A cost-effectiveness analysis of neonatal nurse practitioners

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The delivery of neonatal intensive care in a tertiary care setting.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Critically ill neonates admitted to the NICU within the first 24 hours of life, and whose birth weights were between 500 and 1,250 grams.

Setting
Neonatal intensive care unit at a tertiary health science centre in the South Eastern United States.

Dates to which data relate
Effectiveness and resource use data were collected between January 1991 and August 1992. The price year was not stated.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness analysis. The costing was carried out prospectively alongside the effectiveness analysis.

Study sample
254 records were identified for infants who were admitted to the NICU within the first 24 hours of life, and whose birth weights were between 500 and 1,250 grams. Infants excluded from the study were those:

(1) admitted to the NICU after the first 24 hours of life,

(2) who died within the first 24 hours of life, and

(3) with congenital cardiac, genetic, or surgical conditions.
32 infants were excluded because they died in the first 24 hours of life. Of the remaining 222 infants, NNPs cared for 35. Of the remaining 187 infants who were cared for by medical house staff, 35 infants were selected randomly for inclusion in the study. No power calculations were reported.

**Study design**
This was a retrospective cohort study carried out at a single centre. Infants were followed-up for the period of their stay in hospital.

**Analysis of effectiveness**
The analysis of the clinical study was based on the intention to treat principle. The primary health outcomes used included length of stay, days on oxygen, days on ventilation, morbidity (measured as the frequency of developing sensorineural hearing loss, retinopathy of prematurity and intraventricular haemorrhages), and mortality. At analysis, groups were shown to be comparable in terms of birth weight, gestational age, race, sex, place of birth, and Apgar score.

**Effectiveness results**
No significant difference was found between the two groups in terms of length of stay, days on oxygen, days on ventilation, morbidity and mortality.

**Clinical conclusions**
Neonatal intensive care provided by NNPs or medical house staff was of equal quality.

**Measure of benefits used in the economic analysis**
A quality of care index (QI) was used in the analysis. This QI was a weighted measure of the 5 quality indicators. Ten experts in the field of neonatology were asked to derive weights for each quality indicator representing its perceived importance to overall quality of care.

**Direct costs**
Costs were not discounted given the short time frame of the study (less than 1 year). Quantities and costs were not reported separately. The direct costs included costs accrued by the infants in the NICU for pharmacy, laboratory, radiology, respiratory therapy, supplies, as well as total hospital and NICU costs. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Cost figures were retrieved from the hospital's medical information and accounting offices. The price year was not stated.

**Statistical analysis of costs**
Not reported.

**Indirect Costs**
Not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
Not reported.
Estimated benefits used in the economic analysis
QI scores of 1.02 and 1.01 were obtained for the medical house staff and NNP groups, respectively. A value of 1 indicates average quality.

Cost results
Costs of $107,171.84 and $88,932.17 were found for the medical house staff and NNP groups, respectively.

Synthesis of costs and benefits
Cost-effectiveness values (cost/QI score) of $105,070.43 and $88,051.65 were found for the medical house staff and NNP groups, respectively.

Authors’ conclusions
NNPs, in collaboration with neonatologists, provide care to infants weighing less than 1,250 grams that is comparable in quality and significantly lower in costs than the care given by medical house staff.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear.

Validity of estimate of measure of benefit
The authors acknowledged that future studies should not only focus on outcomes, but also on process and contextual variables that influence provider behaviour and, ultimately, the outcomes of care. Attention should also be paid to both short and long-term outcomes.

Validity of estimate of costs
Charges and not costs were used. Charges do not represent true opportunity costs. No sensitivity analysis was conducted to test the robustness of the cost results. No statistical analysis was carried out.

Other issues
The reader should examine whether these results are generalisable to his/her own setting. The study may suffer from a small sample size. The weights used for calculating the quality index were based on the subjective judgement of 10 experts. A sensitivity analysis on this parameter could have been conducted.

Implications of the study
The study should be replicated across different NICU settings with larger samples.

Source of funding
None stated.

Bibliographic details

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Other publications of related interest

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Subject indexing assigned by NLM

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