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[Intervention Review]

Developmental care for promoting development and preventing morbidity in preterm infants

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ABSTRACT

Background

Preterm infants experience a range of morbidity related to the immaturity of their organ systems and to concurrent disease states. An unfavourable environment in the neonatal intensive care unit (NICU) may compound this morbidity. Modification of the environment could minimize the iatrogenic effects. Developmental care is a broad category of interventions designed to minimize the stress of the NICU environment. These interventions may include one or more elements such as control of external stimuli (vestibular, auditory, visual, tactile), clustering of nursery care activities, and positioning or swaddling of the preterm infant. Individual strategies have also been combined to form programs, such as the 'Neonatal Individualized Developmental Care and Assessment Program' (NIDCAP) (Als 1986).

Objectives

In preterm infants, do developmental care interventions reduce neurodevelopmental delay, poor weight gain, length of hospital stay, length of mechanical ventilation, physiological stress and other clinically relevant adverse outcomes?

Search methods

The Neonatal Review Group search strategy was utilized. Searches were made of MEDLINE from 1966 to July, 2003, and of CINAHL, The Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library, Issue 2, 2003), and conference and symposia proceedings in the English language from 1990 to July, 2003. A list of all relevant articles was sent to two experts in the field to identify any omissions or additional unpublished studies.

Selection criteria

Randomized trials in which elements of developmental care are compared to routine nursery care for infants < 37 weeks gestation and that measured clinically relevant outcomes. Reports were in English or a language for which a translator was available.

Computerized searches were conducted and all potentially relevant titles and abstracts were extracted. Retrieved articles were assessed for relevance independently by two reviewers, based on predetermined criteria. Articles that met all criteria for relevance were assessed for methodological quality based on predetermined criteria. Articles judged to have the appropriate quality by both reviewers were included in the analysis.

Data collection and analysis

Data were extracted independently by the two authors. Meta-analyses were conducted for each intervention where the same outcome measures and/or instruments were used within comparable time points.

Main results

This review detected 32 eligible randomized controlled trials involving four major groups of developmental care interventions, 19 subgroups and multiple clinical outcomes.

The results of the review indicate that developmental care interventions demonstrate some benefit to preterm infants with respect to: improved short-term growth and feeding outcomes, decreased respiratory support, decreased length and cost of hospital stay, and improved neurodevelopmental outcomes to 24 months corrected age. These findings were based on two or three small trials for each outcome, and did not involve meta-analyses of more than two trials for any one outcome. Although a number of other benefits were demonstrated, those results were from single studies with small sample sizes. The lack of blinding of the assessors was a significant methodological flaw in half of the studies. The cost of the interventions and personnel was not considered in any of the studies.

Authors' conclusions

Because of the inclusion of multiple interventions in most studies, the determination of the effect of any single intervention is difficult. Although there is evidence of some benefit of developmental care interventions overall, and no major harmful effects reported, there were a large number of outcomes for which no or conflicting effects were demonstrated. The single trials that did show a significant effect of an intervention on a major clinical outcome were based on small sample sizes, and the findings were often not supported in other small trials.

Before a clear direction for practice can be supported, evidence demonstrating more consistent effects of developmental care interventions on important short- and long-term clinical outcomes is needed. The economic impact of the implementation and maintenance of developmental care practices should be considered by individual institutions.

PLAIN LANGUAGE SUMMARY

Developmental care interventions may help preterm infants cope better with the environment of the Neonatal Intensive Care Unit (NICU)

Preterm infants (babies born before 37 weeks) can develop a range of problems because their organs are not mature. An unfavourable environment in the NICU can add to these problems and negatively affect the infant's growth, with the brain being particularly vulnerable. Developmental care refers to a range of strategies designed to reduce the stresses of the NICU. These include reducing noise and light, minimal handling and giving longer rest periods. The review of trials suggests that these interventions may contribute to better short-term growth and feeding in infants, decreased length of stay and need for breathing support.