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Developmental care and very preterm infants : neonatal, neurological, growth and developmental outcomes

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Citation

Maguire, C. M. (2008, April 17). *Developmental care and very preterm infants : neonatal, neurological, growth and developmental outcomes*. Retrieved from <https://hdl.handle.net/1887/12703>

Version: Corrected Publisher's Version

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Note: To cite this publication please use the final published version (if applicable).

Summary

This thesis examines the effect of a developmental care program in a tertiary NICU in 2 locations in the Netherlands on preterm infants born < 32 weeks gestational age.

Chapter 1. Introduction

Chapter 1 describes the incidence of preterm birth and risks associated with prematurity as well as the impact of the NICU on the infant and family. Research on the sensory development of the preterm infant have shown that many of the environmental factors and care practices in the NICU have a significant impact on infant sensory development. Developmental care programs have been developed to support the infant and family during their stay in the Neonatal Intensive Care Unit (NICU) with the premise that reducing the stress the infant experiences in the NICU and supporting the infant's development may have a positive impact on outcomes. The NIDCAP (Newborn Individualized Developmental Care and Assessment Program) is a comprehensive approach in which caregiving is based on the individual behavior of the infant. Developmental care is a fairly new concept in the Netherlands with little known about its effect in the neonatal system in the Netherlands where there is a centralization of perinatal care. To that aim, we carried out 2 consecutive randomized controlled trials to examine the effect of a basic developmental care program and the comprehensive NIDCAP program on short and long term growth, morbidity and neurodevelopment of preterm infants born < 32 weeks gestational age.

Chapter 2. Hospital based intervention with parents and their preterm infants

Chapter 2 describes a short-term, hospital based intervention study with 10 sets of parents and their preterm infants < 32 weeks in the NICU. This was a phase-lag pilot study in which parents in the intervention group were instructed in preterm infant behavior with the goal of increasing their responsiveness to their infant and therefore their confidence in caregiving. While the lessons significantly increased their knowledge of premature infant behavior, their level of confidence in caregiving increased but not significantly. Parents in the control group who did not receive the instructions showed no increase in confidence in caregiving. While no large effect was found, it did indicate that it is feasible to start an intervention program with parents early on in the NICU period. We concluded that a longer, more intensive program with a larger sample size was necessary.

Chapter 3. Short-term effects of Basic Developmental Care

In Chapter 3 we examined the effects of basic developmental care (DC), which we de-fined as the use of incubator covers and positioning aids, on short term morbidity, growth and neurodevelopmental outcomes to term age in preterm infants born < 32 weeks gestational age. 192 infants were recruited and a total of 179 infants (DC=91, C=88) met inclusion criteria. In-hospital mortality was 12/91 (13.2%) in the DC group and 8/88 (9.1%) in the C group. Ten (DC=3, C=7) infants were lost to follow-up. There was no significant difference in the number of days of respiratory support, number of intensive care days, short-term growth or neuromotor developmental outcome at term age between the DC and C groups. Duration of the intervention, whether only during the intensive care period or until hospital discharge, had no significant effect on outcome. We concluded that providing basic developmental care in the NICU has no effect on short-term physical and neurological outcomes in infants born < 32 weeks GA.

Chapter 4. Effect of Basic Developmental Care on 1 and 2 year outcomes

In Chapter 4 we report the effect of basic developmental care on growth and neurodevelopmental outcome at 1 and 2 years CA of preterm infants < 32 weeks. Of the 159 surviving infants, 147 children (DC= 74, C= 73) at 1 year and 142 children (DC=72, C=70) at 2 years were assessed. No significant difference in growth, neurological outcomes or MDI was found. A positive trend in PDI at 1 year ($p=0.05$) did not continue once the children reached 2 years of age. When neurological and developmental scores were combined, the C group showed more “definitely abnormal” scores than the DC group at both ages, but this did not reach the level of significance. We concluded that basic developmental care has a positive effect on psychomotor development at 1 CA, but no effect on neurological and mental development or growth at 1 and 2 years CA.

Chapter 5. Short-term effects of NIDCAP Developmental Care

Chapter 5 describes the effect of the comprehensive NIDCAP developmental care program in preterm infants < 32 weeks GA on short term morbidity, growth and neurodevelopmental outcomes to term age. 168 infants were recruited (NIDCAP=84; C=84). Four infants (NIDCAP=3, C=1) were excluded because they were admitted less than or died within the first 5 days, leaving a total of 164 infants (NIDCAP=81, C=83) that met inclusion criteria. In-hospital mortality was 8/81 (9.9%) in the NIDCAP group and 3/83 (3.6%) in the C group. No difference in mean days respiratory support (13.9/16.3) or mean days IC (15.2/17.0) were found (NIDCAP/C, respectively). Short-term growth and neuromotor development at term age showed

no differences, even when correcting for the duration of the intervention. Our conclusion was that NIDCAP developmental care has no effect on respiratory support, intensive care days or growth and neuromotor development at term age.

Chapter 6. Effect of NIDCAP on 1 and 2 year outcomes

Chapter 6 examined the effect of NIDCAP in preterm infants < 32 weeks GA on 1 and 2 year growth and neurodevelopmental outcomes. Of the 153 surviving infants, 148 children (NIDCAP= 70, C= 78) at 1 year and 146 children (NIDCAP=68, C=78) at 2 years were assessed. There was no significant difference in growth, neurological outcome or mental and psychomotor development at 1 and 2 years found. When neurological outcome, MDI and PDI scores were combined, there still remained no significant difference. We concluded that NIDCAP developmental care showed no effect on growth, neurological, mental and psychomotor development at 1 and 2 years in infants born < 32 weeks. Duration of the NIDCAP intervention was not associated with neurological and developmental outcome.

Chapter 7. General Discussion

Chapter 7 contains the General Discussion of the results of this study. We examined the methodology of our RCT's and compared our results to previous NIDCAP trials. We suggested that more research is warranted before a definite conclusion can be made concerning the effect of developmental care on preterm infants and families. A recommendation for future research was studying the effect of developmental care not only in the neonatal centers but also continuing the intervention once infants are transferred to regional hospitals. There may also be an added effect to providing early intervention for parents and infants in the first months after discharge to home and therefore such programs should be evaluated in future trials.

