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Title:

Depression and anger in fathers of unsettled infants: a community cohort study.

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Abstract

Aim

To examine the relationship between unsettled infant behaviour and fathers' depressive symptoms, cognitions surrounding infant sleep (anger, doubt), and personal sleep, in a community cohort.

Method

Data were collected from 102 fathers of healthy infants at 4 weeks, 4 months, and 6 months of age. Measures included father report of infant sleep and crying problems, depressive symptoms, cognitions about infant sleep and own sleep quality and quantity. Data were analysed using adjusted regression models.

Results

Sleep problems at 4 months of age were associated with increased depressive symptoms (adjusted mean difference 2.64 (1.27-4.00)), doubt (adjusted mean difference 1.82 (.40-3.25)), anger (adjusted mean difference 1.86 (.51-3.20)), poor personal sleep quantity (adjusted OR .21; 95% CI .09-.51) and quality (adjusted OR .20; 95% CI .08-.51); and at 6 months of age, with increased depressive symptoms (adjusted mean difference 2.56 (1.28-3.84)), anger (adjusted mean difference 1.63 (.40-2.87)), poor personal sleep quantity (adjusted OR .14; 95% CI .05-.38) and quality (adjusted OR .28; 95% CI .11-.72). Infant cry problems at 4 months were associated with increased anger (adjusted mean difference 1.98 (.60-3.36)) and doubt (adjusted mean difference 1.55 (.05-3.05)); and at 6 months, with increased depressive symptoms (adjusted mean difference 3.04 (1.59-4.69)), anger (adjusted mean difference 2.73 (1.29-4.17)) and less personal sleep (adjusted OR .22; 95% CI .07-.71).

Conclusion

Fathers of unsettled infants reported greater anger toward their infant and increased depressive symptoms by 4 months infant age, with these symptoms persisting 2 months later. Evidence-based interventions are needed for these fathers.

Keywords

Unsettled infant, crying, anger, fathers, depression

What is already known on this topic:

- Infant sleep and crying problems are common and associated with poor parent mental health, yet few studies have examined the fathers of these infants.
- Persistent infant crying is the closest proximal risk factor for Abusive Head Trauma (Shaken Baby Syndrome) and male caregivers are the most common perpetrator.
- Poor paternal mental health is associated with poor outcomes for children, and increased risk of harm, yet fathers' cognitions surrounding their unsettled infant, are largely unexplored.

What this paper adds:

- Fathers of unsettled infants report increased depressive symptoms and anger toward their infant, at a time when infants are at greatest risk of harm
- Interventions that provide strategies for coping with unsettled behaviour, and increase parenting self-efficacy, may be protective for infants
- Routine screening of fathers of unsettled infants, and referral to support services, is appropriate.

Introduction

Infant sleep problems are reported by 15-35% of parents in the first few months.(1–5) Parents who are not overly intrusive, and who give their infant opportunity to settle on their own, report fewer infant sleep problems.(6,7) Fathers, in particular, are more likely to support the use of this approach (8), and therefore, father involvement in settling may be instrumental to developing favourable sleep habits.(5,9) Despite this, few studies have sought to understand fathers' experiences of their unsettled infant. Whilst mothers reporting infant sleep problems are more likely to experience depression, anger toward their infant, doubt about their parenting, and problems setting limits at bedtime than mothers of infants who do not have a sleep problem (10), this area remains largely unexplored for fathers.

Infant crying problems are also common (14-28%) (1,3–5,11) and form the closest proximal risk factor for Abusive Head Trauma (AHT; previously known as Shaken Baby Syndrome). (12) Although either parent may inflict AHT, it is more often the male caregiver who offends.(13–15) Infant crying peaks at around 2.5 hours of crying per day at 6 to 8 weeks of age and gradually declines.(16,17) Most cases of AHT occur in the third month (18–20), implying that infants with unsettled behaviour persisting past the normal peak in crying, are at risk. Given that 18-25% of infants die from AHT, with 80% of survivors suffering permanent brain injury (15,21–23), the lack of research examining fathers of unsettled infants, is concerning. Evidence suggests that cases of AHT are becoming more frequent (Brain Injury Australia online report), with 284 cases investigated by the Department of Community Services (NSW Legislative Council Questions and Answers, 2007) over a two year period. A critical step in identifying and supporting families most at risk is to examine fathers' experience of their unsettled infant.

