

## PREMATURITY

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# Prematurity and Its Impact on Psychosocial and Emotional Development in Children

**Phyllis Zelkowitz, EdD**

McGill University, Canada

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### Introduction

A premature birth is a birth that occurs before the 37th week of pregnancy. High-risk premature births occur at 32 weeks of gestation or earlier, at weights under 1500 g. Very-low-birthweight (VLBW, <1500 g) infants, who make up about 1% of live deliveries in Canada, may require treatment in Neonatal Intensive Care (NICU) for up to three months.

### Subject

While mortality rates for VLBW infants have declined, there has been increasing concern about their long-term morbidity rates. A small proportion (10% to 15%) of VLBW infants are born with severe neurosensory handicaps such as blindness, deafness, or cerebral palsy, and 30-60% go on to show cognitive deficits, learning disabilities and language impairments.<sup>1,2</sup> VLBW children have been found to exhibit a variety of behavioural problems, such as attention deficit disorder, hyperactivity, excessive shyness and withdrawal, and social problems.<sup>3</sup> About 29% of VLBW children and adolescents exhibit at least one mental health problem.<sup>4</sup> In fact, VLBW children are

more than twice as likely to develop attention deficit hyperactivity disorder and autism spectrum disorders, compared to children born at full term.

## **Problems**

VLBW infants are medically fragile, and may suffer from many complications, including respiratory distress syndrome, intraventricular haemorrhage (bleeding in the brain), and retinopathy of prematurity (abnormal growth of blood vessels in the eye). They often continue to experience physical health problems that may require frequent medical visits and re-hospitalization in the early years of life. This may limit their participation in regular childhood activities, which may in turn affect their development of social skills. These infants can also be challenging interaction partners for their parents, due to their fragility, irritability, and lack of responsiveness to their social environment. Many parents feel emotional distress following the birth of a VLBW infant, and this may affect parenting behaviour. Maternal anxiety, assessed while the infant was hospitalized in the NICU, has been associated with less effective parenting behaviour in early infancy and in toddlerhood.<sup>5</sup> Depressed mothers have been reported to perceive their VLBW preschoolers as less socially competent, and tend to restrict their participation in extracurricular activities such as sports and creative arts.<sup>6</sup>

## **Research Context**

Developmental outcomes in VLBW infants are best understood as an interaction between biological vulnerability and environmental factors, such as socio-economic status and parental attitudes, and behaviour. Preterm infants may be particularly susceptible to environmental influences in that the impact of environmental factors on infant behaviour is often stronger in preterm infants than it is in full-term infants. Therefore, to assess risk for abnormal outcomes in VLBW infants, it is essential to consider both medical and psychosocial risk factors.

There are still many challenges facing researchers studying developmental outcomes in VLBW infants. Indeed, continuing advances in medical technology have brought about the survival of smaller, sicker babies, making it difficult to compare children from different periods of time. Furthermore, studies demonstrating differences between VLBW and normal birthweight children have shed little light on the processes that lead to such discrepancies.

## **Key Research Questions**

We have identified three main strands for further research:

1. The impact of premature birth on the developing brain
2. The identification of risk factors for behaviour problems and psychiatric disorders
3. Early intervention with parents and their VLBW infants.

## **Recent Research Results**

Magnetic resonance imaging studies have shown reduced brain volume in children who were born preterm as compared to children born at full-term;<sup>7</sup> smaller brain volumes were associated with lower cognitive scores and a higher incidence of attention deficit disorder. Not all preterm infants exhibit brain injuries such intraventricular hemorrhage or ventricular enlargement, but those who do are at greater risk for major depressive disorder and attention deficit disorder.<sup>8</sup> Severe brain injuries are more often observe among preterm infants who had lower Apgar scores, and complications of prematurity such as patent ductus aeteriosus (a heart problem) and necrotizing enterocolitis (infection and inflammation of the bowel).<sup>9</sup> Maternal responsiveness (which includes awareness of and sensitivity to an infant's cues) is associated with greater social and intellectual competence among VLBW children in early childhood.<sup>10</sup> By contrast, controlling, restrictive parental behaviour is associated with poorer social skills and cognitive development among VLBW children at age 3.<sup>11</sup> Developmental delays may predict a higher frequency of disorganized attachment patterns in preterm/VLBW infants than in full-term infants.<sup>12</sup> The need to consider both biological and environmental factors in the development of VLBW infants is highlighted in a study that showed that the two strongest predictors of emotional and behavioural self-regulation were moderate to severe white matter abnormalities and parental sensitivity.<sup>13</sup> Relationship satisfaction and social support promote parental responsiveness<sup>14</sup> and thus may mediate the relationship between maternal distress and social and emotional problems in VLBW children.<sup>15</sup>

Interventions with premature infants and their parents have ranged from targeting a specific risk factor (such as the need for supplementary sensory stimulation) to offering a comprehensive package of services (including medical follow-up, parent training, and centre-based care for infants).<sup>16</sup> Recent efforts have focused on promoting maternal competence and enhancing the mother-infant relationship. Kangaroo Care, which encourages mother-infant skin-to-skin contact, has been found to increase parental sensitivity and reduce intrusiveness.<sup>17</sup> Therapeutic interventions designed to reduce maternal distress have shown some benefits,<sup>18</sup> but have not been tested in randomized controlled trials.

## Conclusions

Because VLBW children are at greater risk than their full-term counterparts for both learning and behavioural difficulties, it is important to investigate how both psychosocial and biological risk factors may affect child outcomes. Sophisticated imaging techniques can be used to learn more about the impact of prematurity on brain development. The lengthy hospital stays required by most VLBW infants and the separation from their parents that ensues can provoke anxiety in parents about their child's health and uncertainty regarding their ability to parent their fragile infant. The development of self-regulation in VLBW infants may be delayed or impaired because they are difficult interaction partners. Their responses to social stimulation and their behavioural signals are different than those seen in full-term infants. Consequently, caregivers may have greater difficulty behaving responsively with their VLBW infants. While VLBW infants may be challenging and somewhat unsatisfying interaction partners, sensitive parental behaviour can produce significant benefits.

## Implications for Policy and Services

Children born preterm who exhibit cognitive deficits and behaviour problems tax the physical, emotional, and financial resources of their families. Moreover, these children may enter school lacking adequate cognitive and social skills and requiring additional educational and social services. Therefore, in order to plan appropriate interventions for VLBW children, it is necessary to screen early, and specify the determinants of their future social and academic competence. By identifying factors that are associated with poor developmental outcomes (such as parental anxiety or lack of social support) it may be possible to sensitize health and education professionals to circumstances that may facilitate or impede parents' ability to provide sensitive, responsive care to VLBW infants. Preventive interventions that begin in early infancy and that target parental well-being as well as the improvement of parenting skills are likely to be the most useful approaches to ensuring optimal developmental outcomes in the future.

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