

Effects of Paternity Leave on Maternal Postpartum Depression in Hong Kong Chinese

Ka-Wai HO MBBS, MRCOG

Department of Obstetrics and Gynaecology, Tuen Mun Hospital, New Territories, Hong Kong

Felix YF IU MBChB, MRCOG, FHKAM (O&G)

Department of Obstetrics and Gynaecology, Tuen Mun Hospital, New Territories, Hong Kong

Sin-Ying TSE MBChB

Department of Obstetrics and Gynaecology, Tuen Mun Hospital, New Territories, Hong Kong

Chui-Shan YIP MBChB

Department of Obstetrics and Gynaecology, Tuen Mun Hospital, New Territories, Hong Kong

Sidney KC AU YEUNG MBBS, FRCOG, FHKAM (O&G)

Department of Obstetrics and Gynaecology, Tuen Mun Hospital, New Territories, Hong Kong

Hon-Cheung LEE MBBS, FRCOG, FHKAM (O&G)

Department of Obstetrics and Gynaecology, Tuen Mun Hospital, New Territories, Hong Kong

Objectives: To examine the effects of paternity leave on maternal postpartum depression, paternal involvement in neonatal care, and maternal perception of social support in Hong Kong Chinese.

Methods: A prospective study was conducted from July to September 2013 in Tuen Mun Hospital, Hong Kong, among postpartum women with liveborn babies. The subjects were assessed by a self-administered survey between 1 and 5 days postpartum, and again at 6 to 8 weeks postpartum. Postpartum depression and social support were assessed using the Edinburgh Postnatal Depression Scale and the Multidimensional Scale of Perceived Social Support, respectively. Paternal involvement in baby care was rated on a Likert scale.

Results: A total of 424 (65.1%) of the 651 subjects responded to the second survey between 6 and 8 weeks postpartum. The prevalence of postpartum depression was 31.4% (133/423). Postpartum depression was associated with shorter duration of stay in Hong Kong, lower family income, lower perceived social support, and lower paternal involvement. The prevalence of paternity leave was 61.6% (261/424) with a mean duration of 8.9 days. Paternity leave was associated with paternal involvement, partner companionship during labour, and some demographic variables (marital status, maternal work status, education level, duration of stay in Hong Kong, family income, household size, number of existing children, helper availability, and pregnancy plan). Paternity leave had no statistically significant effect on maternal perception of social support or postpartum depression.

Conclusion: Although paternity leave was associated with increased paternal involvement in baby care, which was in turn associated with a reduced risk of postpartum depression, it had no direct effect on postpartum depression. Hong Kong J Gynaecol Obstet Midwifery 2015; 15(2):187-200

Keywords: Depression, postpartum; Parental leave; Paternal behavior; Pregnancy complications; Social support

Introduction

Paternity leave is a form of parental leave offered to the father of a newborn so that he can give support to the mother, bond with the newborn, and participate in baby care. Laws about paternity leave vary around the world, with some places offering very generous terms up to months, and others fewer measures in place to promote and protect parental leave. Paternity leave can be taken both before and after a birth, for varying lengths of time. In some places, people are entitled to full or partial pay during their paternity leave. In places where paternity leave is not required by law, it is still provided by some proactive employers. In other instances, the employee has to negotiate with the employer to obtain leave to care for a newborn, and may be forced to take limited time off

without pay. Other employers may grant annual leave to facilitate the new father who wants to spend some time at home. In this study, paternity leave refers to leave taken around the time of delivery that can be paid or unpaid paternity leave, annual leave, or other kinds of leave, and is equally applicable to births within both marital and non-marital partnerships.

The Hong Kong community attaches increasing importance to the father's responsibilities in the family.

Correspondence to: Dr Ka-Wai Ho

Email: hkwoghk@gmail.com

There is an increasing trend for provision of paternity leave by private enterprises for their employees. According to statistics from the Labour Department of the Hong Kong SAR Government, the percentage of respondent private organisations who offer paternity leave on their own volition has increased from 16% in 2006 to 32.5% in 2010¹. Starting from April 2012, eligible government employees can enjoy 5 working days of full-pay paternity leave on each occasion of childbirth. There are views that the Government should legislate for the provision of paternity leave by all employers.

Postpartum depression is a common disorder, with a prevalence estimated at about 12.7% to 24.2% of deliveries in Hong Kong Chinese women². Maternal depression has deleterious effects on the new mother, her baby, and her family³. Risk factors for postpartum depression include stressful life events during pregnancy, difficult birth, marital difficulties, lack of social support, personal history of mood disorders, and depressed mood and / or anxiety during pregnancy⁴. The lack of social support as a risk factor for postpartum depression has been particularly studied. Women who perceive to receive more social support have less psychological distress in the postpartum period⁵. Depressed women tend to have less social support than others⁶ and report less support from their partner⁷. The partner's supportive role seems to be a protective factor against the development of postpartum depression^{8,9}. The lack of paternal involvement in baby care may predict the intensity of maternal depressive symptoms^{10,11}. The provision of paternity leave may encourage paternal support for the mother and paternal involvement in baby care, and thus prevent postpartum depression.

To our knowledge, there has been no local research about the relationship between paternity leave and postpartum health. In this study we examined the effects of paternity leave on maternal postpartum depression, paternal involvement in neonatal care, and maternal perception of social support in the Chinese population of Hong Kong.

Methods

Study Design

A prospective observational study was conducted from July 2013 to September 2013 at Tuen Mun Hospital, Hong Kong. Ethics approval was obtained from the New Territories West Cluster Clinical and Research Ethics Committee before commencement of the study. Postpartum women with liveborn babies were invited to participate in the study by the authors while they were in the postnatal ward. Women who: (1) had active psychiatric disease; (2)

were not ethnic Chinese; (3) were not permanent residents in Hong Kong; (4) did not have a partner (husband or boyfriend); or (5) whose partner was not in full-time employment were excluded.

