

Parental Mental Health and Early Social-emotional Development of Children Born Very Preterm

Karli Treyvaud,¹ D_{PSYCH}, Vicki A. Anderson,^{1,2,3} PhD, Katherine J. Lee,^{1,2} PhD, Lianne J. Woodward,⁴ PhD, Carol Newnham,⁵ PhD, Terrie E. Inder,^{1,6} MD, Lex W. Doyle,^{1,2,3} MD, and Peter J. Anderson,^{1,2} PhD

¹Murdoch Childrens Research Institute, ²University of Melbourne, ³Royal Children's Hospital, ⁴University of Canterbury, ⁵Parent-Infant Research Institute, and ⁶Washington University

Objective The aims of this study were to describe the mental health of parents of children born very preterm and examine relations between parental mental health and early social-emotional development in very preterm and term born children. **Methods** Participants were 177 children born very preterm and 69 children term born and their parents. At 2 year's corrected age for the children, parental mental health was assessed using the General Health Questionnaire (GHQ-28), and child social-emotional development assessed using the Infant-Toddler Social-Emotional Assessment (ITSEA) and a structured parent-child interaction paradigm.

Results Twenty-six per cent of parents of children born very preterm and 12% of parents of term born children reported clinically significant mental health problems. Parental mental health problems were associated with increased risk for dysregulation in very preterm and term children. **Conclusions** Findings highlight the need to identify and support parents of children born very preterm with mental health difficulties.

Key words dysregulation; parental mental health; social-emotional development; very preterm.

Children born very preterm (<32 weeks' gestation) or with very low birth weight (birth weight <1500 g) have an increased risk for social-emotional difficulties. By school age, children born preterm have increased rates of internalizing problems (Anderson, Doyle, & VICS, 2003; Bhutta, Cleves, Casey, Craddock, & Anand, 2002), Attention-Deficit/Hyperactivity Disorder (Bhutta et al., 2002) and other behavioral difficulties (Bhutta et al., 2002; McCormick, Workman-Daniels, & Brooks-Gunn, 1996). Furthermore, children born with low birth weight have been found to be more likely to rate themselves as sad or unhappy compared with normal birth weight peers at the age of 7 years (Hoy et al., 1992). These difficulties appear to persist with age, with elevated levels of major depressive disorders reported by adolescents born with low birth weight (Nomura et al., 2007) or preterm (Patton, Coffey, Carlin, Olsson & Morley, 2004). These increased emotional and attention difficulties in children born preterm are seen even after controlling for the influence of social risk, chronic illness (Farooqi, Hägglöf, Sedín,

Gothefors, & Serenius, 2007), and cognitive development or disability (Samara, Marlow, Wolke, & The EPICure Study Group, 2008).

Recently difficulties with social-emotional development as well as the regulation of affect and behavior in children born very preterm have been identified even earlier than school age (e.g., Delobel-Ayoub et al., 2006; Clark, Woodward, Horwood, & Moor, 2008; Spittle et al., 2009). For example, using the same sample as the current study, Spittle et al. (2009) reported higher rates of internalizing and dysregulation problems as well as lower social-emotional competence in children born very preterm compared with a sample of term born children at the age of 2 years. This is of concern because research shows that early problems in social-emotional development are significantly associated with later behavioral problems and psychiatric diagnosis (Briggs-Gowan & Carter, 2008). Understanding the development and associated risk factors placing children born very preterm at risk of these early difficulties is an important step in supporting the

All correspondence concerning this article should be addressed to Karli Treyvaud, VIBeS, MCRI, Level 2, Royal Children's Hospital, Flemington Road, Parkville, Victoria, 3052, Australia. E-mail: karli.treyvaud@mcri.edu.au

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development of this population. Spittle et al. (2009) found that higher externalizing behaviors were observed in children from families of higher social risk, while poorer social-emotional competence (e.g., attention, empathy, play) was significantly associated with being female, having a lower birth weight, exposure to postnatal corticosteroids and brain injury. Demographic and perinatal risk factors failed to predict the increased internalizing and dysregulation difficulties reported in children born very preterm in their study, suggesting other influences on social-emotional outcomes for these children.

