Are there time and cost savings by using telemanagement for patients on intensified insulin therapy: a randomised, controlled trial

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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
Telemanagement was compared with conventional outpatient management for patients on intensified insulin therapy. Telemanagement procedures permit the transfer of self-monitored blood glucose values, stored together with date and time in memory meters, to a remote diabetes specialist using modern telecommunication techniques and remote data transfer.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with diabetes mellitus on intensified insulin therapy. The criteria for intensified therapy were a minimum of four insulin injections daily, separation of basal and meal-related insulin, a pre-defined target range for preprandial blood glucose, having undergone a structured diabetes education programme, self-control of BG-values before every insulin injection, and the estimation or calculation of the insulin dose from the carbohydrates to be ingested and actual BG-value.

Setting
The setting was the community and an institute for diabetes research. The economic study was carried out in Germany.

Dates to which data relate
The dates to which the data relate were not reported. The 1999 prices were reported.

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

Link between effectiveness and cost data
The costing was undertaken on the same patient group as that used in the effectiveness study.

Study sample
A total of 48 patients were included in the study, 30 on telecare and 18 in the control group. Randomisation was carried out by a "lots" system, with a 2:1 chance in favour of telecare. The required sample size was calculated assuming a delta in the glycosylated haemoglobin (HbA1c) level of 1%, a standard deviation of 1.5%, a type 1 error of 0.005 (95%
confidence) and a type 2 error of 0.1.

The average age was 30.5 (+/-11) years for the telecare group and 30.0 (+/- 8.6) years for controls, and the average duration of diabetes was 10.9 years (telecare) and 8.1 years (control), respectively. The average time to travel to the diabetes centre was 50 minutes for the telecare group and 47 minutes for the controls. The HbA1c level at the beginning of the study was 8.3% (+/- 2.3) in the telecare group and 8.0% (+/- 2.1) in the controls. Five patients did not complete at least 4 months of the study (problems with compliance and the technical handling system) and, as such, were regarded as drop-outs. This left 27 patients in the telecare group and 16 in the control group.

Study design
This was a prospective randomised trial, which was carried out in a single centre. The duration of follow-up was at least 4 months. In patients who did not achieve their personal therapy goal within 4 months, the telecare was continued until the end of the 8-month period. The method of randomisation was not reported in detail, although the authors did state that it had been conducted by "lots".

Analysis of effectiveness
The basis of the analysis of the clinical study was treatment completers only (at least 4 months). The primary health outcome used in the analysis was the level of HbA1c, which is a parameter of metabolic control. The analysis also assessed the time (minutes/month) spent by the health care professional and the patient for telecare and conventional care, and the patients' satisfaction with telecare.

Effectiveness results
The HbA1c levels improved in both groups to 6.9% (+/- 1.3%) after 4 months (27 patients) and 7.1% (+/- 0.7) after 8 months (11 patients) in the telecare group, and to 7.0% (+/- 1.0) after 4 months (16 patients) and 6.8% (+/- 1.1) after 8 months (10 patients) in the control group.

Differences between the groups were not statistically significant. The sample size was too small to compare the other metabolic parameters statistically. Of the 27 telecare patients, 23 (85%) felt that telecare was better than conventional care because of better surveillance, faster intervention, and no waiting and travel time.

Clinical conclusions
Telemanagement of insulin-requiring diabetic patients results in metabolic control comparable to conventional outpatient management.

Measure of benefits used in the economic analysis
The clinical analysis showed no difference in metabolic control between the two groups. The majority (85%) of the telecare patients preferred telecare to conventional care. The economic analysis was, therefore, based on the difference in costs only and can be classified as a cost-minimisation analysis.

Direct costs
The direct costs included the average travel costs and average telephone costs by distance (leasing modem, phone consultation and data transfer). The consultation times were taken from the patients' chart records and all the other times were recorded by the questionnaire. Differences in the physicians' cost were disregarded since the groups were similar in terms of the time spent by the physicians. All times were extrapolated to one year of continuous care. The resources quantities for phone consultation, data transfer and travel time were expressed in time units (minutes). The boundary conditions and assumptions (time unit cost) were derived from 1999 costs for the German telecom and public transportation system. The costs and the quantities were reported separately. The direct costs were not discounted since the follow-up period was less than two years.
Statistical analysis of costs
A statistical analysis of the costs was not performed.

