Nurse follow-up of patients with diabetes: randomized 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
A nurse-led early discharge and follow-up programme was compared with routine hospital care for patients with diabetes mellitus. This nurse-guided programme included the early discharge of the patients from hospital, as well as weekly or biweekly telephone calls from a nurse. The early discharge group of patients received a standardised education programme that included education on essential self-care skills, and the requirement to conduct blood glucose self-monitoring four times on any 2 days each week.

Type of intervention
Palliative care.

Economic study type
Cost-effectiveness analysis.

Study population
Adult patients with Type I or II diabetes who needed to stay in the hospital for glycaemic control, but who were otherwise fit for discharge, were included. In addition, the patients had to be willing to self-monitor their blood glucose level, and either they or their relatives had to be literate. The exclusion criteria were acute complications requiring in-hospital monitoring, ketoacidosis or non-ketotic coma, and poor cognition or mental illness.

Setting
The level was secondary care but the setting was either inpatient or home care, depending on the intervention group. The economic study was performed in a regional hospital in Hong Kong, China.

Dates to which data relate
The effectiveness and resource use data were collected from March 2001 to March 2003. The price year was 2003.

Link between effectiveness and cost data
Both the effectiveness and cost data came from the same sample of patients and were prospectively evaluated.

Study sample
The sample size was adequately planned to be 240 patients but, owing to an unexpected decrease in human resource support, only 128 patients were finally recruited. The patients were recruited from the hospital. From the 128 recruited patients, 8 were excluded before randomisation, leaving a total of 120 (60 in each group) initially randomised.

Study design
This was a single-centred, randomised controlled trial. Randomisation was determined by referral date from other
specialties or from admission date: those referred or admitted on odd days were assigned to the study group and those referred or admitted on even days were recruited to the control group. The researcher who collected the follow-up questionnaires was blind to the study group. The duration of follow-up was 24 weeks. Nineteen patients (15.8%) dropped out, leaving 52 in the study group and 49 in the control arm.

**Analysis of effectiveness**
The primary outcome was glycosylated haemoglobin (HbA1c). Additional outcomes were self-care adherence and patient satisfaction. Only patients with complete data were included in the analysis. The clinical and sociodemographic variables of the two groups were similar at baseline.

**Effectiveness results**
Patients in the study group had a better improvement in HbA1c level than the control group at 24 weeks. The HbA1c level improved from 11.2 to 7.6 in the study group and from 10.6 to 8.1 in the control group. Both groups had a declining linear trend effect in their HbA1c.

The blood-monitoring adherence score and exercise adherence score, were statistically significantly higher in the study group. No statistically significant differences were detected between the groups for medication adherence, diet adherence, body weight or body mass index.

**Clinical conclusions**
Nurse follow-up care was effective in maintaining glycaemic control and enhancing adherence to health behaviours. Nurse follow-up care was shown to improve the HbA1c level better than inpatient care.

**Measure of benefits used in the economic analysis**
The paper did not present a summary measure of benefit and is, in effect, a cost-consequences analysis.

**Direct costs**
Selected direct hospital costs included those related to length of stay in a general medical bed, and nurse time necessary to implement the intervention. Resource use was directly analysed from the study patients. The unit costs were extracted from the fee and service guide (2003) of the Hospital Authority, Hong Kong. As the follow-up period was only 24 weeks, discounting was not necessary. The average costs were reported. The unit costs and quantities were reported for the resources included.

**Statistical analysis of costs**
Some resource use data were treated as stochastic (length of stay) and described with a mean and standard deviation, but nurse time was reported deterministically. An independent t-test was used to compare the length of stay.

**Indirect Costs**
No productivity costs were included.

**Currency**
Hong Kong dollars (HKD).

**Sensitivity analysis**
No uncertainty beyond the length of stay data at the patient level was explicitly considered.
Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The length of stay cost per patient was HKD 12,210 greater for the control group than for the intervention group. The cost of the nurse time per patient in the intervention group was HKD 321.8. The total cost-saving from switching to nurse-led home care was HKD 11,888 per patient.

Synthesis of costs and benefits
The costs and benefits were not combined.

Authors’ conclusions
It is feasible to integrate treatment into the real life environments of patients with diabetes. Nurse-led transitional care was shown to improve outcomes and be a cost-effective model.

CRD COMMENTARY - Selection of comparators
The comparator appears to have been standard practice in the authors' setting. You should decide if the comparator is similar and generalisable to your setting.

Validity of estimate of measure of effectiveness
Though the authors stated that this was a randomised controlled study, the allocation rule based on the day the patient was admitted or referred was not a strictly random method and might have interfered with allocation concealment. Nevertheless, the balance between the groups was adequate in terms of their clinical and sociodemographic characteristics. Another fact that indicates that the results should be interpreted with caution is that although the planned sample size was adequate, recruitment was stopped prematurely, thus rendering the study underpowered for the originally planned effect size. No statistical test comparing the effectiveness of the two interventions was conducted.

Validity of estimate of measure of benefit
The study did not derive a summary measure of benefit, thus a cost-consequences analysis was performed.

Validity of estimate of costs
The perspective of the study was not explicitly reported, but it appears to have been that of the single provider (hospital). The costs section was rather rudimentary and the only costs included were those arising from length of stay and nurse time from local hospital sources. Some resource use reported, but omitted from the analysis, included follow-up costs such as readmissions or emergency room visits. Nevertheless, their omission probably minimised the real cost-difference between the groups. Though resource use was evaluated prospectively, a stochastic analysis was performed only on length of stay days and not on costs.

Other issues
The authors reported similar findings from other studies. They seem have presented their results in a more positive light than can be warranted given the test results. There was no clinical test comparing the effectiveness of the two outcomes. Further, the power was insufficient to detect the originally hypothesised differences. Further limitations the authors reported were the short follow-up and the impossibility of detecting differences in other health care use (e.g. readmissions).
Implications of the study
Early discharge and telephone follow-up by a specialist nurse is a feasible approach to care for appropriately selected patients with diabetes. Although the authors stated that management of glycaemic control is better done in the community than in the hospital, this is not directly supported by the present study (see commentary above). Nurse follow-up in this study contributed to improvement in exercise but not dietary adherence. In general, successful interventions would seem to incorporate certain common features that resemble a case management approach.

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