Evaluation of an early discharge program for infants after childbirth in a military population

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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
An early discharge programme for infants after childbirth was compared with regular discharge.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised military dependent mothers and neonates admitted into a well-baby nursery for level I care, who were either admitted to an early discharge programme according to specific criteria, or admitted to a regular discharge programme. The criteria for the early discharge programme included healthy term singleton newborns delivered by uncomplicated vaginal delivery with maternal support systems, transportation, and phone access.

Setting
The setting was a tertiary care military centre, Fort Lewis, Washington, USA. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness data were collected from a retrospective analysis of two 6-month periods. These were March to August 1994 (before early discharge) and March to August 1996 (after early discharge). Resource use was estimated from the same sample. The price year was not stated, but it is likely that 1999 prices were used.

Source of effectiveness data
The effectiveness data were gathered from a single retrospective study.

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient group as that used in the effectiveness study.

Study sample
Power calculations were not reported as having been used to determine the sample size. In 1994, there were 1,042 infants born during the study period, with 3.6% discharged at less than 48 hours. In 1996, there were 869 infants born during the study period, with 44.2% discharged at less than 48 hours. There were no statistically significant differences between the patient populations in 1994 and 1996. The mean maternal age was 25 (+/- 5) years (1994) versus 24.7 (+/-
The mean infant gestational age was 39.5 (+/- 1.5) weeks (1994) versus 39.4 (+/- 1.4) weeks (1996). The mean birth weight was 3,473.4 (+/- 513) g (1994) versus 3,454.8 (+/- 505) g (1996). In terms of gender, 51% (1994) versus 49% (1996) were male, and in terms of race, 76% (1994) versus 77% (1996) were white.

Study design
This was a single retrospective study from two 6-month periods. A follow-up system of care for the infants and the mothers included a phone call at 24 hours, 48 hours and 5 days after patient discharge, with follow-up with a nurse or a physician within 24 to 48 hours of the time of discharge. A routine 2-week well-baby visit was also scheduled before discharge. No information was provided for any loss to follow-up. The data were gathered retrospectively from the Patient Administration System and Biostatistics Activities version 2 (US Army Medical Department, Fort Sam Houston, TX) and from a computerised hospital outpatient clinical database.

Analysis of effectiveness
The principle used in the analysis of effectiveness (intention to treat or treatment completers only) was not explicitly specified. The study end point was a composite outcome of patient safety, the number of readmissions and maternal satisfaction. Maternal satisfaction was assessed by a written survey given to a random selection of both early and regular discharge mothers attending the well-baby clinic during the 1996 study period (n=159). The questionnaires involved a distinct yes or no choice, a checklist, short answer or Likert scale (0 strongly disagree to 5 strongly agree). Statistical analyses were developed using chi-squared statistics with 95% confidence intervals (CIs) to compare effectiveness data between 1994 and 1996.

Effectiveness results
There were 9 readmissions (0.86%) in 1994 compared with 12 (1.38%) in 1996 (odds ratio, OR=1.61, 95% CI: 0.67 - 3.83).

There was an average of 7.0 emergency room visits per month (4%) during 1994 compared with 7.0 emergency room visits per month (4.8%) in 1996 (OR 1.09, 95% CI: 0.58 - 2.03).

There was an average of 17.6 clinic visits per month (10.1%) in 1994 compared with 36.0 clinic visits per month (24.8%) in 1996 (OR 3.05, 95% CI: 2.18 - 4.27).

The maternal satisfaction with overall care (length of stay, phone calls) was good (Likert score=3.8).

Clinical conclusions
There was no statistically significant increase in the number of readmissions between 1994 and 1996. There was a significant increase in the total number of clinic visits before the 2-week well-child visit for the 1996 group, but this group experienced no change in the number of emergency room visits. The early discharge programme was not associated with increased adverse newborn outcomes.

