; Simpson, Rholes, Campbell, Tran, & Wilson, 2003). Therefore, parenting stress and interpersonal conflicts with a partner and other family members may be more likely to occur. More often than not, the infant is the only “person” a woman encounters during the day. In clinical settings, perinatal health professionals should pay more detailed attention to everyday hassles—particularly interpersonal and infant-related hassles—in order to deliver better psychological support for new mothers.

Our study is not free of limitations. We investigated mothers until 1 month after childbirth. Mothers’ daily life routines may vary for at least a couple of months after childbirth, and hence this study can not be extrapolated to long-term relationships between hassle events and depression. The representativeness of our sample should be carefully considered. All of our participants were from a single prefecture in Japan. Future studies should include women from a variety of communities and with various lifestyles. As in many other cohort studies, this study was prone to selective

drop out. Only 60% of eligible women responded to our solicitation. However, this rate is very similar to that in a large community study in the U.K. (Wolke, Waylen, Samara, Steer, Goodman, Ford, & Lamberts, 2009). Although such attrition may underestimate the prevalence of psychiatric disorders, the validity of regression models is only marginally affected despite range restrictions after selective drop-out (Wolke, et al., 2009).

Also necessary is consideration about the duration of follow-up of 1 month. This may be too a short time for a longitudinal investigation. Postnatal depression may occur after the first one month postnatally and women’s life situations may change as their baby grow up. A longer term study could have created a much more impact on the results.

Our study focused on new mothers only. Fewer studies have investigated new fathers. Pre- and postbirth burden may differ between men and women (Condon, Boyce, & Corkindale, 2004). Perceived stress (Lewis, & Cooper, 1988) and change of marital satisfaction (Levy-Shiff, 1994) may be specific to the parent’s gender. Fathers are no less vulnerable than mothers to depression after childbirth (Areias, Kumar, Barros, & Fifueredo, 1996a, 1996b; Munk-Olsen, Laursen, Pedersen, & Mortensen, 2006; Paulson, & Bazemore, 2010; Teichman, & Lahav, 1987). A focus on new fathers is therefore another issue of importance.

Despite these drawbacks, our study indicated specific relationships between PND and hassles related to the infant and to interpersonal issues. Physical discomforts were, though perceived as highly stressful, not substantially related to the severity of depression. Perinatal health professionals should carefully assess maternal burden related to infant care and interpersonal events.

## 5. Conclusions

Women caring for infants are more vulnerable to NLEs related to infant care and interpersonal relationships than to those related to physical conditions. Clinicians should pay more attention to events related to infant care during the postpartum period.

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