



Maternal stress, social support and preschool children's intelligence

R.F. Slykerman^{a,*}, J.M.D. Thompson^a, J.E. Pryor^b, D.M.O. Becroft^a,
E. Robinson^c, P.M. Clark^a, C.J. Wild^d, E.A. Mitchell^a

^aDepartment of Paediatrics, University of Auckland, Private Bag 92019, Auckland, New Zealand

^bMcKenzie Centre for the Study of Families, Victoria University, P.O. Box 600, Wellington, New Zealand

^cDepartment of Epidemiology and Biostatistics, University of Auckland, Private Bag 92019, Auckland, New Zealand

^dDepartment of Statistics, University of Auckland, Private Bag 92019, Auckland, New Zealand

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Abstract

Background: Despite some research suggesting maternal stress may be associated with cognitive impairment in preschool children, there has been little direct investigation of the association between maternal stress, social support and children's intelligence.

Aim: To determine whether maternal stress and social support during pregnancy and during the child's early years of life are associated with the intelligence test performance of preschool children.

Study design: Five hundred and fifty European mothers and children enrolled in the Auckland Birthweight Collaborative Study at birth were interviewed when the child was 3½ years of age.

Subjects: All children were full term gestation and approximately half the sample were small for gestational age at birth (SGA=birthweight ≤10th percentile).

Outcome measure: The cognitive ability of children aged 3½ years was assessed using the Stanford Binet Intelligence Scale 4th Edition.

Results: In the total sample, maternal stress and lack of social support during pregnancy were significantly associated with lower intelligence test scores of children. In the group of SGA children, maternal stress post pregnancy was significantly associated with lower intelligence test scores in children. There is evidence that for some children the presence of good social support for mothers may reduce the negative effects of maternal stress on children's cognitive development.

* Corresponding author.

E-mail address: rebecca.slykerman@ihug.co.nz (R.F. Slykerman).

Conclusion: Maternal stress and lack of social support appear to be associated with lower intelligence test scores of preschool children. Social support may attenuate some of the negative effects of maternal stress on intelligence in children born small for gestational age.

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1. Introduction

Studies examining the effects of maternal stress and level of social support on the cognitive development of children have been limited. In animals, maternal stress during pregnancy has been associated with adverse cognitive outcomes in offspring [1]. In human studies, maternal stress associated with minor daily stress in early pregnancy has been shown to be significantly related to impaired mental development of children at 8 months of age and elevated maternal cortisol levels in late pregnancy were associated with lower psychomotor development scores in infants [2]. Maternal stress during the first year of the child's life has been associated with poorer expressive language ability in 4-year-old children [3].

Greater social support during pregnancy has been related to fewer intellectual and linguistic delays in 3-year-old children of adolescent mothers [4], while larger and better quality maternal social networks have also been shown to significantly predict higher intelligence test scores in preschoolers aged 4 years [5]. Maternal social support may also protect against the negative effects of maternal stress on birth outcomes [6] and both maternal and infant behaviour at age 4 months [7].

Despite previous research suggesting that maternal stress may affect different children in different ways [8], the effects of maternal stress and social support on the cognitive development of children who were born small for gestational age (SGA) have not been directly investigated.

This study aimed to determine whether levels of maternal stress and of social support during pregnancy and during the child's preschool years were significantly associated with intelligence test performance of children. A further aim was to examine this relationship in a group of children who were born small for gestational age.

2. Method

2.1. Subjects

Mothers and their babies were enrolled in the Auckland Birthweight Collaborative Study (ABC

Study) at birth. The methodology of the ABC Study has been described in detail elsewhere [9]. In brief, all children were full term at 37 completed weeks of gestation or greater. Small for gestational age infants were those with a birthweight \leq 10th percentile for sex and gestation. Infants were defined as appropriate for gestational age (AGA) if their birthweight was above the sex specific 10th percentile for gestation. All SGA infants and a random selection of AGA infants born in the Auckland Healthcare region or the Waitemata Healthcare region between 16 October 1995 and 12 August 1996, and in the Auckland Healthcare region between 12 August 1996 and 30 November 1997 were eligible for inclusion. Infants were excluded if they were from a multiple birth, if they had a congenital anomaly likely to affect their growth or development, or if they had been delivered at home. In total 1714 mothers and children were enrolled, 871 of these were New Zealand European.

2.2. Data collection

Assessment of mothers and babies was conducted in three phases. Phase 1 enrolled mothers and infants shortly after birth. Demographic, obstetric and maternal information was collected from a maternal interview and obstetric records. Specific details of this information have been published previously [9]. At the time of the child's first birthday (phase 2) a questionnaire was sent to families to obtain information primarily about the child's first year of life.

Phase 3 of the study assessed children at the age of 3½ years and collected information about the child's health, behaviour and cognitive development. The intelligence of children was assessed using the Stanford Binet Intelligence Scale Fourth Edition [10] administered by one of seven examiners who were blind to maternal stress and support levels and to the birthweight of the child. All children were assessed at approximately 3½ years of age. The Stanford Binet gives a composite score representing the child's overall cognitive ability. This score is comprised of four subtest scores that represent the child's verbal reasoning, quantitative reasoning, abstract visual reasoning and short-term

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