Infant sleep and crying problems have been associated with increased risk of mental health difficulties in fathers (24,25), and around 10% of fathers display clinical levels of depressive symptoms during the postnatal period.(26) Those with unsettled infants are at greatest risk, with 30% of fathers attending an 'Unsettled Babies Clinic' in a tertiary hospital scoring in the clinical range for depression.(27) Fathers of unsettled infants need support – not only for their own wellbeing, but to avoid poor emotional and behavioural outcomes for the child, and ongoing parenting difficulties.(28,29) Early intervention or prevention strategies may be appropriate but exactly which fathers and which aspects of parenting to target remains unknown.

This study aimed to examine the extent to which fathers, drawn from a community sample, report infant sleeping and crying problems, and the extent to which these problems are associated with fathers' depressive symptoms, cognitions about infant sleep, sleep quality and quantity, and levels of social support.

Method

Participants

All parents of newborn infants across four Local Government Areas (LGAs) in the north-west region of Melbourne (Victoria, Australia) were invited to take part in a large randomised controlled trial (RCT) described elsewhere.(30) The current paper draws on data gathered from 102 fathers allocated to the control group only. Fathers with insufficient English, an infant born before 32 weeks gestation or with a serious health concern were excluded.

Materials

Demographic information. Parents provided demographic information at 4 weeks infant age including birth weight, birth order, father's education and marital status. Socio-economic Indexes for Areas (SEIFA) mapping from family's home postcode was used to measure caregiver socioeconomic status (higher scores indicate less disadvantage). (31)

Infant sleep and crying. At 4 and 6 months of infant age, fathers indicated whether their infant's sleep, crying or feeding had been a problem over the last 2 weeks (yes/no for each).

Fathers' sleep characteristics. Sleep quality and quantity were measured using two items adapted from the validated *Pittsburgh Sleep Quality Index* (PSQI).(32) Fathers ratings were dichotomised to either 'enough' / 'not enough' or 'good enough' / 'not good enough' sleep quality/quantity, respectively.

Depressive symptoms. The *Edinburgh Postnatal Depression Scale* (EPDS) (33) is a well validated, widely used, screening tool that investigates symptoms of depression in the perinatal period. The EPDS has been validated for use with fathers.(34) Scores of ≥ 9 indicate clinically significant levels of depressive symptoms in fathers from community samples. (35)

Cognitions about infant sleep. The validated *Maternal Cognitions about Infant Sleep Questionnaire* (MCISQ) (10) was adapted by substituting ‘mother’ for ‘father’ in one item of the scale, as others have done.(36) The MCISQ has sound psychometric properties (10,36) and includes subscales examining doubt, anger, and ability to set limits at bedtime. The 17-items assessing the following subscales were used: Doubt (e.g., ‘When my child doesn’t sleep at night, I doubt my competence as a parent’), Anger (e.g., ‘ When my child cries at night, I think I might lose control and harm him/her’) and Setting Limits (e.g., ‘It is all right to allow my child to cry at night’). All items were rated on a 6-point scale ranging from 0 (strongly agree) to 5 (strongly disagree).

Perceived social support. Two items from the Longitudinal Study of Australian Children (37) examined fathers perceived level of support they receive from their partner, and family and/or friends and how often they felt that they needed support but could not get any help. These items were dichotomised so that participants were categorised as either having enough help or support, or not (any other value).

Procedures

Approval to carry out this research was obtained from The Royal Children’s’ Hospital (Melbourne, Australia) Human Research Ethics Committee (28130). Maternal and Child Health (MCH) nurses asked all families of newborn infants to take part. Families who agreed completed a consent form and the primary caregiver then completed a questionnaire asking about infant characteristics at 4 weeks of age.

Statistical analyses

Regression analyses were carried out to determine whether those with/without infant sleep or crying problems at both 4 and 6 months of infant age, differed on outcomes. Analyses were adjusted for infant gender and age, socioeconomic status and father’s education.