One potential factor is parental mental health, which has been linked with children's early social-emotional development. For example, term born children of parents with clinical depression have been shown to be at significantly higher risk for depression and anxiety that persists over time compared with children of nondepressed parents (Nomura et al., 2002). Even as early as 6 months of age, changes in children's social-emotional behavior can be related to parental mental health, with evidence that infants display less positive affect when their mothers have experienced chronic depression (Campbell, Cohn & Meyers, 1995). Affect regulation, which emerges during infancy, is one aspect of children's early social-emotional development that may be vulnerable to the influence of parental mental health. The parent-child relationship has a significant role in scaffolding and supporting children's self-regulatory experiences (Feldman, 2007). If this relationship is compromised by parental mental health difficulties, opportunities for children to develop and practice affect self-regulatory skills may be lost or diminished, resulting in observable changes in children's affect. For example, previous studies have linked maternal depression with reduced levels of positive affect in children (Campbell et al., 1995; Feng et al., 2008).

An association between parental mental health and early social-emotional development has also been reported in families of children born with low-birth weight (e.g., McCormick, Workman-Daniels, & Brooks-Gunn, 1996), and Gray, Indurkha and McCormick (2004) found that maternal psychological distress at 40 weeks' gestational age predicted behavioral problems at 3, 5 and 8 years in children born preterm. In fact, parental mental health issues may have a greater effect on the socio-emotional development of children born preterm than children born at term. A recent study found that where a parent had a history of depression, children born with low birth weight were more likely to develop a depressive or anxiety disorder than children born with a normal birth weight (Nomura et al., 2007). To date, research examining this important relationship between parental mental health and

socio-emotional development has generally been restricted to school-age or older cohorts, or less medically vulnerable children born preterm. Given the parental distress associated with the premature birth of a child (Bakewell-Sachs & Gennaro, 2004) and the high initial rates of depressive symptoms documented amongst mothers of preterm children within the first 6 months after birth (Shandor Miles, Holditch-Davis, Schwartz & Scher, 2007), it is critical that this relationship is better understood.

The current study aimed to describe the mental health of parents of children born very preterm at 2 years of age and examine the relationships between parental mental health at this time and early social-emotional development, including child affect. These relationships were also examined in a comparison group of children born at term in order to determine any differences between groups in the strength of the relationships. Specifically, it was hypothesized that: mothers of children born very preterm would display higher rates of mental health problems; significant parental mental health problems would be associated with poorer child social-emotional development for children born very preterm and at term, including reduced positive affect and increased child negative affect; and there would be significant interactions between parental mental health problems and group (very preterm and term) for social-emotional development such that the impact of parental mental health on child outcomes would be stronger for children born very preterm.

Methods

Participants

Participants were families from the Victorian Infant Brain Studies (ViBeS) cohort, which included infants born very preterm at the Royal Women's Hospital, Melbourne Australia, between 2001 and 2003 and who were <30 weeks' gestation or with a birth weight <1250 g. Informed parental consent was obtained for all participants. Two hundred and twenty-seven children born very preterm were initially recruited. Children with a significant neurosensory problem such as cerebral palsy, blindness or deafness ($n = 10$) were excluded from the current analysis due to the potential influence of their conditions on development. Two families with very preterm children refused follow-up. Of the remaining 215 children born very preterm, eight parents (4%) did not have sufficient English language skills to complete the questionnaire, 26 (12%) parents did not complete all sections of the questionnaire, and four (2%) questionnaires were completed by caregivers other than a parent (i.e., grandmother)

resulting in a final sample of 177 children born very preterm.

Also included were 76 term born children (>36 weeks' gestation) recruited at birth from maternity wards ($n = 44$) or at age of 2 years from maternal health centers ($n = 32$). Of these children, seven (9%) parents did not complete all sections of the questionnaire leaving a final sample of 69 children term born.

To avoid reporting the same data multiple times in the case of twins/triplets, mental health data were only reported for 157 parents (7 fathers, 150 mothers) of very preterm children and 68 parents (4 fathers, 64 mothers) of term children. The majority (90%) of parents spoke only English at home.