Informed consent was obtained from women who agreed to participate. Each woman was assigned a unique research number and asked to complete a demographic questionnaire, the Edinburgh Postnatal Depression Scale (EPDS) and the Multidimensional Scale of Perceived Social Support (MSPSS) between the first and fifth day postpartum (time 1). The subjects were given another self-administered survey, along with a stamped envelope, to be completed and returned 6 weeks postpartum (time 2). The subjects would be asked several questions about paternity leave, paternal involvement, EPDS, and MSPSS. If the subjects did not return the survey, they would be reminded by phone to complete and return the second survey before 8 weeks postpartum. This study was conducted in Chinese. All printed materials for the subjects, including information leaflets, consent forms and questionnaires, were in traditional Chinese.

Study Instruments

Postpartum depression was assessed using the Chinese version of the EPDS. The original EPDS is a 10-item self-report scale widely used to screen for postpartum depression, with items of the scale corresponding to various clinical depressive symptoms¹². The Chinese version of the EPDS has been validated among Hong Kong Chinese women. Its psychometric performance is comparable with the original scale. It has been shown to have satisfactory sensitivity and specificity using a cut-off point of 9/10 for detecting depression in Chinese women at 6 weeks postpartum¹³.

The MSPSS was used to assess social support perceived by the mother. This scale consists of 12 questions divided equally between three sources of perceived social support: family members including the husband; friends; and a significant other¹⁴. The Chinese version of the MSPSS has been validated among Hong Kong Chinese and its psychometric performance is comparable with the original scale¹⁵.

Paternal involvement in baby care was assessed over four areas (overall care, changing clothes and napkins, play, and taking care of the baby alone). Subjects were asked to rate the father's level of participation in each area through a Likert item ranging from 0 ('never') to 4 ('all the time'), and the responses were summed to give a maximum

score of 16. Cronbach's alpha for the scale used in a study¹⁰ was 0.85.

We used a demographic questionnaire to collect socio-demographic information from subjects based on known risk factors for postpartum depression. The information included age, education, marital status, number of existing children, whether the pregnancy was unplanned, employment, family income, housing, financial assistance, social support including presence of domestic helper or peiyue maid, and father's disappointment with the baby's gender¹⁶.

Obstetric and neonatal data were also collected. These included age and parity, gestation at delivery, mode of delivery, partner companionship during labour, history of medical or psychiatric illness, obstetric complications, and neonatal complications.

Sample Size Calculation

Assuming a prevalence of postpartum depression of 15%, prevalence of paternity leave of 50% and precision of 3.8%, a total of 190 subjects would be required to achieve a 5% level of significance¹⁷. With an estimated response rate of 50%, 380 cases were required for the study.

Statistical Analysis

Data were analysed using the Statistical Package for the Social Sciences Windows version 20.0 (SPSS Inc., Chicago [IL], US). For continuous variables, *p* values were obtained from the Mann-Whitney *U* test. For discrete variables, *p* values were obtained from the Fisher's exact test. Logistic regression models were used to control for the effect of several significant variables on postpartum depression. For all analyses, a $p < 0.05$ was considered statistically significant.

Results

A total of 872 mothers were approached during the study period. In all, 99 mothers were excluded based on the exclusion criteria; 122 mothers opted out of the study. A total of 651 mothers agreed to participate in the study. Written informed consent was obtained and the first survey completed while they were on our postnatal ward.

Among the subjects, 424 (65.1%) responded ('respondents') to the second survey between 6 and 8 weeks postpartum and their data were valid for analysis (Table 1). Those who completed the first survey but failed to respond to the second survey between 6 and 8 weeks postpartum are classified as 'non-respondents'. In

all, 37.7% of them required a phone reminder to return the second survey. The sample sizes for individual items in the surveys varied slightly because inadmissible or incomplete responses were rejected for analysis. For example, because a small number of respondents neglected to specify the duration or type of paternity leave, the denominators used in the corresponding analyses ranged from 421 to 424 (Table 2).

The mean EPDS score at time 1 for respondents (7.5) and non-respondents (7.9) were not significantly different ($p=0.39$) [Table 1]. Respondents and non-respondents also shared similar demographic characteristics, except that respondents were more likely to be older ($p < 0.001$) and more likely to have obstetric complications ($p=0.01$).

The prevalence of postpartum depression at 6 to 8 weeks postpartum (i.e. EPDS score at time 2 ≥ 10) was 31.4% (133/423) [Table 2]. The mean \pm standard deviation EPDS score at time 2 for all respondents was 7.6 ± 5.0 .

The prevalence of paternity leave was 61.6% (261/424) [Table 2] with an overall mean duration (among those with paternity leave) of 8.9 days. In all, 23% (98/423) had paid paternity leave ranging from 1 to 31 days (mean, 4.7 days). A further 12.6% (53/421) had non-paid paternity leave ranging from 1 to 35 days (mean, 6.4 days). In addition 27.7% (117/422) took annual leave ranging from 2 to 50 days (mean, 7.6 days), and 8.8% (37/421) took other kinds of leave, such as event leave and leave from own business, ranging from 1 to 120 days (mean, 16.1 days).

Postpartum depression was associated with duration of stay in Hong Kong, family income, MSPSS at time 1, MSPSS at time 2, and paternal involvement individually. The prevalence of postpartum depression increased with shorter duration of stay in Hong Kong ($p=0.01-0.04$) [Table 3], lower family income ($p=0.03$) [Table 4], lower MSPSS scores ($p < 0.001$) [Table 5], and lower scores of paternal involvement ($p=0.001$) [Table 6].

Paternity leave was associated with increased paternal involvement ($p=0.001$) [Table 6], but had no statistically significant effect on MSPSS score at time 2 ($p=0.48$) [Table 5]. Paternity leave increased the scores for each of the assessed areas of paternal involvement in baby care (overall care, $p=0.001$; changing clothes and napkins, $p=0.002$; playing with the baby, $p=0.01$; and taking care of the baby alone, $p=0.01$).