Indirect Costs
The indirect costs included the average costs for not working. Data sources for the indirect costs were not reported. The authors reported, on average, two personal visits for telecare patients per year and one personal visit per month for conventional care. The costs of not working were based on a consultation time of 2.5 hours at Euro 25 per hour (i.e. Euro 62.5 per consultation). The indirect costs were extrapolated to one year of continuous care. Discounting was not relevant since the time period was less than two years.

Currency
Euros.

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
Costs for the technical device, telephone and data transfer in the telecare group were highly compensated by savings from travel time and workplace absence. The travel costs and the costs for not working were lower in the telecare group than in the control group. The travel costs were Euro 45 (telecare) and Euro 270 (control), respectively, while the costs of not working were Euro 128 (telecare) and Euro 767 (control). The total costs per year were lower in the telecare group (Euro 390) than in the control group (Euro 1,037).

Synthesis of costs and benefits
The authors did not produce a summary measure that combined the costs and effectiveness, as it is likely that telecare was preferred by the patients and was equivalent to conventional control in terms of metabolic control. The economic analysis therefore included only the costs.

Authors’ conclusions
The telemanagement of insulin-requiring diabetic patients is a cost- and timesaving procedure for the patients and results in metabolic control comparable to conventional outpatient management.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator was clear. It is assumed to be the standard practice in the study setting. You should decide if it represents a valid comparator in your own setting.

Validity of estimate of measure of effectiveness
The analysis used a prospective randomised controlled trial, which was appropriate for the study question. The study sample was representative of the study population. The measure of primary health outcome is likely to be valid. On the other hand, the methodology used to measure patient satisfaction was not clearly reported. No details were given of the type of questionnaire used (self-reported questionnaire, phone questionnaire), or the questions addressed. Ideally, the patient’s satisfaction should have been assessed for each procedure. The sample size of this study was relatively small, which may have led to the fact that no statistically significant differences in benefits were found.
Validity of estimate of measure of benefit
Since there appeared to be no difference in effect between the two groups, no summary measure of benefit was used. The economic analysis was therefore based on the difference in costs only (cost-minimisation analysis).

Validity of estimate of costs
The perspective adopted for the economic analysis was not reported, but it is likely to have been societal. Hence, all the categories of cost relevant to the societal perspective were included in the analysis. The costs and the quantities were reported separately. Although the authors reported the average costs per year, including assumptions on cost unit, there were no statistical analyses of either the quantities or the prices. This may limit the interpretation of the study findings. The study lasted for only 8 months and the authors did not explain how they extrapolated the costs to annual figures.

Other issues
The authors made appropriate comparisons of their findings with those from other studies. However, the issue of generalisability to other settings was not clearly addressed, especially for the cost-analysis. The study enrolled patients on intensified insulin therapy and this was reflected in the authors’ conclusions. The authors reported one main limitation to their study in that the sample size was too small to calculate the statistical significance in relation to hypoglycaemia and insulin requirements; only a tendency was observed.

Implications of the study
The authors believe that telecare in diabetes is best regarded as a problem-solving tool rather than for continuous care monitoring. Telecare can be useful in switching from one insulin preparation to another, in order to avoid hospitalisation. Telecare may be limited in the future by the complexity of the technology and the reimbursement of the health care providers.

Source of funding
Supported by the MediSense/Abbott Co., Wiesbaden, Germany.

Bibliographic details
Biermann E, Dietrich W, Rühl J, Standl E. Are there time and cost savings by using telemangement for patients on intensified insulin therapy: a randomised, controlled trial. Computer Methods and Programs in Biomedicine 2002; 69(2): 137-146

PubMedID
12100793

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Cost Savings; Diabetes Mellitus, Type 1 /drug therapy /metabolism /physiopathology /psychology; Female; Health Care Costs; Humans; Insulin /therapeutic use; Male; Patient Satisfaction; Prospective Studies; Telemedicine
/economics; Time Factors

AccessionNumber
22002006766

Date bibliographic record published
31/10/2003

Date abstract record published
31/10/2003