Cost-effectiveness analysis of thiazolidinediones in uncontrolled type 2 diabetic patients receiving sulfonylureas and metformin in Thailand


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
This study assessed the cost-effectiveness of pioglitazone, compared with rosiglitazone, for patients who failed to control Type 2 diabetes under a combined treatment of sulfonylureas and metformin. The authors concluded that, although pioglitazone appears to be a preferred option, the results were not robust and its probability of being cost-effective was relatively poor. Although the analysis had some methodological weaknesses, the authors’ conclusions appear appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The study assessed the cost-effectiveness of two different medications classified as thiazolidinediones for the treatment of patients with Type 2 diabetes who had failed to respond to a combination of sulfonylureas and metformin for controlling their blood glucose.

Interventions
The two medications compared were oral pioglitazone 45 mg once daily and oral rosiglitazone 8 mg once daily.

Location/setting
Thailand/secondary care.

Methods
Analytical approach:
A Markov diabetes model, the Center for Outcomes Research model, was adjusted to reflect the cost-effectiveness of the treatments in a Thai setting. Full details of the original model are provided elsewhere (Palmer et al. see 'Other Publications of Related Interest' below for bibliographic details). The time horizon of the analysis was 40 years. The authors stated the study perspective to be that of the hospital.

Effectiveness data:
The effectiveness data for the two regimens were obtained from a published meta-analysis. However, no details from the study, such as the sources searched or the inclusion criteria, were reported. Population characteristics were derived from published studies, national sources and a hospital database (Bluddchinara hospital, Phitsanulok, Thailand).

Monetary benefit and utility valuations:
Not reported.

Measure of benefit:
Two measures of benefit were derived, the life-years gained and quality-adjusted life-years (QALYs).

Cost data:
The direct cost categories included drug costs, laboratory monitoring and the treatment of diabetes-related complications. Most of the resource use and cost data were obtained retrospectively from the hospital's database. Further costs were derived from published studies, expert opinion and the Diagnostic-Related Groups guidebook. The
costs were reported in Thailand bahts (THB) and US dollars ($) for the price year 2004. Discounting was performed at an annual rate of 3% and details of currency conversions were reported.

Analysis of uncertainty:
A one-way sensitivity analysis was conducted on key effectiveness parameters, the cost of pioglitazone and the discount rate. A range of incremental cost-effectiveness ratios was presented, including a graphical presentation using a tornado diagram, to show the results of the sensitivity analysis.

Results
When compared with patients in the rosiglitazone group, the incremental life-years gained and QALYs for patients in the pioglitazone group were 0.16 and 0.14, respectively.

The use of the acceptability curve approach showed that the probability of pioglitazone treatment being cost-effective in comparison with rosiglitazone was 0.29 at a willingness-to-pay of THB 110,000 per QALY gained and 0.64 at a willingness-to-pay of THB 33,000 per QALY gained.

Sensitivity analyses demonstrated that the results were most sensitive to changes in the effectiveness of the drugs in reducing glycosylated haemoglobin. The results were also affected by varying other parameters.

Authors' conclusions
The authors concluded that the use of pioglitazone 45 mg, compared with rosiglitazone 8mg, lies within the cost-effectiveness thresholds of the World Health Organization. However, they underlined the fact that the results were sensitive to varying input parameters, and that the analyses conducted demonstrated that the probability of the intervention being cost-effective was relatively low.

CRD commentary
Interventions:
The interventions, including the dosage, were reported clearly.

Effectiveness/Benefits:
The effectiveness data were mainly derived from a published meta-analysis and from a national registry project, which potentially have an adequate level of validity. The analysis was well-reported and justified. However, the methods used to derive the estimates of utilities were not reported, making it difficult to judge the validity of the estimates used. Uncertainty in the utility estimates was not investigated in the sensitivity analysis, thus the impact of variation in these estimates on the economic analysis remains unknown.

Costs:
The cost categories included appear to reflect the authors’ stated perspective. With the exception of the costs and quantities, which were not reported separately, the costing analysis was well-reported with details of currency conversions, discounting and the price year. Uncertainty was only investigated for the drug treatment cost of pioglitazone and the discount rate. The impact of uncertainty in the rest of the cost estimates on the economic results was not investigated, hence potentially limiting the generalisability of the study findings.

Results and Analysis:
The authors conducted an appropriate incremental sensitivity analysis, the results of which were presented in full. In addition, a cost-effectiveness acceptability curve was provided. The sensitivity analysis was restricted to certain model parameters, and the reader may wish to bear this in mind when determining the generalisability to their own setting. The authors provided a balanced discussion on the limitations of their study and addressed important issues for policy makers.

Concluding remarks:
Despite some methodological limitations, the authors present a fairly transparent analysis. The conclusions drawn by the authors are appropriate given the analysis presented.
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Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Diabetes Complications /epidemiology; Diabetes Mellitus, Type 2 /drug therapy; Economics, Pharmaceutical; Female; Humans; Hypoglycemic Agents /economics /therapeutic use; Incidence; Male; Markov Chains; Metformin /economics /therapeutic use; Middle Aged; Registries; Sulfonylurea Compounds /economics /therapeutic use; Thailand /epidemiology; Thiazolidinediones /economics /therapeutic use; Treatment Outcome

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