Procedure

At the age of 2 years (corrected for prematurity), parents completed questionnaires assessing parental mental health and their child's social-emotional development. The parent who was the primary caregiver was requested to complete questionnaires. In addition, a structured parent-child interaction task assessing child positive and negative affect was completed during each child's hospital-based follow-up assessment. In accordance with ethics requirements, parents identified as having symptoms of mental health distress at the time of completing questionnaires were contacted and referral and support options discussed for those not currently receiving appropriate services. The study was approved by the Royal Women's Hospital's Research and Ethics Committee.

Measures

Parental Mental Health

The 28-item self-administered General Health Questionnaire (GHQ-28) (Goldberg & Williams, 1988) was used to assess the mental health of the parent who was the child's primary caregiver. The GHQ has four domains (somatic, anxiety, social dysfunction, and depression) and a total score. Parents rate items concerning how they have been feeling in the past 2 weeks on a 4-point Likert scale ranging from 0 to 3 for each item, with higher scores representing greater symptom severity (range for total score = 0–84). A total score of 24 or greater indicates clinically significant mental health problems (Goldberg et al., 1997). Total score and total clinical cut-off scores were used in the current study. Criterion validity of the 28-item GHQ is acceptable, with correlations between psychiatric interviews and the GHQ ranging from .67 to .83. Sensitivity of the 28-item GHQ ranges from 44 to 100%, and specificity from 74 to 93% (Goldberg & Williams, 1988).

Children's Social-emotional Development

Children's social-emotional development was assessed using the pre-publication version of the Infant-Toddler Social and Emotional Assessment (ITSEA) (Briggs-Gowan & Carter, 2000). The ITSEA is a parent-report questionnaire developed to assess social-emotional problems and competencies in 12–36-month-old children. Parents rate aspects of their child's behavior on 135 items using a 3-point Likert rating scale (0 = not true/rarely, 1 = somewhat true/sometimes, 2 = very true/often, 'No opportunity' available for some). Based on these ratings, age and gender specific t -scores (mean = 50, $SD = 10$, range 25–80) were calculated for four domains: social-emotional competence; externalizing behavior problems; internalizing behavior problems; dysregulation. Mean scores at or below the 10th percentile for competence, and at or above the 90th percentile for externalizing, internalizing and dysregulation were defined as 'at risk' and suggestive of psychopathology. The ITSEA has good test-retest reliability, good criterion validity, and a well supported factor structure (Carter, Briggs-Gowan, Jones, & Little, 2003).

Children's Positive and Negative Affect

Children's positive affect (e.g., smiles, laughs, playful voice tone or behavior) and negative affect (e.g., frowns, whining, sulking, crying, angry facial expressions or voice tone) were observed while they completed three set of activities with their parent during a parent-child interaction task (~15 min), and were subsequently coded via videotape (Belsky, Jafee, Sligo, Woodward & Silva, 2005; Clark et al., 2008). Parents were asked to interact with their child in the same way they would usually play with their child at home. They were given ~4 min per activity and then asked to move on to the next one. For further detail about the activities, see Treyvaud et al. (2009). Scores for positive and negative affect were based on the sum of three scores (one for each of three tasks completed by parents and children together) to give a score between 3 and 15, with higher scores representing more frequent and intense displays of positive or negative affect. Reliability analyses (Cronbach's alpha) were completed using a subsample of parent-child interaction data. Intra-rater reliability ($n = 18$) for positive affect was .84, and for negative affect was .90, while inter-rater reliability ($n = 23$) for positive affect was .76, and for negative affect was .97.

Family Social Risk

Social risk was assessed using a composite measure assessing family structure, education of primary caregiver, occupation and employment status of primary income

earner, language spoken at home and maternal age when the child was born. Each of these six domains was scored on a 3-point scale where a score of 0 represented lowest risk, and a score of 2 represented highest risk (e.g., Roberts et al., 2008; Treyvaud et al., 2009). All domains were added to form a total social risk score, and based on this, families were categorized as lower social risk (total score <2) or higher social risk (total score ≥ 2).

Statistical Analysis

Data were analyzed using STATA 10. First, sociodemographic factors were compared between groups (very preterm, term) and families who did and did not complete questionnaires using chi-squared tests. Mean scores for the total GHQ score and the proportion of parents with clinically significant mental health problems were used to examine parental mental health. Linear regression models were used to examine whether parental mental health was related to the gender of the parent who completed the questionnaire or social risk category. For these equations, parental mental health data were included once per parent/family of twins or triplets ($n = 37$ very preterm children; $n = 2$ term children) to avoid reporting the same parent data twice.