Table 1. Characteristics of respondents and non-respondents*

Characteristics	Respondents [†] (n=424)	Non-respondents [†] (n=227)	Overall (n=651)	p Value [‡]
Maternal age (years)				<0.001
Mean	31.2 ± 4.8	29.0 ± 5.2	30.5 ± 5.1	
<18	1 (0.2)	1 (0.4)	2 (0.3)	
18-24	36 (8.5)	47 (20.7)	83 (12.7)	
25-34	278 (65.6)	143 (63.0)	421 (64.7)	
≥35	109 (25.7)	36 (15.9)	145 (22.3)	
Parity	0.6 ± 0.8	0.5 ± 0.7	0.6 ± 0.7	0.14
Marital status				0.06
Cohabitation	20 (4.7)	21 (9.3)	41 (6.3)	
Married	396 (93.4)	200 (88.1)	596 (91.6)	
Divorced / single	8 (1.9)	6 (2.6)	14 (2.2)	
Duration of stay in Hong Kong				0.31
0-1 Year	14 (3.3)	5 (2.2)	19 (2.9)	
2-5 Years	48 (11.4)	29 (12.9)	77 (11.9)	
6-9 Years	19 (4.5)	17 (7.6)	36 (5.6)	
>10 Years	340 (80.8)	173 (77.2)	513 (79.5)	
Work status				0.12
Full-time work	219 (51.7)	110 (48.5)	329 (50.5)	
Part-time work	14 (3.3)	12 (5.3)	26 (4.0)	
Housewife	189 (44.6)	100 (44.1)	289 (44.4)	
Others	2 (0.5)	5 (2.2)	7 (1.1)	
Education level				0.32
Primary school	4 (0.9)	3 (1.3)	7 (1.1)	
Secondary school	294 (69.3)	167 (73.6)	461 (70.8)	
Forms 6-7	30 (7.1)	19 (8.4)	49 (7.5)	
Tertiary or above	96 (22.6)	38 (16.7)	134 (20.6)	
Family income (HK\$)				0.49
<10,000	46 (10.9)	25 (11.1)	71 (11.0)	
10,000-29,999	249 (59.1)	146 (64.6)	395 (61.1)	
30,000-49,999	100 (23.8)	45 (19.9)	145 (22.4)	
≥50,000	26 (6.2)	10 (4.4)	36 (5.6)	
Living environment				0.53
Owned private housing	135 (32.2)	64 (29.0)	199 (31.1)	
Rented private housing	66 (15.8)	44 (19.9)	110 (17.2)	
A part of rented private housing	9 (2.1)	4 (1.8)	13 (2.0)	
Owned public housing	53 (12.6)	19 (8.6)	72 (11.3)	
Rented public housing	132 (31.5)	78 (35.3)	210 (32.8)	
Temporary housing	6 (1.4)	4 (1.8)	10 (1.6)	
Others	18 (4.3)	8 (3.6)	26 (4.1)	
Economic support				0.09
No	414 (98.6)	217 (96.4)	631 (97.8)	
Yes	6 (1.4)	8 (3.6)	14 (2.2)	

Abbreviations: EPDS = Edinburgh Postnatal Depression Scale; MSPSS = Multidimensional Scale of Perceived Social Support; time 1 = first survey

* Data are shown as No. (%) of respondents or mean ± standard deviation. A minority of subjects did not answer all questions in the survey, hence the total number of subjects for each item may vary

† Respondents refer to those who responded to the second survey between 6 and 8 weeks postpartum. Non-respondents refer to those who completed the first survey but failed to respond to the second survey between 6 and 8 weeks postpartum

‡ For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher's exact test

Table 1. (cont'd)

Characteristics	Respondents [†] (n=424)	Non-respondents [†] (n=227)	Overall (n=651)	p Value [‡]
Household size	3.0 ± 1.7	3.0 ± 1.6	3.0 ± 1.7	0.74
No. of existing children	0.7 ± 0.8	0.7 ± 0.9	0.7 ± 0.9	0.16
Living with parents				0.14
No	371 (88.3)	188 (83.9)	559 (86.8)	
Yes	49 (11.7)	36 (16.1)	85 (13.2)	
Living with parents-in-law				0.17
No	312 (74.3)	155 (68.9)	467 (72.4)	
Yes	108 (25.7)	70 (31.1)	178 (27.6)	
Helper availability				0.92
No	322 (76.8)	171 (76.3)	493 (76.7)	
Yes	97 (23.2)	53 (23.7)	150 (23.3)	
Planned pregnancy				0.13
No	126 (30.0)	81 (36.0)	207 (32.1)	
Yes	294 (70.0)	144 (64.0)	438 (67.9)	
Partner disappointment about the baby's gender				1.00
No	402 (95.7)	215 (95.6)	617 (95.7)	
Yes	18 (4.3)	10 (4.4)	28 (4.3)	
Gestation at delivery				0.99
<28 Weeks	1 (0.2)	1 (0.4)	2 (0.3)	
28-31+ Weeks	2 (0.5)	1 (0.4)	3 (0.5)	
32-33+ Weeks	4 (0.9)	2 (0.9)	6 (0.9)	
34-36+ Weeks	32 (7.5)	18 (7.9)	50 (7.7)	
37-41+ Weeks	385 (90.8)	205 (90.3)	590 (90.6)	
Mode of delivery				0.52
Normal spontaneous delivery	265 (62.5)	149 (65.6)	414 (63.6)	
Assisted vaginal delivery	41 (9.7)	25 (11.0)	66 (10.1)	
Elective Caesarean section	37 (8.7)	20 (8.8)	57 (8.8)	
Emergency Caesarean section	81 (19.1)	33 (14.5)	114 (17.5)	
Partner companionship during labour				0.80
No	195 (49.4)	108 (50.7)	303 (49.8)	
Yes	200 (50.6)	105 (49.3)	305 (50.2)	
History of medical illness				0.14
No	365 (86.1)	185 (81.5)	550 (84.5)	
Yes	59 (13.9)	42 (18.5)	101 (15.5)	
History of psychiatric illness				0.87
No	396 (93.4)	211 (93.0)	607 (93.2)	
Yes	28 (6.6)	16 (7.0)	44 (6.8)	
Obstetric complications				0.01
No	213 (50.2)	138 (60.8)	351 (53.9)	
Yes	211 (49.8)	89 (39.2)	300 (46.1)	
Neonatal complications				0.77
No	324 (76.4)	171 (75.3)	495 (76.0)	
Yes	100 (23.6)	56 (24.7)	156 (24.0)	
EPDS score at time 1	7.5 ± 4.2	7.9 ± 4.6	7.7 ± 4.4	0.39
EPDS score at time 1 ≥10				0.66
No	282 (67.5)	148 (65.8)	430 (66.9)	
Yes	136 (32.5)	77 (34.2)	213 (33.1)	
MSPSS score at time 1	69.5 ± 13.9	68.3 ± 14.9	69.1 ± 14.3	0.50