Results

Of 150 interested fathers, 102 (68%) completed data at 4 months, and 90 (60%) at 6 months of infant age. Fathers taking part in the study were of broad age range (range 24.72 – 51.38 years, $M = 35.7$, $SD = 5.3$), slightly higher socio-economic status than average (SEIFA score, $M=1017.0$, $SD=41.4$) and most had a tertiary degree or higher (65.4%). Infants were of average birth weight ($M=3522.5$ grams, $SD=479.5$), mostly full-term (90.4%), firstborn (60.6%), and 47% were male.

Just over half of the fathers reported an infant sleep problem at 4 and 6 months of age (Table 1). Crying problems were also common at 4 months (35%) but less so at 6 months (22%). At 4 months 10% ($n=10$) of fathers had scores above the EPDS community cut off, dropping to around 4% ($n = 4$) by 6 months of infant age. Half of fathers at 4 and 6 months reported that they do not get enough sleep with slightly fewer indicating that the quality of their sleep was 'not good enough'. Although fathers felt well supported by their partners, almost 1 in 5 felt that they 'sometimes' or 'never' received help or support from family or friends and around 40% reported that they 'sometimes' or 'never' get help or support when needed.

[Insert Table 1 here]

Results (Table 2) indicate that fathers reporting an infant sleep problem at 4 months of age, had increased depressive symptoms, greater doubt and anger towards their infant, poorer sleep quality and quantity, less support from family and friends, and were likely to report that they had needed help/support and could not get it. At 6 months of age, only depressive symptoms, anger, sleep quality and sleep quantity remained significantly worse for fathers with an infant sleep problem.

[insert Table 2 here]

Fathers reporting an infant crying problem at 4 months, had increased doubt and anger towards their infant. This remained significant at 6 months, with the addition of increased depressive symptoms, less personal sleep, a lack of support from friends and family, and a greater likelihood of reporting that they have needed help/support but could not get it (Table 3).

[insert Table 3 here]

Discussion

To our knowledge, this is the first study to examine associations between unsettled infant behaviour and fathers' depressive symptoms, cognitions about their infant, personal sleep and social support. Many fathers reported an infant sleep problem at either 4 (56%) or 6 months (54%) of infant age. These proportions are high given that infant sleep generally becomes more regular and consolidated by 6 months of age.⁽³⁸⁾ Infant crying problems were fairly common at 4 months of age (35%) but reduced by 6 months of age (22%), likely reflecting the normal reduction in crying seen at this age.

Fathers reporting infant sleep problems had significantly increased depressive symptoms (at 4 and 6 months), more doubt about their ability to parent their infant at bedtime (4 months), more anger toward their infant (4 and 6 months), poorer personal sleep (4 and 6 months), and inadequate support (4 months). Infant sleep problems at 4 months of age had a broader negative impact on fathers than did infant sleep problems that were ongoing at 6 months of age.

Of concern, fathers reporting infant cry problems reported significantly greater anger toward their infant and doubt about their parenting across time points. If the cry problem was present at 6 months of age, fathers also reported significantly increased depressive symptoms, less personal sleep, a lack of support from family or friends, and were more likely to report that there were times when they needed help or support but could not get it. The proportion of fathers meeting criteria for postnatal depression was 10% at 4 months and 4% at 6 months. Depressive symptom scores were significantly higher in fathers reporting either a sleep or cry problem, highlighting the need for greater identification of and support services for this subset of fathers. The association between infant sleep problems and adverse paternal outcomes was less marked at 6 months of age, and was related to reduced doubt about parenting ability at bedtime. This may be because fathers' distress is being alleviated by increased self-efficacy, even when unsettled infant behaviour is still present.

Infant cry problems at 4 months of infant age were associated with increased feelings of doubt about parenting ability and increased feelings of anger toward the infant, but there were no differences between those with or without an infant cry problem on the other 6 measures of father wellbeing. However, at 6 months of age, those reporting an infant cry problem reported many more problems than they did at 4 months of age. Parents probably expect infant crying to reduce by 6 months of age, and it may be distressing if this does not occur.

Also, prolonged stress and interruption to paternal sleep might exacerbate depressive symptoms.

