Intensive interventional maternity care reduces infant morbidity and hospital costs

Reece E A, Lequizamon G, Silva J, Whiteman V, Smith D

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 Temple Infant and Parent Support Services (TIPSS) programme, a comprehensive maternal and infant care programme, was studied. The programme comprised multidisciplinary services including community outreach, health education and clinical care for the entire family.

Type of intervention
Mixed: Primary prevention, treatment and health education.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised high-risk pregnant women attending the Temple University Hospital and School of Medicine. Further details were not reported. ‘High risk’ was not defined.

Setting
The setting was the community. The economic study was carried out in Temple, North Philadelphia, USA.

Dates to which data relate
The dates of the effectiveness study were not reported. Resource use and unit costs were estimated for the same unspecified period.

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

Link between effectiveness and cost data
The costing was carried out prospectively for the same sample of patients as that in the effectiveness study.

Study sample
The authors did not report that power calculations were carried out to estimate the influence of chance on the results. The sample was selected by including all women who were enrolled in the TIPSS programme for the first 3 years. It was unclear how women were selected for enrolment into the TIPSS programme, as this was a sub-sample of all patients receiving care in the Temple University Hospital. Those patients not enrolled in the TIPSS programme formed the control group. The initial sample was appropriate for the clinical question because it included patients requiring prenatal care. The authors reported that the effectiveness was evaluated among high-risk groups, but it was not evident how or why this group were considered high risk. The total study population numbered 1,628, of whom 761 were in the
study group and 867 in the control group. There was no report of patients being excluded for any reason.

**Study design**
The basis of the analysis was a non-randomised controlled trial that was conducted at a single university hospital. Members of the control group were matched to members of the TIPSS group for age, parity, ethnicity, health insurance and smoking. The groups were split into two cohorts, preterm delivereries and term deliveries, to eliminate the possibility of bias for low weight birth based on length of gestation. The patients and their babies were followed until the first birthday of the child. No loss to follow-up was reported. It was not possible to blind the patients and clinicians in this study. The blinding of the data collectors and analysts may have been possible but was not reported.

**Analysis of effectiveness**
The authors did not state whether the basis of the analysis was intention to treat or treatment completers only. The primary health outcomes were:

the number of prenatal visits,

the incidence of low birth weight,

the incidence of preterm delivery, and

the incidence of perinatal mortality.

The groups were compared in terms of gravity, parity, race and smoking. No significant differences were observed. As already described, an adjustment was made to avoid bias due to preterm birth.

**Effectiveness results**
The average number of prenatal visits was 10 in the TIPSS group and 7 in the control group, (p<0.001).

The number of visits was positively correlated with birth weight.

The mean birth weight at term was 3,276 g in the TIPSS group and 3,290 g in the control group.

The number of infants weighing less than 2,500 g was 20 (5.2%) in the TIPSS group and 48 (11%) in the control group, (p<0.05).

The number of admissions to the neonatal intensive care unit was 11 (2.8%) in the TIPSS group and 29 (6.6%) in the control group, (p<0.05).

When birth weight was adjusted for length of gestation, preterm infants born to TIPSS patients were significantly heavier than those born to control patients.

The incidence of perinatal mortality was not reported.

**Clinical conclusions**
The authors concluded that the initiation of a comprehensive, multidisciplinary, prenatal care programme resulted in a significant reduction in morbidity among newborns.

**Measure of benefits used in the economic analysis**
The authors did not produce a summary measure of health benefit. The study was, in effect, a cost-consequences analysis.
**Direct costs**
The authors reported that the "economic impact was... assessed by comparing hospital charges among both groups". This was the only detail provided of the cost analysis. From the results reported, the authors appear to have been concerned with the cost of neonatal intensive care unit admissions. Discounting was not reported but, given the 9-month pregnancy plus additional 1-year time span, it would have been relevant if the costs were estimated over the complete time horizon. The perspective seems to have been that of the hospital, although this was not explicitly reported. The source of the estimates was also not reported.

**Statistical analysis of costs**
The cost estimates were treated deterministically.

**Indirect Costs**
The indirect costs were not estimated. These may have been relevant if admission to intensive care meant that the parents were in attendance and this led to time away from economic productivity.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analyses were reported.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.

**Cost results**
The cost per infant born was $2,849 in the TIPSS group and $8,499 in the control group.

The saving per infant born to mothers receiving care on the TIPSS programme was $5,650.

**Synthesis of costs and benefits**
Not relevant.

**Authors' conclusions**
The study group had significantly lower morbidity. This resulted in cost-savings from decreased stays in the neonatal intensive care unit.

**CRD COMMENTARY - Selection of comparators**
The authors compared prenatal women receiving care on the TIPSS programme with patients receiving usual prenatal care. This comparator was the natural choice to demonstrate the benefits of the TIPSS programme in a pragmatic setting. You should decide if this represents a valid comparison in your own setting.

**Validity of estimate of measure of effectiveness**
The study design was appropriate for the stated aim of assessing whether the TIPPS programme reduced infant morbidity. The study sample comprised high-risk individuals who were not representative of the complete population of patients who might benefit from prenatal care. Moreover, the control group consisted of patients who had self-selected...
into care and who, as the authors acknowledged, were likely to be lower risk. Therefore, the study population was not consistent throughout the study, thus creating areas for potential bias. Although the authors reported that the demographic characteristics of the two groups were comparable, there did not appear to have been any comparison in terms of risk status (high or low), propensity to choose care without being recruited into the programme (for study group patients), and nutritional well-being. All of which are factors that may create bias in a pregnancy-related study.

The authors claimed that a randomised study was not possible due to the universally accepted benefits of prenatal care. However, it ought to have been feasible to carry out the following randomisation. First, take a sample of patients who self-selected into prenatal care. Second, recruit a number of non self-selected patients. Third, stratify the groups before randomisation to either the TIPSS programme or usual prenatal care. This would ensure comparable numbers of the two types of patient (high and low risk) in each group. It would also eliminate the possibility of self-selection and high-risk/low-risk bias.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. Hence this was, in effect, a cost-consequences analysis.

Validity of estimate of costs
Very limited details of the cost analysis were provided. It was not possible to assess whether all the relevant costs were included, as a perspective was not reported and a breakdown of the composition of the analysis was not given. The sparse reporting of the costs prevents the reader from assessing the quality of the analysis and recreating parts of the analysis in their own setting.

Other issues
The authors made some comparisons with the results from other studies, although these could have been presented in more detail rather than an overall report. For instance, the authors might have considered the methodology used by other authors to explain similarities and differences in their results. The issue of generalisability to other settings was not explicitly considered but, given the poor reporting of the costs and the application of the entire study to a highly specific care programme, generalising the results is not recommended. The results were presented thoroughly and graphical representations enable the reader to better interpret the results given. The authors' conclusions accurately reflected the scope of the study, in acknowledging the high-risk nature of patients, and were a true reflection of the results presented. However, no definition of 'high-risk' patients was provided. A number of potential and actual limitations were presented. These included the non-randomised design of the study and the possibility for selection bias, which the authors argued was "blunted" due to the control group being self-selected and the study group being enrolled.

Implications of the study
The authors made no recommendations for policy or practice following their study. They also did not make any suggestions for further work.

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Other publications of related interest

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