Table 2. Characteristics of paternity leave taken by partners of respondents with and without postpartum depression*

Variable	EPDS score <10	EPDS score ≥10	Total	p Value [†]
Presence of PL				0.75
No	110 (37.9)	53 (39.8)	163 (38.5)	
Yes	180 (62.1)	80 (60.2)	260 (61.5)	
Total duration of leave (for respondents with / without paternity leave)	5.7 ± 8.9	4.9 ± 11.3	5.4 ± 9.7	0.43
Paid PL	1.0 ± 2.6	1.2 ± 3.4	1.1 ± 2.9	0.70
Non-paid PL	0.9 ± 3.5	0.6 ± 2.0	0.8 ± 3.1	0.57
Annual leave	2.2 ± 5.5	1.8 ± 3.7	2.1 ± 5.0	0.72
Other kinds of leave	1.5 ± 6.7	1.3 ± 10.5	1.4 ± 8.1	0.74
Comparison of paid PL with other categories				0.91
Paid PL	66 (23.1)	32 (24.1)	98 (23.4)	
No PL	110 (38.5)	53 (39.8)	163 (38.9)	
Non-paid / annual / others	110 (38.5)	48 (36.1)	158 (37.7)	
Comparison of non-paid PL with other categories				0.86
Non-paid PL	38 (13.3)	15 (11.3)	53 (12.6)	
No PL	110 (38.5)	53 (39.8)	163 (38.9)	
Paid / annual / others	138 (48.3)	65 (48.9)	203 (48.4)	

Abbreviations: EPDS = Edinburgh Postnatal Depression Scale; PL = paternity leave

* Data are shown as No. (%) of respondents or mean ± standard deviation. A minority of subjects did not answer all questions in the survey, hence the total number of subjects for each item may vary

† For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher's exact test

It was also associated with partner companionship during labour ($p=0.01$) [Table 7], and some demographic variables (marital status, maternal work status, education level, duration of stay in Hong Kong, family income, household size, number of existing children, helper availability, and pregnancy plan) [Table 3].

Paternity leave had no statistically significant effect on maternal postpartum depression ($p=0.75$) [Table 2], even after controlling for significant variables (duration of stay in Hong Kong, family income, MSPSS score at time 2, and paternal involvement) using logistic regression ($p=0.85$). Sub-categories of paternity leave also had no statistically significant effect on postpartum depression (p values, 0.57-0.74). Subgroup analyses of paid and non-paid paternity leave likewise showed no statistically significant effect on postpartum depression (Table 2).

Discussion

The prevalence of postpartum depression in Asian countries ranges from 3.5% to 63.3%, and the prevalence in Hong Kong Chinese women ranges from 12.7 to 24.2%². In our study, the prevalence of postpartum

depression at 6 to 8 weeks postpartum was 31.4%, relatively high compared with previous studies of Hong Kong Chinese². The women in our locality might be more prone to develop postpartum depression because of their socio-economic characteristics. The obstetric population in the New Territories West Cluster tended to be younger, less educated, and of lower income compared with those in other parts of Hong Kong¹⁸. Our estimation of the prevalence was limited by self-selection bias, as our subjects might differ significantly in their susceptibility to depression from women who opted out of the study. Despite a reasonably high response rate, the risk of non-response bias, where depressed subjects would be more likely or less likely to respond to the second survey, could not be eliminated. The characteristics of respondents and non-respondents were largely comparable, except that the respondents tended to be older and suffer from obstetric complications (which were not shown to be associated with postpartum depression in this study). Finally, direct comparison with previous studies might be inappropriate because of differences in timing and methods for detection of postpartum depression, cut-off scores for diagnosis, and inclusion criteria.

Table 3. Maternal age, parity, marital status, duration of stay in Hong Kong, work status, and education level of respondents with and without postpartum depression and paternity leave*

Variable	EPDS score <10	EPDS score ≥10	Total	p Value [†]
Maternal age (years)	31.2 ± 4.8	31.2 ± 4.9	31.2 ± 4.8	0.73
Maternal age-group (years)				0.99
<18	1 (0.3)	0	1 (0.2)	
18-24	25 (8.6)	11 (8.3)	36 (8.5)	
25-34	190 (65.5)	87 (65.4)	277 (65.5)	
≥35	74 (25.5)	35 (26.3)	109 (25.8)	
Parity	0.6 ± 0.8	0.6 ± 0.8	0.6 ± 0.8	0.64
Marital status				0.44
Cohabitation	13 (4.5)	7 (5.3)	20 (4.7)	
Married	273 (94.1)	122 (91.7)	395 (93.4)	
Divorced / single	4 (1.4)	4 (3.0)	8 (1.9)	
Duration of stay in Hong Kong category 1 (years)				0.03
0-1 Year	11 (3.8)	3 (2.3)	14 (3.3)	
2-5 Years	24 (8.3)	24 (18.2)	48 (11.4)	
6-9 Years	12 (4.2)	7 (5.3)	19 (4.5)	
≥10 Years	241 (83.7)	98 (74.2)	339 (80.7)	
Duration of stay in Hong Kong category 2 (years)				0.04
0-5 Years	35 (12.2)	27 (20.5)	62 (14.8)	
≥6 Years	253 (87.8)	105 (79.5)	358 (85.2)	
Duration of stay in Hong Kong category 3 (years)				0.03
0-9 Years	47 (16.3)	34 (25.8)	81 (19.3)	
≥10 Years	241 (83.7)	98 (74.2)	339 (80.7)	
Duration of stay in Hong Kong category 4 (years)				0.01
2-5 Years	24 (8.3)	24 (18.2)	48 (11.4)	
Others	264 (91.7)	108 (81.8)	372 (88.6)	
Work status				0.19
Full-time work	155 (53.4)	63 (47.4)	218 (51.5)	
Part-time work	12 (4.1)	2 (1.5)	14 (3.3)	
Housewife	121 (41.7)	68 (51.1)	189 (44.7)	
Others	2 (0.7)	0	2 (0.5)	
Education level				0.24
Primary school	1 (0.3)	3 (2.3)	4 (0.9)	
Secondary school	204 (70.3)	89 (66.9)	293 (69.3)	
Forms 6-7	22 (7.6)	8 (6.0)	30 (7.1)	
Tertiary or above	63 (21.7)	33 (24.8)	96 (22.7)	