This study confirms that unsettled infant behaviour is associated with increased paternal depressive symptoms, anger, and doubt, at a time when infants are at greatest risk for AHT. Interventions that help fathers deal with unsettled behaviour could be protective for infants, as they may improve paternal feelings of self-efficacy. There is a pressing need to develop interventions that are father inclusive, particularly where risk factors are present. **Paternal emotional wellbeing needs to be examined regularly across the first 4 months of life, to better determine how anger and depressive symptoms manifest. Additionally, the potential influence of anger and/or depressive symptoms on unsettled infant behaviour should be examined.**

This study had several strengths including use of a community-based sample, inclusion of measures with well-established psychometric properties, and adjustment of analyses for potential confounders identified a priori. There are several limitations worth noting. The sample comprised of fathers from the control group of a study that aimed to reduce infant sleep and cry problems (30), therefore, it is possible that the sample was more open to seeking help than other fathers, or these fathers may have taken part because they already had concerns about their infants behaviour at only 3-4 weeks of age. In addition, all fathers were partnered, were mostly English speaking, well educated and of higher socioeconomic status than average, limiting the applicability of findings to fathers more broadly.

Services that routinely screen mothers for symptoms of postnatal depression might be well placed to screen fathers, and offer referral to appropriate support services when needed. Infant health services and parent support programs might better accommodate working fathers by increasing flexibility, using father inclusive language and addressing fathers directly. Flexible and engaging online interventions may also be appropriate for fathers who are unable to attend face-to-face appointments.

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References

1. Messer D, Richards M. The development of sleeping difficulties. In: St James-Roberts I, Harris G, Messer D, editors. *Infant crying, feeding and sleeping: development, problems and treatments*. London: Wheatsheaf; 1993. p. 150–73.
2. Bayer JK, Hiscock H, Hampton A, Wake M. Sleep problems in young infants and maternal mental and physical health. *J Paediatr Child Health*. 2007;43(1-2):66–73.
3. Wake M, Morton-Allen E, Poulakis Z, Hiscock H, Gallagher S, Oberklaid F. Prevalence, stability, and outcomes of cry-fuss and sleep problems in the first 2 years of life: prospective community-based study. *Pediatrics*. 2006 Mar;117(3):836–42.
4. Canivet C, Hagander B, Jakobsson I, Lanke J. Infantile colic--less common than previously estimated? *Acta Paediatr* [Internet]. 1996 Apr;85(4):454–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/8740304>
5. Goodlin-Jones B, Burnham M, Anders T. Sleep and sleep disturbances: regulatory processes in infancy. In: Sameroff A, Lewis M, Miller M, editors. *Handbook of developmental psychopathology*. New York: Kluwer Academic; 2000. p. 309–25.
6. St James-Roberts I, Sleep J, Morris S, Owen C, Gillham P. Use of a behavioural programme in the first 3 months to prevent infant crying and sleeping problems. *J Paediatr Child Health* [Internet]. 2001 Jun;37(3):289–97. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11468047>
7. Wolfson A, Lacks P, Futterman A. Effects of parent training on infant sleeping patterns, parents' stress, and perceived parental competence. *J Consult Clin Psychol* [Internet]. 1992 Feb;60(1):41–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/1556284>
8. Tikotzky L, Sadeh A, Glickman-Gavrieli T. Infant sleep and paternal involvement in infant caregiving during the first 6 months of life. *J Pediatr Psychol*. 2011 Jan;36(1):36–46.

