



Associations between parental psychological well-being and socio-emotional development in 5-year-old preterm children



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ABSTRACT

Background: Preterm children are at risk for developing behavioral and emotional problems, as well as being less socially competent. Premature birth causes chronic distress in the parents.

Aims: The aim of the paper is to discover whether parental psychological well-being is associated with the social, behavioral, and functional development of very low birth weight (VLBW, ≤ 1500 g) children at 5 years of age.

Study design: A longitudinal prospective cohort study.

Subjects: A cohort of 201 VLBW infants (≤ 1500 g, <37 weeks of gestation) born during 2001–2006 in Turku University Hospital, Finland was studied.

Outcome measures: At 4-year chronological age of their child, parents independently completed validated questionnaires (Beck Depression Inventory, Parenting Stress Index and Sense of Coherence Scale). At 5 years, parents and day-care providers evaluated the development of the child by completing the Five to Fifteen questionnaire.

Results: The parents of VLBW children reported significantly more problems in child development compared to the Finnish normative data. Depressive symptoms and weaker sense of coherence in mothers, but not in fathers, were associated with more problems in child development. Parenting stress, for both mothers and fathers, was associated with developmental problems in their child at 5 years of age.

Conclusions: Maternal depressive symptoms and parenting stress of both parents may be risk factors for the social, behavioral, and functional development of 5-year-old preterm children. On the other hand, stronger maternal sense of coherence may be a protective factor.

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1. Introduction

Improved prognosis for survival of very preterm infants has led to increasing concerns about their neurobehavioral and socio-emotional development during childhood and adolescence. Previous findings highlight preterm infants' increased risk for behavioral and emotional problems [1–6], as well as being less socially competent [1,7]. Deficits in executive functions have been reported in very low birth weight (VLBW, birth weight ≤ 1500 g) children even after controlling for cognitive development [8,9]. Neurodevelopmental problems can be

detected even before school attendance [10] but deficits in socio-emotional development [11] and executive functions [12] may persist into adolescence and later complicate academic achievement. There is thus a need to explore factors predisposing for later developmental problems in preterm infants, in order to prevent or alleviate them.

Previous evidence suggests that parenting and home environment are important modulators of the psycho-emotional development and the development of social competence of preterm children [1,13–19]. Apart from acute distress, premature birth itself also causes chronic distress in parents [20–23] because of their prolonged concerns about well-being and development of the child [15,24–26]. In the 2000s, family-centered intervention programs have reduced maternal distress and improved parent–infant interactions in families with a preterm infant [27,28]. Maternal distress in particular has been associated with later behavioral problems [18,19], and recent studies have revealed parallel results in fathers of preterm children [17]. Still, there is a paucity of studies that have investigated paternal distress and resilience in the families of preterm infants.

Abbreviations: BDI, Beck Depression Inventory; FIF, Five to Fifteen questionnaire; MDI, Mental Development Index; PSI, Parenting Stress Index; SOC, sense of coherence; SOC-13, Sense of Coherence Scale; VLBW, very low birth weight, ≤ 1500 g.

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In this study, we investigated the role of parental psychological well-being in relation to the development and behavior of their VLBW child. We hypothesized that the parents' depressive symptoms, parenting stress, and weak sense of coherence (SOC) are associated with social, behavioral, and functional deficits in very low birth weight (VLBW) children at 5 years of age.

2. Methods

2.1. Participants

A regional cohort of 261 VLBW preterm children (birth weight ≤ 1500 g and gestational age < 37 weeks) who were admitted to a level III neonatal intensive care unit in Turku University Hospital, Finland, between January 2001 and December 2006, were invited to participate in this study as part of a larger prospective longitudinal cohort study on the development and functioning of VLBW preterm infants from infancy to school age (the PIPARI Study [29]). We excluded eight infants (four infants lived outside the catchment area of the hospital, two had anomalies or a syndrome, and language problems prevented participation of two families). In total, 97% of eligible children were recruited. Forty-one of the infants died during the neonatal period and 11 families refused to participate after receiving oral and written information about the study leaving 201 children and their parents in the final study group. The PIPARI Study protocol was approved by the Ethical Committee of the Hospital District of Southwest Finland. Parents gave their informed consent after receiving written and oral information.

2.2. Design

At 4 years of age, parents independently completed validated questionnaires (Beck Depression Inventory [BDI], Parenting Stress Index [PSI], and Sense of Coherence Scale [SOC-13]). At 5 years, parents and day-care providers evaluated the development of the child by completing the Five to Fifteen (FTF) questionnaire. We studied the associations between the measures of parental psychological well-being and child development.