Chi square analysis was used to compare rates of parental mental health problems in very preterm and term groups. To assess whether parental mental health was associated with: child social-emotional development (using *t*-scores); and child affect, linear regression models were fitted to each of the four ITSEA domains and the positive and negative affect, using Generalized Estimating Equations (GEEs) with an exchangeable correlation structure and robust standard errors to allow for correlations between twins/triplets (Carlin, Gurrin, Sterne, Morley, & Dwyer, 2005; Hanley, Negassa, de B. Edwardes, & Forrester, 2003). Social risk category was accounted for in all regression models. Child affect data were unavailable for 57 children (37 very preterm, 20 term) due to technical difficulties filming the parent-child interaction. Compared to those without parent-child interaction data (mean = 18.49, *SD* = 8.44), the total mental health scores of parents who had parent-child interaction data (mean = 17.70, *SD* = 10.19) was not significantly different [regression coefficient = 0.66, 95% confidence interval (CI) = -1.99, 3.30, $p = .63$].

To test whether clinically significant parental mental health problems were associated with the child being 'at risk' in terms of social-emotional problems, logistic regression models were fitted to the binary outcome of whether a child is 'at risk' with an indicator for the parent having clinically significant mental health

symptoms as a predictor, again fitted using GEEs. Odds ratios and 95% CIs were calculated, adjusted for social risk.

The potential for differing effects of group (very preterm and term) on social-emotional development for children of parents with a higher overall mental health score or significant mental health problems was explored by the inclusion of interaction terms in regression models using GEEs as described above.

Results

Sociodemographic and background characteristics of study families in two groups are presented in Table I. As expected, there were more children from multiple pregnancies in the group of children born very preterm, $\chi^2(1, 215) = 21.57, p = .000$. There were significantly more children born very preterm in the moderate-high social risk category [$\chi^2(1, 285) = 17.96, p = .000$], and significantly fewer parents of children born very preterm with a tertiary education [$\chi^2(1, 246) = 23.39, p = .000$].

Compared with families included in the study, families without questionnaire data ($n = 41$) were more likely to be classified in the moderate-high social risk category (82% versus 46%; $\chi^2(1, 285) = 17.96, p = .000$) and/or have twins or triplets in the family (51% versus 31%; $\chi^2(1, 289) = 9.06, p = .01$). No other significant differences on the sociodemographic characteristics in Table I were identified.

Parent Mental Health

Parent scores on the GHQ are shown in Table I. Of note, 26% of parents of children born very preterm reported clinically significant mental health problems (42 mothers, 3 fathers), compared with 12% of parents of term born children (all mothers) [$\chi^2(1, 225) = 5.74, p = .02$]. There was little evidence that overall mental health scores were different between mothers or fathers, or in families with different social risk categories (data not shown).

Relationship Between Parental Mental Health and Child Outcomes

Overall parental mental health score was significantly associated with dysregulation score for both groups (see Table II). The relationship was stronger for children born at term, for whom 14% of the variance in dysregulation scores was explained by parental mental health compared with 5% of variance explained for children born very preterm. There was also a significant relationship between parental mental health score and externalizing

