Cost-effectiveness analysis of donepezil for mild to moderate Alzheimer's disease in Taiwan

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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.

CRD summary
The study assessed the cost-effectiveness of donepezil compared with usual care for the treatment of patients with Alzheimer's disease. The authors concluded that the use of donepezil in Taiwanese patients was potentially cost-effective, and was also cost-saving from a societal perspective. The study methodology seems robust but the sources used to populate the decision model were not clearly described. The authors’ conclusions were strengthened by the robustness of the results of the sensitivity analyses.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of donepezil in comparison with usual care for the treatment of patients with Alzheimer's disease (AD). A typical cohort of both genders of patients aged 60 years or older, half with mild disease and half with moderate disease, was considered.

Interventions
Donepezil treatment (5mg per day) for AD was compared with usual care, which was not described.

Location/setting
Taiwan/secondary care.

Methods
Analytical approach:
A Markov model was developed to assess the clinical and economic impact of the two strategies. The time horizon of the analysis was five years and the authors stated that both a societal perspective and that of the health care payer were adopted.

Effectiveness data:
The clinical data, which were transition probabilities, were mainly derived from a previous study by the same authors. This study followed Taiwanese patients with mild or moderate AD receiving or not receiving donepezil. However, no other details on this key source were given. The key clinical outcome was the relative risk of disease progression with or without donepezil.

Monetary benefit and utility valuations:
The utility valuations were based on a previous US study which used the Health Utility Index Mark II with a sample of 528 AD caregivers of patients cared for at home.

Measure of benefit:
Quality-adjusted life-years (QALYs) were chosen as the summary benefit measure and they were discounted at an annual rate of 3%.

Cost data:
The three main cost categories considered were medical expenses paid by the National Health Insurance, out-of-pocket co-payments, and unpaid informal care. Direct medical costs included the costs of AD care, co-morbidity treatments, and acquisition fee of donepezil. The productivity costs included caregiver time. All costs were presented as macro-
categories. They, and related data on resource consumption, were derived from published studies involving Asian and Taiwanese patients. Caregiver time was valued using two approaches, the replacement method and the labour cost method, which provided high and low estimates of costs. The cost of donepezil was based on the reimbursement rate per tablet. All costs were in US dollars ($) and a 3% annual discount rate was applied to future costs. The price year was not clearly reported but the cost data were collected in 1999.

Analysis of uncertainty:
A deterministic univariate sensitivity analysis was performed on all model inputs and a tornado diagram was generated. Influential model inputs were further investigated in a probabilistic sensitivity analysis. The types of distributions were stated.

Results
From the perspective of the society, the expected five year costs per patient were $65,373 with usual care and $57,220 with donepezil.

The expected QALYs were 1.687 with usual care and 2.211 with donepezil. Thus, the incremental analysis indicated that donepezil was a dominant strategy (i.e. simultaneously more effective and less expensive) over usual care.

From the perspective of the payer, the expected five year costs were $4,750 with usual care and $8,427 with donepezil. The incremental cost per QALY gained with donepezil was $7,009.

The univariate sensitivity analysis demonstrated the robustness of the base-case findings. The probabilistic sensitivity analysis indicated that, at a willingness to pay of $10,000 per QALY, the probability that donepezil was cost-effective was 90% from the societal perspective and 71% from the payer’s perspective. The corresponding values at a willingness to pay of $50,000 per QALY were both above 99%.

Authors’ conclusions
The authors concluded that the use of donepezil for the treatment of mild to moderate AD in Taiwan was, potentially, a cost-effective alternative to usual care, and it was also a cost-saving strategy from a societal perspective.

CRD commentary
Interventions:
The comparison of the new treatment (i.e. donepezil) with usual care was appropriate. However, a clear description of the usual pattern of care would have been useful in terms of assessing its relevance in other health care systems.

Effectiveness/benefits:
The current analysis represents an update of earlier work by the authors. However, they did not describe the main characteristics of the previous study or the sources used to derive the clinical data. Thus, it is not possible to judge the validity of these clinical estimates. The authors justified the selection of QALYs as the summary benefit measure by stating that they are a validated measure, which allows cross-disease comparisons. The utility weights were taken from a published US study due to the lack of Taiwanese data.

Costs:
The use of a societal perspective represented a strong feature of the analysis because all possible costs were included in the study. Furthermore, the authors provided the cost results when only costs relevant to the decision maker were included, in order to ensure that the study findings were applicable to different levels of funding. However, costs were not broken down into individual items, but were presented as disease categories. Moreover, the sources used to derive most cost categories were not fully described. These characteristics of the study partially limit both the transparency and the external validity of the economic analysis. Discounting was appropriately applied given the long-term horizon of the study, but the price year was not clearly reported.

Analysis and results:
The synthesis of costs and benefits was appropriately performed and reported. The issue of uncertainty was extensively addressed by means of both deterministic and probabilistic sensitivity analyses. A clear description of the decision
model, transition probabilities and cycle length was provided. The authors presented the results from several published economic evaluations that had shown the cost-effectiveness of donepezil in other contexts.

Concluding remarks:
The study methodology appears robust, but the sources used to populate the decision model were not clearly described. The authors’ conclusions were strengthened by the robustness of the results found in the sensitivity analyses.

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