Multifetal pregnancy reduction: perinatal and fiscal outcomes
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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
Use of a multifetal pregnancy reduction programme for pregnancies with multiple gestations.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Pregnancies with surviving infants of 25 weeks' gestation or longer.

Setting
Hospital. The economic analysis was carried out in the USA.

Dates to which data relate
Effectiveness data for the multifetal pregnancy reduction group covered the period between 1986 and 1997. The corresponding period for the control group was between 1 January 1986 and June 1998. The percentage of high-order multiple neonates admitted to the neonatal intensive care unit was derived from a study published in 1994. Resource use data and their corresponding collection dates were not reported. The price year was not explicitly specified.

Source of effectiveness data
The evidence for the final outcomes was based on a single study and assumptions made by the authors on the basis of the data from another published study.

Link between effectiveness and cost data
Costing was retrospectively performed on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not used to determine the sample size. The study sample consisted of 438 deliveries in the multifetal pregnancy reduction group and 98,520 deliveries in the control group (the general delivery population of the study institution).

Study design
This was a retrospective cohort study, carried out in a single centre. The duration of the follow-up appears not to have
been specified. No information was given regarding loss to follow-up. Outcome data were determined using a comprehensive perinatal database.

**Analysis of effectiveness**

The principle used in the analysis of effectiveness appears to have been treatment completers only (as only surviving neonates were included in the analysis). The health outcomes were surviving deliveries according to finishing number (triplets, twins, and singletons) aggregated into 2 categories in terms of gestational age, 25 to 32 weeks' gestation and 33 weeks' gestation or longer. It was reported that data were not available to compare any demographic or prenatal characteristics.

**Effectiveness results**

The proportions of triplet deliveries were as follows:

control group, 49.1% with gestation age of 25-32 weeks and 50.9% with gestation age of 33 weeks or over;

multifetal group, 45% (25-32 weeks) and 55% (>= 33 weeks), (non significant).

The proportions of twin deliveries were as follows:

control group, 24.4% (25-32 weeks) and 75.6% (>= 33 weeks);

multifetal group, 15.7% (25-32 weeks) and 84.3% (>= 33 weeks), (p<0.01).

This showed that the reduced cases actually had better outcomes than for unreduced twins.

The proportions of singleton deliveries were as follows:

control group, 4.2% (25-32 weeks) and 95.8% (>= 33 weeks)

multifetal group, 7% (25-32 weeks) and 93% (>= 33 weeks), (non significant)

**Clinical conclusions**

Pregnancies reduced to triplets, twins, and singletons had outcomes at least comparable to unreduced pregnancies starting at these numbers and substantially better than unreduced pregnancies with the same starting number.

**Methods used to derive estimates of effectiveness**

An assumption was made by the authors on the basis of data from a published study.

**Estimates of effectiveness and key assumptions**

78% of the high-order (>= 3) multiple neonates would be admitted to the neonatal intensive care unit.

**Measure of benefits used in the economic analysis**

No summary benefit measure was identified in the economic analysis, and only individual clinical outcomes were reported.

**Direct costs**

Costs were not discounted due to the short time frame of the cost analysis. Resource use quantities were not reported separately from the costs and only estimated NICU admissions avoided were reported separately. Some cost items were reported separately. The cost analysis covered the costs of the multifetal pregnancy reduction programme and admission.
to the neonatal intensive care unit (NICU), applying the value of the percentage of the high-order multiple neonates admitted to NICU derived from a published study. The perspective adopted in the cost analysis was not explicitly specified. The cost per NICU admission was obtained from the Source Book of Health Insurance Data 1994. Charge data were used to estimate the costs of the multifetal pregnancy reduction and ultrasonography. The price year was not specified. The cost analysis did not cover any long-term costs of care for surviving but impaired infants.

**Indirect Costs**
Indirect costs were not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
Not applicable.

**Cost results**
The total cost of multifetal pregnancy reduction for the 438 cases of reduction was $1,403,980 based on $3,210 per case. The estimated NICU costs avoided ($50,000 per stay) were $30,200,000, resulting in cost savings of more than $28 million dollars.

**Synthesis of costs and benefits**
Costs and benefits were not combined.

**Authors' conclusions**
Use of multifetal pregnancy reduction improved obstetric outcomes for pregnancies with multiple gestations and was also associated with significant fiscal savings.

**CRD COMMENTARY - Selection of comparators**
The policy of not performing the multifetal pregnancy reduction procedure was regarded as the comparator. This allowed the active value of the intervention to be evaluated.

**Validity of estimate of measure of effectiveness**
The internal validity of the effectiveness results cannot be guaranteed due to the retrospective nature of the study design and the non-availability of the data on the comparison the two groups in terms of baseline characteristics. The control group of the general obstetric population of the study institution could also have received different care in comparison with the intervention group of high-risk pregnancies, which could have had a significant influence on the outcomes. Furthermore, it is not entirely clear why pregnancy outcomes such as loss and long-term sequelae for surviving infants were not assessed in the effectiveness analysis. The study sample appears to have been representative of the study population (surviving neonate with minimum gestational age of 25 weeks).

**Validity of estimate of measure of benefit**
The authors did not derive a measure of health benefit. The analysis was therefore a cost-consequences design.
Validity of estimate of costs
A positive feature of the cost analysis was that some details of methods of cost estimation were given. However, the following features may have adversely affected the validity of the cost analysis: quantities of resource use were not reported separately from the costs; the price year and perspective adopted in the cost analysis were not explicitly reported; the costing was retrospectively conducted, introducing the possibility of bias into the calculations; charge data were used instead of true costs; the direct cost analysis does not appear to have been comprehensive as some of the cost components such as long-term costs of care for surviving but impaired infants and costs of fetuses lost during the multifetal pregnancy reduction were not included in the cost calculations; the effects of alternative procedures on indirect costs were not addressed; cost results may not be generalisable to other countries.

Other issues
Because of the inherent limitations of the study design and the lack of sensitivity analysis, the results should be treated with some degree of caution. The issue of generalisability to other settings or countries was not addressed. The authors did compare their results with regard to multifetal pregnancy reduction losses through various time periods in a paper published in 1999 by the same group. Regarding the issue of representativeness of the study sample of the study population, the authors acknowledged that the inclusion of survivors only, and survivors with a gestation age of at least 25 weeks, represented a limitation of the study. An incremental cost-effectiveness ratio could have been calculated based on the adoption of a benefit measure incorporating the pregnancy outcomes such as losses and long-term complications. Due to the presence of a strong psychological element in the procedure, it may have been more appropriate to adopt a cost-utility approach to incorporate the subjective assessment of the patients in the analysis.

Implications of the study
Additional studies will be required to measure the long-term outcomes and psychological impacts of the multifetal pregnancy reduction, preferably in the framework of a cost-utility approach based on a societal perspective.

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