9. Tikotzky L, Sadeh A, Glickman-Gavrieli T. Infant sleep and paternal involvement in infant caregiving during the first 6 months of life. *J Pediatr Psychol* [Internet]. 2011 Jan;36(1):36–46. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20444853>
10. Morrell J. The role of maternal cognitions in infant sleep problems as assessed by a new instrument, the maternal cognitions about infant sleep questionnaire. *J Child Psychol Psychiatry* [Internet]. 1999 Feb;40(2):247–58. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10188707>
11. Bayer JK, Hiscock H, Hampton A, Wake M. Sleep problems in young infants and maternal mental and physical health. *J Paediatr Child Health* [Internet]. 2007 [cited 2014 May 26];43(1-2):66–73. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17207059>
12. Barr RG. Preventing SBS with an educational campaign on infant crying: “the period of purple crying”. In: *The European Conference on Shaken Baby Syndrome*. Edinburgh; 2003.
13. Barr RG. Preventing abusive head trauma resulting from a failure of normal interaction between infants and their caregivers. *Proc Natl Acad Sci* [Internet]. 2012 Oct 8 [cited 2015 Oct 19];109(Supplement_2):17294–301. Available from: http://www.pnas.org/cgi/content/long/109/Supplement_2/17294
14. Christian CW, Block R. Abusive head trauma in infants and children. *Pediatrics* [Internet]. 2009 May 1 [cited 2015 Oct 29];123(5):1409–11. Available from: <http://pediatrics.aappublications.org/content/123/5/1409.full>
15. Starling SP, Holden JR, Jenny C. Abusive Head Trauma: The Relationship of Perpetrators to Their Victims. *Pediatrics*. 1995;95(2).
16. Michelsson K, Rinne A, Paaianen S. Crying, feeding and sleeping patterns in 1 to 12-month-old infants. *Child Care Hlth Dev*. 1990;16:99–111.
17. Walker AM, Menaheim S. Intervention of supplementary carrying on normal baby crying patterns: a randomised study. *J Dev Behav Pediatr*. 1994;15:174–8.
18. Barlow KM, Minns RA. Annual incidence of shaken impact syndrome in young children. *Lancet (London, England)* [Internet]. 2000 Nov 4 [cited 2015 Oct 29];356(9241):1571–2. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11075773>
19. Barr RG, Trent RB, Cross J. Age-related incidence curve of hospitalized Shaken Baby Syndrome cases: convergent evidence for crying as a trigger to shaking. *Child Abuse Negl* [Internet]. 2006 Jan [cited 2014 Jun 10];30(1):7–16. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16406023>
20. Lee C, Barr RG, Catherine N, Wicks A. Age-related incidence of publicly reported shaken baby syndrome cases: is crying a trigger for shaking? *J Dev Behav Pediatr* [Internet]. 2007 Aug [cited 2015 Oct 29];28(4):288–93. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17700080>

21. King WJ, MacKay M, Sirnick A. Shaken baby syndrome in Canada: clinical characteristics and outcomes of hospital cases. *CMAJ* [Internet]. 2003 Jan 21 [cited 2015 Sep 2];168(2):155–9. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=140423&tool=pmcentrez&rendertype=abstract>
22. Committee on Child Abuse and Neglect. Shaken Baby Syndrome: Rotational Cranial Injuries Technical Report. *Pediatrics* [Internet]. 2001 Jul 1 [cited 2015 Oct 29];108(1):206–10. Available from: <http://pediatrics.aappublications.org/content/108/1/206.full>
23. Barr RG, Robinson GE. Preventing abusive head trauma resulting from a failure of normal interaction between infants and their caregivers.
24. Giallo R, Cooklin A, Zerman N, Vittorino R. Psychological distress of fathers attending an Australian early parenting service for early parenting difficulties. *Clin Psychol*. 2013 Jul;17(2):46–55.
25. Smart J, Hiscock H. Early infant crying and sleeping problems: a pilot study of impact on parental well-being and parent-endorsed strategies for management. *J Paediatr Child Health* [Internet]. 2007 Apr [cited 2014 Jun 6];43(4):284–90. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17444831>
26. Paulson JF, Bazemore SD. Prenatal and postpartum depression in fathers and its association with maternal depression. *JAMA*. 2010;303:1961–9.
27. Smart J, Hiscock H. Early infant crying and sleeping problems: a pilot study of impact on parental well-being and parent-endorsed strategies for management. *J Paediatr Child Health*. 2007 Apr;43(4):284–90.
28. Kahn RS, Brandt D, Whitaker RC. Combined effect of mothers' and fathers' mental health symptoms on children's behavioral and emotional well-being. *Arch Pediatr Adolesc Med* [Internet]. 2004 Aug;158(8):721–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15289242>
29. Ramchandani P, Stein A, Evans J, O'Connor TG. Paternal depression in the postnatal period and child development: a prospective population study. *Lancet* [Internet]. 2005 Jun [cited 2015 Oct 12];365(9478):2201–5. Available from: <http://www.sciencedirect.com/science/article/pii/S0140673605667785>
30. Hiscock H, Cook F, Bayer J, Le HND, Mensah F, Cann W, et al. Preventing early infant sleep and crying problems and postnatal depression: a randomized trial. *Pediatrics* [Internet]. 2014 Mar [cited 2014 May 29];133(2):346–54. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24394682>
31. Australian Bureau of Statistics. Socio-Economic Indexes for Areas (SEIFA) 2011. Canberra, Commonwealth of Australia; 2013.
32. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*