Abbreviation: EPDS = Edinburgh Postnatal Depression Scale

* Data are shown as No. (%) of subjects or mean ± standard deviation. A minority of subjects did not answer all questions in the survey, hence the total number of subjects for each item may vary

† For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher's exact test

Table 3. (cont'd)

Variable	With paternity leave	Without paternity leave	Total	p Value [†]
Maternal age (years)	31.4 ± 4.6	31.0 ± 5.1	31.2 ± 4.8	0.51
Maternal age-group (years)				
<18	0	1 (0.6)	1 (0.2)	
18-24	21 (8.0)	15 (9.2)	36 (8.5)	
25-34	171 (65.5)	107 (65.6)	278 (65.6)	
≥35	69 (26.4)	40 (24.5)	109 (25.7)	
Parity	0.6 ± 0.8	0.7 ± 0.8	0.6 ± 0.8	0.07
Marital status category 1				0.02
Cohabitation	13 (5.0)	7 (4.3)	20 (4.7)	
Married	247 (94.6)	149 (91.4)	396 (93.4)	
Divorced / single	1 (0.4)	7 (4.3)	8 (1.9)	
Marital status category 2				0.01
Cohabitation / married	260 (99.6)	156 (95.7)	416 (98.1)	
Divorced / single	1 (0.4)	7 (4.3)	8 (1.9)	
Duration of stay in Hong Kong category 1 (years)				<0.001
0-1 Year	6 (2.3)	8 (5.0)	14 (3.3)	
2-5 Years	18 (6.9)	30 (18.6)	48 (11.4)	
6-9 Years	8 (3.1)	11 (6.8)	19 (4.5)	
≥10 Years	228 (87.7)	112 (69.6)	340 (80.8)	
Duration of stay in Hong Kong category 2 (years)				<0.001
0-5 Years	24 (9.2)	38 (23.6)	62 (14.7)	
≥6 Years	236 (90.8)	123 (76.4)	359 (85.3)	
Duration of stay in Hong Kong category 3 (years)				<0.001
0-9 Years	32 (12.3)	49 (30.4)	81 (19.2)	
≥10 Years	228 (87.7)	112 (69.6)	340 (80.8)	
Duration of stay in Hong Kong category 4 (years)				<0.001
2-5 Years	18 (6.9)	30 (18.6)	48 (11.4)	
Others	242 (93.1)	131 (81.4)	373 (88.6)	
Work status				<0.001
Full-time work	156 (59.8)	63 (38.7)	219 (51.7)	
Part-time work	10 (3.8)	4 (2.5)	14 (3.3)	
Housewife	94 (36.0)	95 (58.3)	189 (44.6)	
Others	1 (0.4)	1 (0.6)	2 (0.5)	
Education level				<0.001
Primary school	1 (0.4)	3 (1.8)	4 (0.9)	
Secondary school	160 (61.3)	134 (82.2)	294 (69.3)	
Forms 6-7	23 (8.8)	7 (4.3)	30 (7.1)	
Tertiary or above	77 (29.5)	19 (11.7)	96 (22.6)	

Table 4. Demographics of household of respondents with and without postpartum depression and paternity leave*

Variable	EPDS score <10	EPDS score ≥10	Total	p Value [†]
Family income category 1 [‡] (HK\$)				0.03
<10,000	25 (8.7)	21 (15.8)	46 (11.0)	
10,000-29,999	168 (58.5)	81 (60.9)	249 (59.3)	
30,000-49,999	78 (27.2)	22 (16.5)	100 (23.8)	
≥50,000	16 (5.6)	9 (6.8)	25 (6.0)	
Family income category 2 [‡] (HK\$)				0.04
<10,000	25 (8.7)	21 (15.8)	46 (11.0)	
≥10,000	262 (91.3)	112 (84.2)	374 (89.0)	
Living environment				0.31
Owned private housing	97 (33.9)	37 (28.0)	134 (32.1)	
Rented private housing	44 (15.4)	22 (16.7)	66 (15.8)	
A part of rented private housing	3 (1.0)	6 (4.5)	9 (2.2)	
Owned public housing	39 (13.6)	14 (10.6)	53 (12.7)	
Rented public housing	87 (30.4)	45 (34.1)	132 (31.6)	
Temporary housing	4 (1.4)	2 (1.5)	6 (1.4)	
Others	12 (4.2)	6 (4.5)	18 (4.3)	
Economic support				0.08
No	284 (99.3)	129 (97.0)	413 (98.6)	
Yes	2 (0.7)	4 (3.0)	6 (1.4)	
Household size	3.0 ± 1.6	2.9 ± 1.8	3.0 ± 1.7	0.15
No. of existing children	0.8 ± 0.8	0.7 ± 0.9	0.7 ± 0.8	0.68
Living with parents				0.74
No	251 (87.8)	119 (89.5)	370 (88.3)	
Yes	35 (12.2)	14 (10.5)	49 (11.7)	
Living with parents-in-law				1.00
No	212 (74.1)	99 (74.4)	311 (74.2)	
Yes	74 (25.9)	34 (25.6)	108 (25.8)	
Helper availability				0.17
No	213 (74.7)	108 (81.2)	321 (76.8)	
Yes	72 (25.3)	25 (18.8)	97 (23.2)	
Planned pregnancy				0.26
No	81 (28.3)	45 (33.8)	126 (30.1)	
Yes	205 (71.7)	88 (66.2)	293 (69.9)	
Partner disappointment with the baby's gender				0.30
No	276 (96.5)	125 (94.0)	401 (95.7)	
Yes	10 (3.5)	8 (6.0)	18 (4.3)	

