The cost-effectiveness of universal screening in pregnancy for subclinical hypothyroidism

Thung SF, Funai EF, Grobman WA

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.

CRD summary
The objective was to determine whether or not routine screening for subclinical hypothyroidism, during pregnancy, was cost-effective. The authors concluded that universal screening for subclinical hypothyroidism could be cost-effective or cost-saving, but further evidence of treatment efficacy from randomised controlled trials was needed before adopting the strategy. Given the limitations of the study and the lack of reporting of some data, the findings should be treated with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to determine whether or not routine screening for subclinical hypothyroidism, during pregnancy, could be cost-effective.

Interventions
The intervention was the routine screening, in the first trimester, of all asymptomatic pregnant women, who did not have a history of thyroid disease, compared with the usual care, which was no screening for this patient population.

Location/setting
USA/out-patient secondary care.

Methods
Analytical approach:
A decision tree was used to synthesise the effectiveness, outcome, and cost data. The authors reported that a societal perspective was adopted.

Effectiveness data:
The clinical and effectiveness data were derived from published literature. The main effectiveness estimate was the effect of treatment by maternal thyroid replacement on the offspring’s individual development.

Monetary benefit and utility valuations:
The utilities for children with an intelligence quotient (IQ) of less than 70, 70 to 85, or over 85, were derived from published studies.

Measure of benefit:
Quality-adjusted life-years (QALYs) gained were the measure of benefit.

Cost data:
The costs included: screening by a random serum thyroid-stimulating hormone (TSH) test, in the first trimester; maternal treatment, including thyroxine test, counselling sessions with a nurse, TSH tests, thyroxine supplementation, and consultant appointments; and care for children with an IQ of less than 70, or between 70 and 85. The screening costs were from Medicare data and the costs associated with low IQ were from a study that evaluated the costs of neurologic outcomes similar to those expected in children with low IQs. All costs were reported in US dollars ($).

Analysis of uncertainty:
A series of univariate and bivariate sensitivity analyses was undertaken by varying parameters, such as the probability of children having an IQ lower than 85 after thyroid hormone replacement, the prevalence of disease, and the inclusion of disutility estimates for iatrogenic hyperthyroidism in the mother.

Results
Screening 100,000 women resulted in 175 fewer cases of an offspring with an IQ of less than 85 and 22.7 fewer cases of an offspring with an IQ of less than 70. This resulted in a gain of 589.3 QALYs. Screening resulted in a saving of $8,356,383.

Screening was dominant over usual care, as it was both less costly and more effective.

When the prevalence of disease was reduced to 0.25%, the incremental cost-utility ratio for screening, compared with usual care, was $21,664 per QALY gained. When the probability of having a child with an IQ of less than 85, after thyroid hormone replacement, was 5% less than that for an untreated mother, the incremental cost-utility ratio was around $50,000 per QALY gained.

Authors' conclusions
The authors concluded that universal screening for subclinical hypothyroidism could be cost-effective or cost-saving, but further evidence of treatment efficacy from randomised controlled trials was needed before adopting this strategy.

CRD commentary
Interventions:
The interventions were reported clearly and in detail. An explicit justification was given for the use of no screening as the comparator, and this was that it was recommended in American guidelines.

Effectiveness/benefits:
The authors did not report the methods used to identify the published studies that supplied the data for the model and it is not possible to determine if all relevant information was included. It is also unclear how the QALYs were calculated, as the authors did not report the time horizon, the details of the studies used to obtain the utilities, nor how these studies were identified. They also did not report discounting of the outcomes.

Costs:
The authors reported that societal costs were included, but they did not state the categories of costs for children with a low IQ, and it is unclear if all the relevant costs were analysed. They provided details of the methods used to estimate the costs, but the sources were not reported. The time horizon, discounting, and the price year were also not reported.

Analysis and results:
All the evidence for the costs and outcomes was synthesised using a decision tree. Adequate details of its structure were reported, but no diagram was given. The impact of uncertainty on the model was tested using a series of one- and two-way sensitivity analyses. These methods go some way towards assessing the impact of uncertainty, but a probabilistic sensitivity analysis could capture the overall model uncertainty. The authors reported that the main limitation of their study was the lack of data for the treatment effectiveness, which was derived from non-randomised studies. This limitation was fully accounted for in their conclusions.

Concluding remarks:
Due to the limitations of the study and the lack of reporting of some of the data, the findings should be treated with caution.

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