- [Internet]. 1989 May [cited 2014 Nov 17];28(2):193–213. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2748771>
33. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry* [Internet]. 1987 Jun 1 [cited 2014 Jun 3];150(6):782–6. Available from: <http://bjp.rcpsych.org/content/150/6/782.short>
 34. Edmondson OJH, Psychogiou L, Vlachos H, Netsi E, Ramchandani PG. Depression in fathers in the postnatal period: assessment of the Edinburgh Postnatal Depression Scale as a screening measure. *J Affect Disord* [Internet]. 2010 Sep [cited 2015 Oct 29];125(1-3):365–8. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2927780&tool=pmcentrez&rendertype=abstract>
 35. Murray L, Carothers AD. The validation of the Edinburgh Post-natal Depression Scale on a community sample. *Br J Psychiatry* [Internet]. 1990 Aug [cited 2014 Jun 4];157:288–90. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2224383>
 36. Sadeh A, Flint-Ofir E, Tirosh T, Tikotzky L. Infant sleep and parental sleep-related cognitions. *J Fam Psychol* [Internet]. 2007 Mar [cited 2014 May 26];21(1):74–87. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17371112>
 37. Sanson A, Nicholson J, Ungerer J, Zubrick S, Wilson K, Ainley J, et al. *Introducing the Longitudinal Study of Australian Children*. Melbourne; 2002.
 38. Teng A, Bartle A, Sadeh A, Mindell J. Infant and toddler sleep in Australia and New Zealand. *J Paediatr Child Health* [Internet]. 2012 Mar [cited 2015 Oct 29];48(3):268–73. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22107168>
 39. Wolke D, Rizzo P, Woods S. Persistent Infant Crying and Hyperactivity Problems in Middle Childhood. *Pediatrics* [Internet]. 2002 Jun 1 [cited 2014 Oct 24];109(6):1054–60. Available from: <http://pediatrics.aappublications.org/content/109/6/1054.short>
 40. Hemmi MH, Wolke D, Schneider S. Associations between problems with crying, sleeping and/or feeding in infancy and long-term behavioural outcomes in childhood: a meta-analysis. *Arch Dis Child* [Internet]. 2011 Jul 1 [cited 2014 Oct 24];96(7):622–9. Available from: <http://adc.bmj.com/content/96/7/622.short>

Table 1. Descriptive statistics for all measures at 4 and 6 months infant age

	4 months n= 102	6 months n=90
Sleep problem		
sleep problem, yes, n (%)	58 (56.86)	49 (54.44)
Cry problem		
yes, n (%)	35 (35.00)	20 (22.22)
EPDS		
depression subscale, M (SD)	1.93 (2.10)	1.46 (1.83)
anxiety subscale, M (SD)	2.00 (1.75)	1.60 (1.64)
total score, M (SD)	3.91 (3.60)	3.06 (3.20)
Score > 9, n (%)	10.00 (9.90)	4.00 (4.49)
MCISQ		
doubt subscale, M (SD)	4.62 (3.50)	3.96 (3.84)
anger subscale, M (SD)	5.04 (3.40)	4.44 (2.95)
limit setting subscale, M (SD)	11.53 (5.42)	10.44 (4.84)
Sleep quantity		
not enough, n (%)	53 (51.96)	41 (46.07)
Sleep quality		
not good enough, n (%)	46 (45.10)	37 (41.11)
Help and support		
from partner (not enough), n (%)	2 (1.96)	1 (1.12)
from family and friends (not enough), n (%)	20 (19.61)	16 (17.98)
unable to get any support or help at least some of the time, n (%)	40 (39.22)	36 (40.45)

Table 2. Adjusted regression analyses for paternal outcomes, by infant sleep problem at age four and six months.