Abbreviation: EPDS = Edinburgh Postnatal Depression Scale

* Data are shown as No. (%) of subjects or mean ± standard deviation. A minority of subjects did not answer all questions in the survey, hence the total number of subjects for each item may vary

† For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher's exact test

‡ Family income was grouped into two categories, including 4 subgroups as category 1 and 2 subgroups as category 2

Table 4. (cont'd)

Variable	With paternity leave	Without paternity leave	Total	p Value [†]
Family income category 1 [‡] (HK\$)				<0.001
<10,000	14 (5.4)	32 (20.0)	46 (10.9)	
10,000-29,999	146 (55.9)	103 (64.4)	249 (59.1)	
30,000-49,999	78 (29.9)	22 (13.8)	100 (23.8)	
≥50,000	23 (8.8)	3 (1.9)	26 (6.2)	
Family income category 2 [‡] (HK\$)				<0.001
<10,000	14 (5.4)	32 (20.0)	46 (10.9)	
≥10,000	247 (94.6)	128 (80.0)	375 (89.1)	
Living environment				<0.001
Owned private housing	99 (38.4)	36 (22.4)	135 (32.2)	
Rented private housing	41 (15.9)	25 (15.5)	66 (15.8)	
A part of rented private housing	3 (1.2)	6 (3.7)	9 (2.1)	
Owned public housing	36 (14.0)	17 (10.6)	53 (12.6)	
Rented public housing	67 (26.0)	65 (40.4)	132 (31.5)	
Temporary housing	1 (0.4)	5 (3.1)	6 (1.4)	
Others	11 (4.3)	7 (4.3)	18 (4.3)	
Economic support				0.21
No	256 (99.2)	158 (97.5)	414 (98.6)	
Yes	2 (0.8)	4 (2.5)	6 (1.4)	
Household size	2.8 ± 1.6	3.2 ± 1.8	3.0 ± 1.7	0.04
No. of existing children	0.7 ± 0.8	0.9 ± 0.9	0.7 ± 0.8	0.01
Living with parents				0.21
No	232 (89.9)	139 (85.8)	371 (88.3)	
Yes	26 (10.1)	23 (14.2)	49 (11.7)	
Living with parents-in-law				0.49
No	195 (75.6)	117 (72.2)	312 (74.3)	
Yes	63 (24.4)	45 (27.8)	108 (25.7)	
Helper availability				0.02
No	188 (72.9)	134 (83.2)	322 (76.8)	
Yes	70 (27.1)	27 (16.8)	97 (23.2)	
Planned pregnancy				0.002
No	63 (24.4)	63 (38.9)	126 (30.0)	
Yes	195 (75.6)	99 (61.1)	294 (70.0)	
Partner disappointment with the baby's gender				0.81
No	246 (95.3)	156 (96.3)	402 (95.7)	
Yes	12 (4.7)	6 (3.7)	18 (4.3)	

Table 5. MSPSS score with and without postpartum depression and paternity leave*

Variable	EPDS score <10	EPDS score ≥10	Overall	p Value [†]
MSPSS score at time 1	71.5 ± 12.9	65.3 ± 15.1	69.5 ± 13.9	<0.001
MSPSS score at time 2	69.6 ± 13.0	60.0 ± 16.9	66.6 ± 15.0	<0.001
Variable	With paternity leave	Without paternity leave	Overall	p Value [†]
MSPSS score at time 1	69.7 ± 13.4	69.2 ± 14.7	69.5 ± 13.9	0.94
MSPSS score at time 2	67.2 ± 14.6	65.8 ± 15.7	66.6 ± 15.0	0.48
Correlation	Overall		EPDS score at time 1 ≥10	
	Change in EPDS score	p Value	Change in EPDS score	p Value [†]
MSPSS score at time 2	-0.146	0.003	-0.197	0.02

Abbreviations: EPDS = Edinburgh Postnatal Depression Scale; MSPSS = Multidimensional Scale of Perceived Social Support; time 1 = first survey; time 2 = second survey

* Data are shown as mean ± standard deviation

† For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher’s exact test

Table 6. Rating of paternal involvement with and without postpartum depression and paternity leave*

Variable	EPDS score <10	EPDS score ≥10	Overall	p Value [†]
Paternal involvement in baby care	12.1 ± 3.9	10.8 ± 4.0	11.7 ± 3.9	0.001
Taking care of the baby	3.2 ± 1.0	3.0 ± 1.0	3.1 ± 1.0	0.04
Changing clothes and napkins	2.9 ± 1.2	2.6 ± 1.3	2.8 ± 1.3	0.002
Playing with the baby	3.4 ± 0.9	3.1 ± 1.0	3.3 ± 0.9	0.002
Taking care of the baby alone	2.6 ± 1.3	2.2 ± 1.3	2.5 ± 1.3	0.003
Variable	With paternity leave	Without paternity leave	Overall	p Value [†]
Paternal involvement in baby care	12.3 ± 3.5	10.8 ± 4.4	11.7 ± 3.9	0.001
Taking care of the baby	3.3 ± 0.9	2.9 ± 1.1	3.1 ± 1.0	0.001
Changing clothes and napkins	3.0 ± 1.1	2.5 ± 1.4	2.8 ± 1.3	0.002
Playing with the baby	3.4 ± 0.8	3.1 ± 1.0	3.3 ± 0.9	0.01
Taking care of the baby alone	2.6 ± 1.2	2.2 ± 1.4	2.5 ± 1.3	0.01
Correlation	Overall		EPDS score at time 1 ≥10	
	Change in EPDS score	p Value	Change in EPDS score	p Value [†]
Paternal involvement in baby care	-0.177	<0.001	-0.344	<0.001
Taking care of the baby	-0.160	0.001	-0.306	<0.001
Changing clothes and napkins	-0.155	0.002	-0.314	<0.001
Playing with the baby	-0.185	<0.001	-0.429	<0.001
Taking care of the baby alone	-0.130	0.01	-0.189	0.03