Table I. Sociodemographic and Descriptive Characteristics of the Sample

Characteristic	Very preterm (<i>n</i> = 177)	Term (<i>n</i> = 69)
Birth weight (g): mean (<i>SD</i>)	967.0 (224.5)	3370.3 (426.1)
Gestational age (weeks): mean (<i>SD</i>)	27.4 (2.0)	38.9 (1.4)
Male: <i>n</i> (%)	96 (54%)	33 (48%)
Singleton: <i>n</i> (%)	140 (79%)	67 (97%)
Maternal age (years): mean (<i>SD</i>)	32.1 (5.5)	33.2 (5.6)
Moderate-high social risk: <i>n</i> (%)	96 (54%)	16 (23%)
Education (tertiary:secondary:<secondary): (%)	34:51:15	67:30:3
SGA: <i>n</i> (%)	17 (10%)	1 (1%)
IVH grade III/IV: <i>n</i> (%)	6 (3%)	–
Oxygen at 36 weeks: <i>n</i> (%)	58 (33%)	–
Parent total GHQ: mean (25th, 75th percentiles)	18.5 (12, 24) ^c	16.3 (11, 21) ^d
Parent total GHQ clinically significant: <i>n</i> (%)	41 (26%) ^c	8 (12%) ^d
Internalizing: mean (<i>SD</i>); <i>n</i> (%) 'at risk'	49.2 (11.9); 17 (10%)	45.0 (10.8); 4 (6%)
Externalizing: mean (<i>SD</i>); <i>n</i> (%) 'at risk'	49.2 (9.2); 11 (6%)	48.8 (9.4); 3 (4%)
Dysregulation: mean (<i>SD</i>); <i>n</i> (%) 'at risk'	53.1 (11.6); 34 (19%)	49.0 (10.1); 7 (10%)
Competence: mean (<i>SD</i>); <i>n</i> (%) 'at risk'	46.7 (10.2); 27 (15%)	51.7 (7.8); 3 (4%)
Child positive affect: mean (<i>SD</i> , range)	4.4 (1.6, 3–9) ^a	4.9 (1.9, 3–11) ^b
Child negative affect: mean (<i>SD</i> , range)	3.9 (1.5, 3–12) ^a	3.4 (1.3, 2–9) ^b

Note. *SD*: standard deviation; Competence: Social-emotional Competence; Education level completed by primary caregiver; SGA: small for gestational age; IVH: intraventricular hemorrhage on cranial ultrasound; a, *n* = 146; b, *n* = 49; c, *n* = 157; d, *n* = 68; clinically significant GHQ: total GHQ score 24 or more.

Table II. Parental Mental Health Predicting Child Social-emotional Development, and Interaction Between Mental Health and Group (*n* = 246)

	Total parental mental health score		Significant parental mental health problems	
	Individual GEE regression coefficients (95% CI)	<i>p</i> for interaction	Individual GEE regression coefficients (95% CI)	<i>p</i> for interaction
Internalizing: very preterm	0.18 (–0.01, 0.36)	.87	2.76 (–1.40, 6.93)	.46
Internalizing: term	0.25 (–0.53, 1.02)		7.73 (–4.85, 20.33)	
Externalizing: very preterm	0.15 (–0.02, 0.32)	.26	1.29 (–1.83, 4.41)	.22
Externalizing: term	0.39 (0.02, 0.75)*		7.14 (–1.60, 15.88)	
Dysregulation: very preterm	0.23 (0.05, 0.42)*	.37	3.20 (–1.15, 7.56)	.07
Dysregulation: term	0.37 (0.13, 0.61)**		9.70 (4.24, 15.15)***	
Social-emotional Competence: very preterm	–0.06 (–0.19, 0.07)	.83	–1.49 (–5.08, 2.11)	.36
Social-emotional Competence: term	–0.04 (–0.20, 0.12)		1.12 (–3.12, 5.38)	

Note. All equations adjusted for social risk category; **p* < .05; ***p* < .01; ****p* < .001.

behavior for term born children only. No other significant associations between parental mental health and children's internalizing behaviors or social-emotional competence were identified.

Within the group of children born very preterm, parents with clinically significant mental health problems were more likely to have children classified as 'at risk' for dysregulation (odds ratio = 2.51, 95% CI = 1.11, 5.62, *p* = .03). There was also a tendency for children born very preterm who were being cared for by parents with significant mental health problems to be classified as 'at risk' for internalizing problems, but this did not reach significance (odds ratio = 2.29, 95% CI = 0.81, 6.47,

p = .12). The odds ratios could not be calculated for the term born children due to the low numbers of children in the 'at risk' range for social-emotional problems and parents with significant mental health problems.

Interaction Between Group and Parental Mental Health on Child Outcomes

The potential for differing effects of group (very preterm and term) on the relationship between parental mental health and social-emotional development was examined using interaction terms. There were no significant interactions between group (very preterm or term) and either total parental mental health score or significant parental

mental health problems for any of the domains of child social-emotional development (see Table II). However, there was limited evidence for a 6-point difference between children born very preterm and at term in the effect of significant parental mental health problems on dysregulation ($p = .07$). This suggested a trend for a stronger association between parental mental health problems and child dysregulation amongst children born at term compared with children born very preterm.

