A randomized trial of home telemonitoring in a typical elderly heart failure population in North West London: results of the Home-HF study

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 examined the cost-effectiveness of a nurse-led telemonitoring programme in comparison with the usual care for patients with heart failure. The authors concluded that telemonitoring produced similar outcomes to usual care, but reduced the number of out-patient and emergency visits and unplanned heart-failure hospitalisations at little additional cost. The study was adequately conducted and reported and the authors’ conclusions appear to be valid for the scope of the analysis.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to examine the impact in terms of cost and effectiveness of home telemonitoring of the signs and symptoms of patients with typical heart failure, who had recently been discharged from hospital.

Interventions
The intervention was compared with usual care. Usual care was a regular clinic review, by a heart-failure team that included a physician and at least one nurse, plus telephone support. Telemonitoring patients received the usual care and had telemonitoring equipment installed in their home, to daily monitor the signs and symptoms indicative of worsening heart failure. The monitored readings were transmitted to a base station in each participating hospital and reviewed on a daily basis by a heart failure nurse. Any variation from predefined criteria for the vital signs resulted in a telephone call with further patient assessment and advice.

Location/setting
UK/primary care.

Methods
Analytical approach:
The economic evaluation was carried out alongside a trial with a time horizon of six months. The authors stated that the perspective was that of the UK National Health Service (NHS).

Effectiveness data:
The clinical data came from the multi-centre, prospective, randomised controlled trial (RCT), in which randomisation took place at the patient level within each hospital. Patients in the New York Heart Association classes II to IV at the time of discharge were recruited from three acute hospitals and randomised to telemonitoring (n=91) or usual care (n=91). The length of follow-up was six months, with measurements carried out at baseline and three and six months. A total of nine patients were lost to follow-up in the telemonitoring group and seven in the usual care group. The main outcome was the number and duration of all non-elective hospitalisations. To adjust for the impact of death, this was expressed as the number of days that the patient was alive and out of hospital. Secondary outcomes were heart-failure related admissions, health-related quality of life, and anxiety and depression, which were measured using the Hospital Anxiety and Depression Score.

Monetary benefit and utility valuations:
The utility values were estimated from two multi-attribute self-administered postal questionnaires: the disease-specific
Minnesota Living with Heart Failure questionnaire and the generic European Quality of life (EQ-5D) questionnaire.

**Measure of benefit:**
Health-related quality of life was the benefit measure.

**Cost data:**
The analysis considered the direct costs of telemonitoring equipment, hospital readmission, drugs, primary care visits, secondary care visits, and hospital transport. Information on the resources used was collected prospectively from the trial using hospital records and the health diaries recorded by the patients. The unit costs were from published national databases. All costs were expressed in UK pounds sterling (£).

**Analysis of uncertainty:**
No sensitivity analyses were performed.

**Results**
The authors stated that there was no change in the overall health-related quality of life as measured by the EQ-5D and there was slight, but not statistically significant, improvement when it was measured using the Minnesota Living with Heart Failure questionnaire.

There were no significant differences between the groups in the other outcome measures, except emergency admissions. The median days out and alive were 178 (IQR 90 to 180) for the telemonitoring group and 180 (IQR 165 to 180) for the usual care group. The number of patients hospitalised (all causes) was 33 for the telemonitoring group and 23 for the usual care group. The number of patients hospitalised as result of heart failure was 17 with telemonitoring and 10 with usual care. The proportion of emergency heart-failure hospitalisations was 36% with telemonitoring and 81% with usual care.

The mean cost per patient was £4,610 (SD 7,377) for the telemonitoring group and £3,006 (SD 3,847) for the usual care group. The mean incremental cost per patient for telemonitoring over usual care was £1,600. The authors stated that the cost data were highly skewed with a total median cost per patient of £1,688 (IQR 878 to 6,305) for the telemonitoring group, and £1,498 (IQR 751 to 4,053) for the usual care group.

**Authors' conclusions**
The authors concluded that telemonitoring produced similar outcomes to usual care, but reduced the number of outpatient and emergency visits, and unplanned heart-failure hospitalisations at little additional cost.

**CRD commentary**

**Interventions:**
The selection of the comparators appears to have been appropriate in that the new approach was compared with the usual care in the authors’ setting. The two comparators were clearly described.

**Effectiveness/benefits:**
A RCT with concealment was a valid source for the clinical evidence, given the strengths of its design. The internal validity was enhanced by the following features: the detailed reporting of the sample selection procedure (reasons for exclusion, refusal, or withdrawal); details on the loss to follow-up; and the use of the intention-to-treat principle. The patient groups were shown to be comparable at baseline. Power calculations, which ensure an appropriate sample size, were carried out and were reported, but it was also noted that the study failed to achieve the target sample size and so some comparisons may have been underpowered. The derivation of the benefit measure was reported and was based on validated instruments.

**Costs:**
The categories of costs were consistent with the perspective. Information on the gathering of resource use data and the sources of costs were provided, but the individual data were not and a price year was not reported. This limits the ability to reproduce the study for other settings. The authors did not analyse the statistical significance of differences in costs. The skewed distribution of costs resulted from a small number of patients, who generated very high or very low costs.
and a nonparametric bootstrapping technique should have been used to test the statistical significance. The authors presented both mean and median costs, but the nature of the data means that the median costs were more appropriate.

Analysis and results:
The costs and effects were not combined into cost-effectiveness ratios. The findings were clearly reported and the authors compared these findings with those of other published economic evaluations and explained the reasons for any differences. The authors did not use sensitivity analysis to explore the impact of varying the key clinical and cost estimates on the conclusions.

Concluding remarks:
The clinical trial was well reported and of high quality. The reporting of the cost analysis was limited and no attempt was made to assess the uncertainty in the estimates used. In general, the quality of the economic evaluation was adequate and the authors' conclusions appear to be appropriate.

Funding
Funded by Honeywell HomMed.

Bibliographic details

PubMedID
19174529

DOI
10.1093/eurjhf/hfn050

Original Paper URL
http://eurjhf.oxfordjournals.org/content/11/3/319.abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Aged, 80 and over; Female; Follow-Up Studies; Heart Failure /diagnosis /mortality /therapy; Home Care Services; Humans; London /epidemiology; Male; Middle Aged; Outpatients; Quality of Life; Retrospective Studies; Telemetry /methods; Treatment Outcome; Urban Population

AccessionNumber
22009101916

Date bibliographic record published
02/12/2009

Date abstract record published
05/05/2010