Abbreviation: EPDS = Edinburgh Postnatal Depression Scale

* Data are shown as mean ± standard deviation, unless otherwise specified

† For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher’s exact test

Table 7. Obstetric characteristics and co-morbidities of respondents*

Variable	EPDS score <10	EPDS score ≥10	Total	p Value [†]
Gestation at delivery				0.23
<28 Weeks	1 (0.3)	0	1 (0.2)	
28-31+ Weeks	1 (0.3)	1 (0.8)	2 (0.5)	
32-33+ Weeks	3 (1.0)	1 (0.8)	4 (0.9)	
34-36+ Weeks	17 (5.9)	15 (11.3)	32 (7.6)	
37-41+ Weeks	268 (92.4)	116 (87.2)	384 (90.8)	
Mode of delivery				0.84
Normal spontaneous delivery	182 (62.8)	82 (61.7)	264 (62.4)	
Assisted vaginal delivery	26 (9.0)	15 (11.3)	41 (9.7)	
Elective Caesarean section	27 (9.3)	10 (7.5)	37 (8.7)	
Emergency Caesarean section	55 (19.0)	26 (19.5)	81 (19.1)	
Partner companionship during labour				0.11
No	125 (46.6)	70 (55.6)	195 (49.5)	
Yes	143 (53.4)	56 (44.4)	199 (50.5)	
History of medical illness				0.45
No	252 (86.9)	112 (84.2)	364 (86.1)	
Yes	38 (13.1)	21 (15.8)	59 (13.9)	
History of psychiatric illness				1.00
No	271 (93.4)	124 (93.2)	395 (93.4)	
Yes	19 (6.6)	9 (6.8)	28 (6.6)	
Obstetric complications				0.47
No	149 (51.4)	63 (47.4)	212 (50.1)	
Yes	141 (48.6)	70 (52.6)	211 (49.9)	
Neonatal complications				0.11
No	228 (78.6)	95 (71.4)	323 (76.4)	
Yes	62 (21.4)	38 (28.6)	100 (23.6)	
Variable	With paternity leave	Without paternity leave	Total	p Value [†]
Gestation at delivery				0.22
<28 Weeks	1 (0.4)	0	1 (0.2)	
28-31+ Weeks	1 (0.4)	1 (0.6)	2 (0.5)	
32-33+ Weeks	4 (1.5)	0	4 (0.9)	
34-36+ Weeks	16 (6.1)	16 (9.8)	32 (7.5)	
37-41+ Weeks	239 (91.6)	146 (89.6)	385 (90.8)	
Mode of delivery				0.10
Normal spontaneous delivery	155 (59.4)	110 (67.5)	265 (62.5)	
Assisted vaginal delivery	24 (9.2)	17 (10.4)	41 (9.7)	
Elective Caesarean section	29 (11.1)	8 (4.9)	37 (8.7)	
Emergency Caesarean section	53 (20.3)	28 (17.2)	81 (19.1)	
Partner companionship during labour				0.01
No	108 (44.1)	87 (58.0)	195 (49.4)	
Yes	137 (55.9)	63 (42.0)	200 (50.6)	
History of medical illness				0.39
No	228 (87.4)	137 (84.0)	365 (86.1)	
Yes	33 (12.6)	26 (16.0)	59 (13.9)	
History of psychiatric illness				0.55
No	242 (92.7)	154 (94.5)	396 (93.4)	
Yes	19 (7.3)	9 (5.5)	28 (6.6)	
Obstetric complications				0.23
No	125 (47.9)	88 (54.0)	213 (50.2)	
Yes	136 (52.1)	75 (46.0)	211 (49.8)	
Neonatal complications				0.91
No	200 (76.6)	124 (76.1)	324 (76.4)	
Yes	61 (23.4)	39 (23.9)	100 (23.6)	

Abbreviation: EPDS = Edinburgh Postnatal Depression Scale

* Data are shown as No. (%) of subjects. A minority of subjects did not answer all questions in the survey, hence the total number of subjects for each item may vary

[†] For continuous variables, p values were obtained from Mann-Whitney *U* test. For discrete variables, p values were obtained from Fisher's exact test

Obstetric complications, neonatal complications, and a history of psychiatric illness were not shown to be statistically significant risk factors for postpartum depression in this study (Table 7). Nonetheless all obstetric and neonatal complications and a history of psychiatric illnesses (after exclusion of active psychiatric illness) were included, and their nature and severity were not further categorised or studied. Therefore, the effects of severe complications and a history of major psychiatric illness might be lessened by the inclusion of minor conditions in the analysis.

Consistent with previous studies^{2,10,11}, paternal involvement in baby care and high MSPSS scores at time 1 and time 2 were shown to be protective against postpartum depression (Tables 5 and 6). This highlights the importance of encouraging paternal involvement and social support in the postpartum period. Our result was limited by the use of a non-validated questionnaire for the mother to rate paternal involvement in baby care. Women with postpartum depression might perceive their partners to be less supportive than others⁷. This could affect the correlation between maternal perception of paternal involvement and actual paternal involvement. The reduced paternal involvement demonstrated in women with postpartum depression could be attributable to bias in maternal perception.

Consistent with the studies by Séjourné et al^{10,11} in France, our study did not demonstrate any significant effect of paternity leave on postpartum depression in Hong Kong Chinese (Table 2). This could not be attributed to the limited duration of paternity leave, as there was no difference in the mean duration of paternity leave between those with or without postpartum depression. Hence, we did not stratify the duration of paternity leave for further analysis. It is possible that some paternity leave was taken in response to the development of maternal depressive symptoms in the postpartum period. This might offset the possible reduction in postpartum depression caused by longer paternity leave taken in the absence of depressive symptoms.

Although it was shown that those with paternity leave experienced higher paternal involvement, and that higher paternal involvement was associated with a lower risk of developing postpartum depression (Table 6), the magnitude of the association might be small. This might explain why this study failed to demonstrate any direct statistically significant effect of paternity leave on postpartum depression.

