A systematic review of the benefits of home telecare for frail elderly people and those with long-term conditions

Barlow J, Singh D, Bayer S, Curry R

CRD summary
The review concluded that telecare interventions improved care for frail elderly people and people with chronic conditions, but the strength of the evidence depended on the type of telecare application. Overall, the authors' conclusions appear to be a reasonable interpretation of unreliable evidence.

Authors' objectives
To determine the effects of home telecare for frail elderly people or people with chronic conditions.

Searching
MEDLINE, EMBASE, ERIC, CINAHL, the Science Citation Index, the Cochrane Library, Cochrane Central Register of Controlled Trials, PsycLit, HealthSTAR, the WHO library, Health Management Information Consortium, Sigal, Research Findings electronic Register, Dissertation Abstracts, National Research Register, ASSIA and HMIC electronic databases were searched without language restriction up to January 2006. References of relevant articles were checked, experts in the field were contacted and relevant journals, websites and conference proceedings were searched for additional articles.

Study selection
Randomised controlled trials (RCTs) or observational studies with at least 80 participants, examining home-based telecare services as their core component in elderly people or adults with long term conditions, that reported individual or system-wide effects were eligible for inclusion. Studies that focused only on implementation or satisfaction; residential homes, prisons or other institutions; or focused on terminal conditions were excluded.

Types of telecare services included vital signs monitoring, safety and security monitoring, and information and support. The majority of studies focused on individuals with diabetes and heart disease or heart failure. Other study populations included patients with hypertension, chronic obstructive pulmonary disease, dementia, asthma, arthritis, chronic back pain, depression, and various long-term conditions, frail elderly, and general population. Most studies (64%) were conducted in the USA.

Two reviewers independently selected studies for inclusion in the review and any disagreements were resolved by discussion. Inter-rater agreement was 98%.

Assessment of study quality
The authors stated that they performed a subjective quality assessment to guide the weight given to the reported results. The authors did not state how the papers were assessed for validity or how many reviewers performed the quality assessment.

Data extraction
One reviewer extracted data from the included studies and this was checked by another reviewer. Inter-rater agreement was 100%.

Methods of synthesis
Studies were combined in a narrative synthesis grouped by type of telecare service and outcomes (individual versus system-wide).

Results of the review
Ninety-eight studies (68 randomised controlled trials and 30 observational studies), with almost 150,000 participants, were included in the review. Of these, 65 studies focused on information and support systems, 31 studies focused on
vital signs monitoring, and two studies focused on home safety alert systems.

**Vital signs monitoring:** Eleven studies, in a range of patient groups, found some clinical benefit following vital signs monitoring for individual outcomes, five studies found no statistically significant effect of home-based telecare interventions in patients with diabetes, and two studies indicated that exercise rehabilitation programmes using telephone or internet monitoring may be as effective as in-person rehabilitation.

**Systems outcomes:** Most studies looking at systems outcomes found that home-based telecare interventions were at least as efficient as conventional care and may reduce the use of health services people with heart failure or chronic obstructive pulmonary disease. Three studies indicated improved outcomes in elderly people with heart failure and chronic lung disease or people with diabetes.

Most studies of vital signs monitoring focused on automated transmission of data. There was limited evidence for individual outcomes of manually entering clinical data; three studies indicated improvements for clinical indicators or quality of life. There was less evidence for the effects on system outcomes. There was some evidence that telephone support from practitioners helps improve individual clinical outcomes and that telephone follow-up service was associated with reduced health service use.

The effects of education and support provided through e-mail or the internet were inconclusive.

**Cost information**
The cost-effectiveness of home-based telecare services is not clear. However, there is some evidence to suggest that vital signs monitoring may help to reduce health service use, including reducing hospital admissions and costs.

**Authors’ conclusions**
Telecare improved care for frail elderly people and people with chronic conditions, but the strength of the evidence depended on the type of telecare application. The most effective telecare interventions appeared to be automated vital signs monitoring for reduced health service use and telephone follow-up by nurses for improving clinical indicators and reducing health service use.

**CRD commentary**
The review question was supported by clear inclusion criteria. Several databases were searched without language restriction and the authors attempted to locate both published and unpublished material, minimising the possibility of language and publication biases. Steps were taken to minimise the likelihood of reviewer error and bias at all stages in the review process. The authors reported that they used subjective validity assessment to determine the weight given to studies in the synthesis, but it is unclear what this entailed. The authors highlighted that, although many of the included studies were randomised controlled trials, the sample sizes were often small and the follow-up period was short. A narrative synthesis appears to have been appropriate given the differences between the studies described by the authors. Limited reporting of details, such as study and participant characteristics, and effect sizes, as well as uncertain study quality, make interpretation of the results difficult. Overall, the authors’ conclusions appear to be a reasonable interpretation of unreliable evidence.

**Implications of the review for practice and research**
*Practice:* The authors did not state any implications for practice.

*Research:* The authors stated that, as moves to implement telecare on a mainstream basis are undertaken, it is important to fully evaluate such schemes for effectiveness.

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