Newborn Individual Development Care and Assessment Program (NIDCAP): a systematic review of the literature

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CRD summary
This review concluded that although the findings appeared to be promising, the methodological limitations of the evidence prevented the drawing of any definitive conclusions about the effectiveness of the Newborn Individualized Developmental Care and Assessment Program for preterm infants. Overall, the authors’ cautious conclusions appear to reflect the limitations of the evidence presented.

Authors’ objectives
To assess the effects of the Newborn Individualized Developmental Care and Assessment Program (NIDCAP) on psychomotor development, neurological status, medical or nursing care outcomes, and parental perceptions, in preterm infants. A secondary aim was to assess the cost-effectiveness of the NIDCAP.

Searching
PubMed, the Cochrane Library, and HEED were searched for studies published between 1950 and September 2007; search terms were reported. The reference lists of retrieved articles were searched for further studies. Any unpublished studies that were identified were included in the discussion.

Study selection
Randomised controlled trials (RCTs) of any duration were eligible for inclusion if they evaluated NIDCAP as an intervention and assessed any outcome in preterm infants.

Included trials compared the NIDCAP, or observation and development of a care plan based on the principles of the NIDCAP, with conventional care or standard neonatal intensive care, without the NIDCAP or care plan. Included infants were mainly recruited within care units and had either very low birth weight (usually under 1,250g; equivalent to a gestation age of less than 30 weeks) or low birth weight (under 2,500g: equivalent to gestation age 30 to 34 weeks).

Outcomes were grouped as follows: psychomotor development or neurological status (assessed by behaviour, Bayley and Bayley II, Kangaroo box, Prechtl, electroencephalogram, mortality, and morbidity); medical or nursing care outcomes during in-patient care (duration on oxygen supply, continuous positive airway pressure, mechanical ventilation, nutritional support, growth, and complications); mothers’ perception of care; and costs and in-patient duration (age at discharge). Follow-up durations ranged from two weeks (or discharge) to 5.5 years. All trials were published from 1993 onwards and carried out mainly in the USA; some trials were carried out in Sweden.

The authors did not state how many reviewers performed the selection.

Assessment of study quality
The quality of included trials was assessed using the criteria of the Swedish Council on Technology Assessment in Health Care (SBU). These included the following 12 items: power calculation performed, adequate number of patients, groups comparable at baseline, intention-to-treat analysis, drop-out rate, blinded assessment, assessment of intervention performance and extension, equal treatment of groups besides intervention, risk of crossover of intervention to the control group, relevant outcomes assessed, relevant number of outcomes assessed, and ethical approval obtained. Each trial was awarded a yes or no for each criterion. RCTs that fulfilled 10 to 12 criteria were classified as high quality, those fulfilling six to nine criteria were medium quality and those fulfilling five or less criteria were low quality.

Assessments were carried out independently by two reviewers and any discrepancies were resolved through consensus.

Data extraction
Statistically significant data were extracted independently by two reviewers.
Methods of synthesis
Trials were grouped by type of outcome measure and synthesised using narrative methods.

Results of the review
Six RCTs (approximately 250 patients) were included in the review. The quality of each trial was reported to be medium. Common methodological flaws were small sample size and large number of outcome measures, which increased the probability of finding statistically significant effects purely by chance.

Psychomotor development or neurological status (six RCTs): Five articles (four RCTs) reported significant improvements in some or all of the six subscales of the Assessment of Preterm Infants’ Behavior index. Three out of four articles using the Bayley scale, one out of two articles using the Prechtl instrument, one article using the Kangaroo Box test, and one article assessing normal behaviour at age 5.5 years, all reported significant improvements. Two articles assessing infant sleep behaviour did not show a significant difference between NIDCAP and control.

Medical or nursing care outcomes (six RCTs): Data favouring NIDCAP in comparison with control were reported for four out of six trials assessing respiratory care; two out of six trials assessing feeding or growth; and three out of six trials assessing complications.

Mothers’ perceptions (one RCT): Positive effects were found for the NIDCAP group, with perceived closeness to their infants, but also increased anxiety in comparison with control.

Costs and in-patient duration: Two out of three RCTs reported that infants treated with NIDCAP were discharged at a younger age, had a shorter hospital stay, and lower care costs in comparison with control. One trial reported a reduced number of infants receiving hospital care at 42 weeks after conception, for infants receiving NIDCAP compared with control.

No complications or undesirable effects were reported in any of the six RCTs.

Cost information
No cost-effectiveness studies assessing NIDCAP were identified.

Authors’ conclusions
Although the findings appear to be promising, the methodological limitations, of the evidence, prevent the drawing of any definitive conclusions on the effectiveness of NIDCAP.

CRD commentary
This review assessed a clearly defined question using a broad range of outcome measures. Relevant sources were searched for published studies, but no deliberate attempts were made to locate unpublished studies. Some unpublished studies were identified and were included in the discussion. There may have been a risk of language bias. Some attempts were made to reduce the risk of reviewer error and bias when assessing the quality of the trials and extracting the trial data. It was unclear whether similar precautions were taken when assessing the eligibility of trials for inclusion.

The methodological quality of RCTs was rated as medium and many of them had flaws which could affect their reliability. The trials also showed considerable variation particularly with respect to the populations studied and outcomes assessed. Given these differences, a narrative synthesis appears to have been appropriate. The authors only appeared to discuss those outcomes that showed statistically significant findings in favour of NIDCAP. Information on other findings, and more numerical and statistical data in general would have been helpful in confirming the authors’ conclusions.

Overall the authors’ cautious conclusions appear to reflect the limitations of the evidence presented.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further evidence from a large study, focusing on one or two important outcomes, including psychomotor development and neurological status, with extended follow-up, was required to assess the effects
of NIDCAP.

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