There were likely other factors associated with postpartum depression and paternity leave that were not addressed in this study. Such confounding factors might include marital conflict, relationship problems with in-laws, active psychiatric illness such as antepartum depression, and severe obstetric or neonatal complications. The sample size of this study may also not have been sufficiently large to demonstrate the 'small' effect in the presence of confounding factors.

Actual paternal involvement in maternal and neonatal care might be more important in the prevention of maternal postpartum depression than paternity leave per se. The provision of paternity leave did not necessarily lead to increased paternal involvement. Differences in the fathers' motivation for taking paternity leave, which was not explored in our study, might lead to differences in paternal support for the mother and newborn.

Given the positive effects of paternity leave on paternal involvement, we consider paternity leave to be a desirable component of postpartum care. In addition, our study showed that paternity leave was positively associated with partner companionship during labour (Table 7). Previous studies¹⁹ have shown that partner companionship is associated with better maternal satisfaction and obstetric outcomes.

Strengths and Limitations

To our knowledge, this is the first study to examine the effects of paternity leave on postpartum depression in Hong Kong women. Its strengths included the large sample size, reasonably high response rate, prospective design, and use of validated instruments.

It might not be appropriate to extrapolate the results of our study to all Chinese women in Hong Kong. Socio-demographic characteristics of the obstetric population vary across Hong Kong¹⁸ and this study was conducted in one regional hospital only. One-third of the subjects did not respond to the second survey, and there were some demographic differences between respondents and non-respondents. Other limitations of this study included a lack of data on the fathers' motivation for taking paternity leave, and the lack of an objective instrument to measure actual paternal involvement in baby care.

Conclusion

Although paternity leave was associated with increased paternal involvement in baby care, which

was in turn associated with a reduced risk of developing postpartum depression, paternity leave had no statistically significant direct effect on the prevalence of maternal postpartum depression. Our study highlights the importance of paternal involvement and social support in the prevention of postpartum depression.

Future research may explore the timing and duration of and motivation for paternity leave to clarify its relationship with postpartum depression. Data on known risk factors for postpartum depression such as antepartum depression and marital conflict² may be collected to study the effects of paternity leave on high-risk women who are

especially in need of family support. Future research may also study other possible beneficial effects of paternity leave, for example, its influence on breastfeeding rate.

Acknowledgements

The authors are grateful to all the mothers who took valuable time from their families to complete the surveys, and to the midwives of our postnatal wards for their dedicated work. We would like to thank Dr Yat Chow (Department of Psychiatry, Kwai Chung Hospital) for his comments on the manuscript, and Mr Jaden Lam (Quality and Safety Division, Tuen Mun Hospital) for his advice and statistical support.

References

- Labour and Welfare Bureau. Study on legislating for the provision of paternity leave in Hong Kong. Paper presented to Legislative Council Panel on Manpower on 20 June 2012. LC Paper No. CB(2)2353/11-12(03).
- Klainin P, Arthur DG. Postpartum depression in Asian cultures: a literature review. *Int J Nurs Stud* 2009; 46:1355-73.
- Leiferman J. The effect of maternal depressive symptomatology on maternal behaviors associated with child health. *Health Educ Behav* 2002; 29:596-607.
- O'Hara MW. The nature of postpartum disorders. In: Murray L, Cooper PJ, editors. Postpartum depression and child development. New York: Guilford Press 1997; 3-31.
- Stemp PS, Turner RJ, Noh S. Psychological distress in the postpartum period: the significance of social support. *J Marriage Fam* 1986; 48:271-7.
- Stein A, Cooper PJ, Campbell EA, Day A, Altham PM. Social adversity and perinatal complications: their relation to postnatal depression. *BMJ* 1989; 298:1073-4.
- O'Hara MW. Social support, life events, and depression during pregnancy and the puerperium. *Arch Gen Psychiatry* 1986; 43:569-73.
- Gotlib IH, Whiffen VE, Wallace PM, Mount JH. Prospective investigation of postpartum depression: factors involved in onset and recovery. *J Abnorm Psychol* 1991; 100:122-32.
- Marks M, Wieck A, Checkley S, Kumar C. How does marriage protect women with histories of affective disorder from post-partum relapse? *Br J Med Psychol* 1996; 69:329-42.
- Séjourné N, Beaumé M, Vaslot V, Chabrol H. Effect of paternity leave on maternal postpartum depression [in French]. *Gynecol Obstet Fertil* 2012; 40:360-4.
- Séjourné N, Vaslot V, Beaumé M, Goutaudier N, Chabrol H. The impact of paternity leave and paternal involvement in child care on maternal postpartum depression. *J Reprod Infant Psychol* 2012; 30:135-44.
- Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry* 1987; 150:782-6.
- Lee DT, Yip SK, Chiu HF, et al. Detecting postnatal depression in Chinese women. Validation of the Chinese version of the Edinburgh Postnatal Depression Scale. *Br J Psychiatry* 1998; 172:433-7.
- Zimet GD, Dahlem NW, Zimet SG, Farley GK. The Multidimensional Scale of Perceived Social Support. *J Pers Assess* 1988; 52:30-41.
- Chou KL. Assessing Chinese adolescents' social support: the Multidimensional Scale of Perceived Social Support. *Pers Individ Dif* 2000; 28:299-307.
- Lee DT, Yip AS, Leung TY, Chung TK. Identifying women at risk of postnatal depression: prospective longitudinal study. *Hong Kong Med J* 2000; 6:349-54.
- Naing L, Winn T, Rusli BN. Practical issues in calculating the sample size for prevalence studies. *Arch Orofac Sci* 2006; 1:9-14.
- Tiwari A, Chan KL, Fong D, et al. A territory-wide survey on intimate partner violence among pregnant women in Hong Kong. *Hong Kong J Gynaecol Obstet Midwifery* 2007; 7:7-15.
- Hodnett ED, Gates S, Hofmeyr GJ, Sakala C. Continuous support for women during childbirth. *Cochrane Database Syst Rev* 2012;(10):CD003766.