Educational Implications of Preterm Birth: A National Sample of 8- to 11-Year-Old Children Born Prematurely and Their Full-Term Peers

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ABSTRACT

Introduction: Preterm birth remains a significant public health issue, with children born prematurely experiencing health and educational difficulties throughout childhood. The specific aim of this study was to evaluate the educational implications of actual or potential health risks of premature birth for children in middle childhood compared with children of the same age who were born at term.

Methods: This descriptive study is a secondary analysis of the 2011/2012 National Survey of Children's Health, specifically an 8- to 11-year-old subset, comparing children identified as being born premature and those born at term. Educational and health outcome variables were explored.

Results: Preterm birth negatively affects the educational experience of children born prematurely. Logistic modeling provides insight into predicting risk.

Discussion: Collaboration between primary care providers, educators, and families is recommended to improve care coordination and address educational need of children born premature. J Pediatr Health Care. (2016) *30*, 464-470.

KEY WORDS

Preterm, premature, middle childhood, educational outcomes

Children born prematurely represent 12% of births each year in the United States. Preterm birth remains a significant public health issue, despite advances in the care provided to women and neonates, with higher rates of significant neurodevelopmental comorbidities occurring with decreasing gestational age. Development of the central nervous system during gestation is a continuous process, with critical changes occurring through even the last 4 to 6 weeks of gestation (Baron, Litman, Ahronovich, & Baker, 2012). Children born prematurely are at risk for varying degrees of educational difficulties throughout childhood, refuting the assumption that late preterm birth and early term birth are "close enough." For this reason, the Association of Women's Health, Obstetric and Neonatal Nurses, the American College of Obstetricians and Gynecologists, the March of Dimes (MOD), and several other organizations actively support public awareness campaigns to decrease the incidence of elective preterm delivery and encourage term pregnancies (i.e., 40 weeks of gestation).

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Children who fail to master basic skills early in their development will be unsuccessful with tasks that build upon those skills. Educational support to children born prematurely represents a significant cost in the United States. Early intervention services for children younger than 3 years cost an estimated $611 million per year, with special educational services costing an additional $1.1 billion per year (MOD, 2015). Given the 12% incidence of premature birth, it is estimated that in the average size U.S. elementary school classroom, up to four children were born prematurely (Hornby & Woodward, 2009). Typically, school officials, teachers, and nurses are not provided with this information, so they do not know which children in their mainstream classrooms were born prematurely.

Baron and colleagues (2012), in a review of late preterm birth neuropsychological and medical outcome literature, reports lower intelligence scores, more attention and internalizing problems, and poor academic achievement at age 5 years, with higher socioeconomic status and maternal education being protective. Baron and colleagues (2012) further identified risk of developmental delay even in children identified as "healthy late-preterm." Charkaluk and colleagues (2011) identified children born at less than 32 weeks of gestation who, at 2 years of age, were medically determined to be without disability. However, when those children were 8 years of age, their parents and teachers were surveyed, revealing that 30% of the children had either repeated a grade, required special support in school, or were in a special educational setting (Charkaluk et al., 2011). Extremely premature infants—that is, those 25 weeks of gestation or less—who are participating in mainstream education at 6 years of age perform one standard deviation (SD) below their peers in the same school setting in visuospatial, perceptuomotor, attention-executive, and gross motor function (Marlow, Hennessy, Bracewell, Wolke, & the EPICure Study Group, 2007).

Research suggests that low-severity, high-incidence conditions such as executive-function deficits result in educational difficulties that may not present until school age or later (Marlow et al., 2007; Salt & Redshaw, 2006). Initially, children born prematurely may do well with educational pursuits; however, difficulties present as children age and academic expectations increase. Pritchard, Bora, Austin, Levin, and Woodward (2014) evaluated school readiness at 4 years of age, compared with their educational abilities at 6 and 9 years of age in children born very preterm. These children displayed an increase in educational delay over time; at 6 years, 60% of the sample had education delays, and at 9 years, 64% of premature children had educational delays. Aarnoudse-Moens, Oosterlaan, Duivenvoorden, van Goudoever, and Weisglas-Kuperus (2011) found similar patterns of increasing difficulties with linguistic performance in 4- to 6-year-old and 6- to 12-year-old very preterm children.

Parents may believe that their children have "outgrown" the premature birth diagnosis, that they are no longer "sick babies," or that they have special health care needs that are no longer attributed to their premature birth. Health care providers may inadvertently reinforce this idea by failing to ask questions about premature birth in new patient encounters with toddlers and school-aged children. Children born premature may be represented in studies of children with learning disabilities, behavioral challenges, or medical conditions (e.g., asthma), but they are not analyzed as children born prematurely. By dropping the categorical or diagnostic label of premature birth, health care providers and researchers miss the opportunity to address the health care and educational needs of these children.

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NATIONAL SURVEY OF CHILDREN'S HEALTH

The 2011/2012 National Survey of Children's Health (NSCH) from the Maternal and Child Health Bureau is a nationally representative dataset consisting of 95,677 completed surveys of children 0 to 17 years of age, with a subset of children 8 to 11 years of age (N = 20,965; term, N = 18,258; premature, N = 2,442) (National Center for Health Statistics [NCHS], 2013). Respondents were parents or caregivers with knowledge of health of the sample child; 68.8% were mothers, 24.2% were fathers, and 7.2% were other caregivers (Centers for Disease Control and Prevention [CDC], NCHS, & State and Local Area Integrated Telephone Survey [SLAITS], 2013). The 2011/2012 NSCH survey was professionally translated into Spanish, Mandarin, Cantonese, Vietnamese, and Korean; 4,905 of the surveys were complete using a Spanish-language interpreter, and 229 were completed using an Asian-language interpreter (CDC et al., 2013).

The stated aims of the NSCH are to estimate national and state-level prevalence of physical, emotional, and behavioral child health indicators and to obtain information on the children's family context and neighborhood environment to help guide policy makers, advocates, and researchers (www.childhealthdata.