	4 months					6 months				
	Sleep Problem N=58	No Sleep Problem N=44	Adj OR/ Adj Mean difference	95% CI	p	Sleep Problem N=49	No Sleep Problem N=41	Adj OR/ Adj Mean difference	95% CI	P
EPDS total score, m (SD)	4.86 (3.89)	2.63 (2.57)	2.64	1.27, 4.00	.00	4.24 (3.36)	1.60 (2.16)	2.56	1.28, 3.84	.00
Doubt, m (SD)	5.36 (3.84)	3.63 (2.72)	1.82	.40, 3.25	.01	3.88 (3.18)	4.05 (4.54)	-.20	-1.82, 1.43	.81
Anger, m (SD)	5.88 (3.15)	3.93 (3.45)	1.86	.51, 3.20	.01	5.24 (3.34)	3.45 (2.02)	1.63	.40, 2.87	.01
Limit setting, m (SD)	12.11(5.03)	10.79 (5.86)	1.42	-.83, 3.68	.21	10.41 (4.43)	10.49 (5.33)	-.09	-2.22, 2.05	.94
Sleep Quantity not enough, n (%)	39 (67.24)	14 (31.82)	.21	.09, .51	.00	32 (66.67)	9 (21.95)	.14	.05, .38	.00
Sleep Quality not enough, n (%)	34 (58.62)	12 (27.27)	.20	.08, .51	.00	27 (55.10)	10 (24.39)	.28	.11, .72	.01
Not enough support – family/friends, n (%)	16 (27.59)	4 (9.09)	.23	.07, .82	.02	12 (24.49)	4 (10.00)	.28	.07, 1.09	.07
Not enough support – overall, n (%)	29 (50.00)	11 (25.00)	.32	.13, .79	.01	24 (48.98)	12 (30.00)	.49	.20, 1.21	.12

Note: OR= Odds Ratio, CI= Confidence Interval, EPDS= Edinburgh Postnatal Depression Scale

Table 3. Adjusted regression analyses for paternal outcomes, by infant cry problem at age four and six months.

	4 months					6 months				
	Cry Problem N=35	No Cry Problem N=67	Adj OR/Adj Mean difference	95% CI	p	Cry Problem N=20	No Cry Problem N=70	Adj OR/Adj Mean difference	95% CI	p
EPDS total score, m (SD)	3.91 (3.33)	3.92 (3.75)	.28	-1.27, 1.82	.72	5.50 (3.55)	2.35 (2.67)	3.04	1.59, 4.69	.00
Doubt, m (SD)	5.65 (3.95)	4.14 (3.14)	1.55	.05, 3.05	.04	4.75 (3.70)	3.73 (87)	1.16	-.81, 3.12	.25
Anger, m (SD)	6.43 (3.22)	4.33 (3.29)	1.98	.60, 3.36	.01	6.65 (4.08)	3.80 (2.18)	2.73	1.29, 4.17	.00
Limit setting, m (SD)	11.46 (4.07)	11.67 (6.12)	-.14	-2.54, 2.27	.91	10.10 (4.19)	10.54 (5.03)	-.49	-3.09, 2.11	.71
Sleep Quantity not enough, n (%)	21 (60.00)	31 (47.69)	.58	.24, 1.38	.22	14 (73.68)	27 (38.57)	.22	.07, .71	.01
Sleep Quality not enough, n (%)	19 (54.29)	26 (40.00)	.48	.20, 1.16	.10	12 (60.00)	25 (35.71)	.47	.16, 1.38	.17
Not enough support – family/friends, n (%)	10 (28.57)	10 (15.38)	.40	.13, 1.18	.10	8 (40.00)	8 (11.59)	.10	.02, .47	.00
Not enough support – overall, n (%)	18 (51.43)	22 (33.85)	.50	.21, 1.22	.13	14 (70.00)	22 (31.88)	.21	.07, .66	.01

Note: OR= Odds Ratio, CI= Confidence Interval, EPDS= Edinburgh Postnatal Depression Scale