The characteristics of the study participants and their families are presented in Table 1. Parental background data were obtained from the parents when the child was born. Neonatal background data on the VLBW infants were prospectively collected from the medical records. At 2 years corrected age, the children were invited for outpatient appointments to conduct medical and neurological examinations by a pediatrician and standardized developmental testing (Bayley Scales of Infant Development, II [30]) by a psychologist. Neurodevelopmental impairment of the child was considered to be present if the child exhibited one or more of the following factors: cognitive disability (mental development index [MDI] < 70), cerebral palsy (determined during systematic follow-up to 2 years corrected age using the classification proposed by Himmelmann et al. [31] and Bax et al. [32]), severe visual impairment (blindness or visual acuity below 0.3), or severe hearing deficit (hearing loss requiring amplification at least in one ear or a hearing impairment with a cut-off point of 40 dB). In order to exclude the confounding effect of neurodevelopmental impairment of the child on parental psychological well-being we studied the associations also excluding the children with neurodevelopmental impairment.

2.3. Parental psychological well-being measures (4 years)

Parental psychological well-being was measured using scores of depressive symptoms, parenting stress, and the level of their sense of coherence. The questionnaires had previously been well validated, and used internationally; they have been described in detail elsewhere [33]. When VLBW children reached 4 years of chronological age, the

Table 1

Infant and family characteristics of children born with very low birth weight (VLBW).

Characteristics	VLBW infants n = 201
Birth weight (grams), mean \pm SD [min, max]	1076 \pm 283 [400, 1500]
Gestational age (weeks), mean \pm SD [min, max]	28.8 \pm 2.8 [23, 35.9]
Small for gestational age (SGA), n (%)	79 (39)
Days in level III hospital, mean \pm SD	61 \pm 32 [3,183], missing data n = 7
Multiple birth, n (%)	59 (29)
Male, n (%)	107 (53)
Neurodevelopmental impairment, n (%)	23 (12), missing data n = 6
Mental development index ^a < 70	6 (3), missing data n = 6
Cerebral palsy	12 (6), missing data n = 2
Severe visual impairment	0
Severe hearing deficit	10 (5), missing data n = 2
Mental development index ^a < 85 , n (%)	23 (12), missing data n = 6
Mother, n (%)	
Education, missing data n = 5	
≤ 9 years	24 (12)
over 9–12 years	53 (27)
> 12 years	119 (61)
Smoker	37 (20), missing data n = 15
Employed	99 (52), missing data n = 11
Father, n (%)	
Education, missing data n = 6	
≤ 9 years	18 (9)
over 9–12 years	114 (59)
> 12 years	63 (32)
Smoker	59 (32), missing data n = 16
Employed	177 (94), missing data n = 13
Married/living with a partner, n (%)	182 (98), missing data n = 15

SGA is defined as a birth weight of < -2.0 SD according to age- and gender-specific Finnish growth charts.

^a Bayley N. *Bayley scales of infant development – II*. 2nd ed. San Antonio, TX: Psychological Corporation; 1993.

parents were asked to complete self-reporting questionnaires, independently from each other. Their depressive symptoms were examined using the modified 13-item Finnish translation [34] of the original 21-item BDI [35]. The Finnish translation of the PSI [36] was used to measure the stress related to parenting caused by either child characteristics (the child domain) or parents' functioning (the parent domain). Higher scores in these two questionnaires indicated more symptoms. The Finnish translation of the SOC-13 [37] was used to assess the parents' global orientation to view the world; to comprehend, manage, and find meaning in their individual lives. Higher scores in this questionnaire indicated better SOC. The questionnaires were mailed one month before the child's fourth birthday and no reminders were sent. The BDI and PSI questionnaires were used to estimate psychological burden and the SOC-13 questionnaire was used as a measure for resilience.

2.4. The evaluation of the VLBW infants' social, behavioral, and functional development (5 years)

The parents rated their children at 5 years of age using the FTF parent questionnaire, which is a validated [38,39] questionnaire comprising 181 questions grouped into eight problem domains (motor skills, executive functions, perception, memory, language, learning, social skills, emotion/behavior) of child development and behavior. The FTF questionnaire was developed by a multidisciplinary group of Scandinavian clinical researchers for detecting developmental deficits in 5 to 15-year-old children [40]. The questionnaire was originally created in Swedish, but Korkman et al. have conducted a pilot study with the Finnish translation [39]. Instead of establishing diagnoses the FTF questionnaire was developed to gain information about the relevant problem areas of the child as perceived by the parents [40]. The items were scored (0) "does not apply", (1) "applies sometimes or to some

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