Measure of benefits used in the economic analysis
The authors did not develop a summary benefit measure. Thus, a cost-consequences analysis was conducted.

Direct costs
The costs and the quantities were reported separately for all the categories of costs. The average cost data per hospital day and per clinic visit were obtained from the patient administrative services. These included inpatient hospitalisation costs, readmission costs, and follow-up visit costs for the well-child clinic, paediatric clinic and emergency room. Laboratory costs were not included. The phone follow-up costs were estimated from the hourly salary of the nursing personnel making the calls. Discounting was not applied. The price year was not reported.
Statistical analysis of costs
No statistical analysis of the costs was reported.

Indirect Costs
No indirect costs were included in the analysis.

Currency
US dollars ($).

Sensitivity analysis
A sensitivity analysis was not carried out.

Estimated benefits used in the economic analysis
No summary measure of benefit was derived. See 'Effectiveness Results' section.

Cost results
The average cost per infant was $1,830.16 in 1994 compared to $1,363.68 in 1996. The mean number of hospital days was 2.54 (+/- 0.83) per infant in 1994 compared with 1.88 (+/- 1.03) in 1996. The programme was able to save 599 inpatient hospital days, for an estimated cost-savings of $442,903.23, and an average cost-savings of $509.37 per infant during the 6-month 1996-study period. Taking into account the additional costs of follow-up, the early discharge programme was still able to save an estimated $402,755.43 for the 6-month 1996-study period, and the average cost-savings per infant was $463.47.

Synthesis of costs and benefits
No synthesis of the costs and benefits was conducted.

Authors’ conclusions
The authors concluded that, by following strict discharge criteria, increasing patient education before discharge, implementing a phone follow-up system, and ensuring easy access to care, an early discharge programme in a military population was not associated with increased adverse newborn outcomes. In addition, it was cost-effective.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator was clear. The comparator was chosen because it represented the routine practice for discharge mothers and their infants. You should consider whether this is a widely used technology in your own setting.

Validity of estimate of measure of effectiveness
Due to the observational nature of the study some bias and confounding is likely to be present. Consequently, the internal validity of the study might be quite low. The authors have made no attempt to adjust for confounding or bias. The authors highlight the problem of selection bias on the validity of the maternal satisfaction questionnaire. Only 39% (159 out of 408) of a sub-group of mothers agreed to participate in the survey. The random sample included both early and regular discharge mothers, but only included those attending the well-baby clinic. No power calculations were conducted. The authors acknowledge that the study may lack the power to detect significant differences.

Validity of estimate of measure of benefit
The analysis was based upon the effectiveness equivalence of the alternatives. Therefore, the economic analysis included only the costs.

**Validity of estimate of costs**
The authors did not report the perspective adopted. The indirect costs were not included in the analysis, despite the fact that they are probably quite significant in this group of patients. The authors reported this limitation in their discussion. Moreover, some others relevant costs were omitted. The costs of laboratory tests were excluded from the analysis because they were unavailable. Since the analysis based the average cost-savings on a fixed daily cost, the average cost-savings may have been underestimated. The costs and the quantities were reported separately. No statistical analysis of the quantities or prices was performed. In addition, despite the costs being incurred over two different periods (March to August 1994 and March to August 1996), discounting was not undertaken. It is likely that the authors used 1999 prices for both periods, but again this was not explicitly reported.

**Other issues**
The authors made appropriate comparisons of their findings with those from other studies. They acknowledged that their study has limited generalisability and that caution must be used when extrapolating the results to other clinical settings. The authors' conclusions reflected the scope of the analysis. The authors reported a number of limitations to their study, as already discussed.

**Implications of the study**
Studies specifically evaluating maternal outcome in a military system need to be carried out. Prospective multicentre studies are required to further evaluate infant outcomes and different aspects of early discharge. The decision of when to discharge the healthy term newborn must remain an individual one made by the practitioner on the basis of the medical, social and economic aspects of each case.

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