Parental Mental Health and Observed Child Affect

Although there was a trend for children born very preterm to display lower levels of positive affect and higher levels of negative affect compared with term born children (see Table 1), these relationships were not significant once social risk was taken into account. Overall parental mental health score was not significantly associated with positive child affect (GEE regression coefficient = 0.00, 95% CI = -0.02, 0.03, $p = .81$) or negative child affect (GEE regression coefficient = 0.00, 95% CI = -0.02, 0.03, $p = .75$). There was no significant interaction between group (very preterm, term) and parental mental health for either positive child affect ($p = .74$) or negative child affect ($p = .57$).

Discussion

Approximately a quarter of parents of 2-year-old children born very preterm in this study reported clinically significant mental health problems. In contrast, 12% of parents of term born children in the current study reported clinically significant mental health problems. This figure of 12% for parents of term born children is more consistent with the prevalence of affective and anxiety disorders in the general Australian adult population (6–14% respectively, Australian Bureau of Statistics, 2008), and the rate of depression reported by mothers six months postpartum (7.5%, Milgrom et al., 2008). While the results from the current study are based on overall mental health problems rather than depression or anxiety alone, findings presented here suggest a substantial number of parents (primarily mothers) of children born very preterm are experiencing significant mental health problems at 2 years of age. Shandor Miles et al. (2007) found that 63% of mothers of children born preterm in their study reported significant symptoms of depression while their children were hospitalized. By the time children were 22 months old, Shandor Miles et al. found the rate of significant depressive symptoms had declined to 21%, which is consistent with the prevalence of 26% reported in the current study.

Importantly, the results of the current study provide further evidence of the increased level of mental health problems experienced by parents of children born very preterm in the early years compared with parents of term born children.

For the current study, increased symptoms of parental mental health problems were related to higher levels of dysregulation in 2-year old children born very preterm and at term. More specifically, parents of children born very preterm with clinically significant mental health problems were two and a half times more likely to have children who were classified as being 'at risk' for dysregulation problems. Our results are consistent with previous research in low birth weight and preterm cohorts demonstrating a relationship between maternal mental health problems and children's social-emotional difficulties in school aged children (Gray et al., 2004; McCormick et al., 1996; Nomura et al., 2002). The current study presents new information by extending previous findings to a recently born very preterm population. In addition, our findings demonstrate that a relationship between parental mental health and children's emotional, behavioral and physical regulation is evident as early as 2 years of age for both children born very preterm and at term.

Dysregulation emerged as the only aspect of social-emotional development linked with parental mental health for both children born very preterm and at term. Consistent with these findings, previous research has linked reduced maternal positive affect and maternal depression with poorer emotional regulation in children (Bandon, Calkins, Keane, & O'Brien, 2008; Eisenberg et al., 2003; Feng et al., 2008). While this suggests that parental mental health problems may contribute to delays or difficulties in physical and emotional regulation, the relationship is likely to be bi-directional. The influence of the child in the relationship is worth considering, particularly when considering a child born very preterm. Children born very preterm have an increased risk for certain biological complications such as brain injury (Hack & Fanaroff, 1999; Inder, Wells, Mogridge, Spencer, & Volpe, 2003) that may contribute to their previously reported increased risk for early difficulties with behavioral regulation (Minde, 2000). Supporting this link, Clark, Woodward, Horwood & Moor (2008) found preschool aged children born preterm (born <28 weeks gestation) had significantly poorer emotional and behavioral regulation skills compared with children born at term, a relationship explained in part by white matter brain injury associated with prematurity.

The influence of factors associated with prematurity such as brain injury on regulation skills may help to

explain the unexpected non-significant trend for a weaker relationship between parental mental health and dysregulation for children born very preterm compared with term born children reported by the current study. While parental mental health had a significant relationship with the dysregulation scores of children born very preterm, it is likely that biological influences such as brain injury and chronic illness, and other environmental influences such as the parent-child relationship in the neonatal intensive care unit and early years also contribute. Replication with a larger sample of term born children is needed to see if this was a chance finding or a relationship that may reach significance with increased power.

Returning to the role of the child born very preterm in the relationship between parental mental health and child dysregulation, it is possible that having a child who has significant difficulty regulating their physical, sensory and emotional systems increases the parent's risk for symptoms of anxiety and depression. This is then likely to continue to influence the child's social-emotional development due to the bi-directional and cyclical nature of the parent-child relationship. The increased proportion of children born very preterm with problems with regulation compared with children born at term reported by others (e.g., Clark et al., 2008; Spittle et al., 2009) could help to explain in part the larger prevalence of mental health problems in parents of children born very preterm reported by the current study. Considering the weak relationship between parental mental health and early symptoms of internalizing and externalizing problems in children born very preterm reported by the current study, longitudinal research is needed to investigate how parental mental health difficulties interact with the potentially vulnerable emotional and behavioral regulation system of children born very preterm, and how early dysregulation is associated with both parent and child social-emotional functioning over time. Such research is important to determine whether the early symptoms of dysregulation seen here in toddlers lead to later mental health problems in school-age children, which would have implications for early identification and intervention around early regulatory difficulties.

Contrary to predictions, parental mental health was not predictive of children's positive or negative affect. This may be related to the measurement of children's affect used in the current study, and more detailed observations of children's affect and affect regulation across multiple contexts are needed to fully assess this relationship. A lack of power due to the reduced numbers may also have been influential. The lack of significant findings relating parental mental health and child affect may also be related to the chronicity of parental mental health

problems. For example, Campbell et al. (1995) found that only maternal depression lasting at least 6 months was associated with child affect, but the current study measured parental depressive symptoms at only one time point and could not determine chronicity. Follow-up of parental mental health over time would provide more information that could be used to investigate whether chronic mental health problems are more likely to be associated with observable changes in children's affect, as well as the effects of chronicity and severity of parental mental health problems more generally on children's social-emotional development.

Limitations

It is challenging to obtain reliable and valid measures of social-emotional difficulties directly from young children themselves, and because many toddlers are not in formal care outside of the home, obtaining external reports of social-emotional development from carers other than parents is difficult, and not possible at all from other experienced observers, such as teachers. Most frequently parent-report measures are used, which introduces the potential for a parent's own mental health to influence their perception of their child's behavior (e.g., Breslau, Davis, & Prabucki, 1988). Although there is some evidence from a study by Chilcoat and Breslau (1997) that mothers with a history of both depression and anxiety were more likely to over-report externalizing difficulties in their children, their perceptions of internalizing difficulties was more accurate, suggesting that mental health difficulties do not necessarily limit the validity of parental perceptions of their child's development. In addition, parental perceptions of their children's behavior have a strong influence on the impact the behavior has on the family (Armstrong, O'Donnell, McCallum & Dadds, 1998), and thus remain relevant.

Secondly, the measure of child affect reported in this study assessed the extent to which children were characterized by higher or lower levels of positive or negative affect during a single interaction with their primary caregiver. Others have reported similarly low levels of observed child affect using the same measure (Clark et al., 2008), suggesting that further studies employing multiple measures that tap children's capacities for emotional regulation as well as emotional expression may be helpful. There is also a need to assess children's affective states and regulation of affect across multiple contexts, including more stressful contexts.

Finally, this study did not examine the influences of biological factors such as brain injury on social-emotional development in children born very preterm. Further

research examining how such biological factors interact with environmental factors and influence the social-emotional development and regulatory skills of children born very preterm in particular would help identify those children and parents most in need of early intervention and support.

Conclusion and Clinical Implications

The results of this study have implications for the support provided to parents of children born very preterm. Two years after the premature birth of their child, approximately a quarter of parents of children born very preterm were reporting significant symptoms of psychological distress. Furthermore, increased symptoms of parental mental health problems were associated with increased dysregulation problems in both children born very preterm and at term. Although many hospitals provide support to parents while their children are inpatients, the results from this study suggest that it may be important to provide these parents with support to manage ongoing or subsequently arising anxiety and depression. Considering the likely bidirectional relationship between child and parent social-emotional functioning, the findings presented here also suggest that parents of children born very preterm may benefit from interventions that incorporate a focus on helping parents to support their child's emotional and behavioral regulation.

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