Telemedicine and telecare for older patients: a systematic review
van den Berg N, Schumann M, Kraft K, Hoffmann W

CRD summary
The authors’ conclusion that telemedicine provided promising results (especially in monitoring and supporting behavioural change) reflects the evidence presented but a lack of quality assessment of the included studies and potential for missed studies means that the reliability of the authors’ conclusion is unclear.

Authors’ objectives
To assess the feasibility, acceptance and determinants of successful telemedicine to support healthcare for older adults with chronic diseases in the home.

Searching
PubMed, PsycINFO and The Cochrane library were searched from 2007 to February 2012 for publications written in English. Search terms were reported.

Study selection
Eligible studies were controlled trials that analysed telemedicine interventions that connected patients in their homes to a medical provider. Trials needed to involve at least five participants aged 60 years or over with a defined diagnosis or medical indication. Studies that did not include participation by medical professionals or did not include an explicit end point were excluded.

Half of all studies included participants with cardiovascular disease; other disease groups included diabetes, respiratory diseases and cancer. Over one third of all studies excluded participants with health limitations related to old age such as cognitive or visual impairment, communication barriers and hearing problems. The mean age in more than half of the included studies ranged from 60 to 69 years. Most studies included males and females. Where reported most studies recruited participants via hospitals, private practices, general practitioners, medical specialists and home care agencies. Nearly 80% of the studies included personal contact. Most studies had monitoring patients as a goal of the telemedicine intervention; other goals were diagnostic and therapy. The types of telemedicine used were categorised as measurement of vital signs/other parameters, IT supported interactive and personal intervention. More than half of the included studies included a medical outcome. Other outcomes included medical utilisation of healthcare systems, mortality, quality of life and acceptance/satisfaction with the healthcare concept. Nearly half of the included studies were conducted in USA.

One reviewer selected studies for inclusion. Uncertainties were discussed with other reviewers.

Assessment of study quality
The authors did not state that they assessed validity. Methods of randomisation were discussed.

Data extraction
The results of each outcome were extracted for each study and categorised as positive, negative or similar. Positive results indicated better outcomes for the telemedicine intervention group than the control group. Negative results indicated better outcomes for the control group compared to the telemedicine intervention group. In studies with different age groups information was extracted with special attention to older adults.

It appeared that two authors extracted data. The authors did not state whether this was conducted independently and did not report how discrepancies were resolved.

Methods of synthesis
A narrative synthesis was undertaken based on numbers of positive, negative, similar or mixed outcomes. These were compared by diagnostic group, outcomes assessed and other aspects of the studies.

Results of the review
Sixty-eight studies were included in the review (average number of participants 439, range 13 to 4,598). Fifty-one studies used randomisation at the patient level. Five studies used cluster randomisation. Seven studies allocated patients based on patient residence or decision of the physician. Five studies used matched controls.

No studies reported negative results.

**Diagnostic group:**

Cardiovascular disease (33 studies). Twenty studies reported positive results, seven studies reported similar results and six studies reported positive and similar results for different endpoints.

Diabetes (16 studies). Eleven studies reported positive results, four studies reported similar results and one study reported mixed results.

Chronic renal failure (two studies) and nervous system disorders (two studies) reported only positive results.

Respiratory diseases (four studies), cancer (three studies), musculoskeletal diseases (two studies) and multi-morbidity (two studies) reported positive, similar or mixed results.

**Outcomes:**

Twenty-four out of 50 studies (48%) of medical outcomes reported positive results and two reported mixed results.

Nineteen out of 23 studies (83%) of behavioural outcomes reported positive results and three showed mixed results.

Five out of 13 studies (38%) of quality of life showed significant improvement in the telemedicine group compared to the control group.

Outcomes for satisfaction, burden, and perceptions were reported.

**Cost information**

Fifteen out of 36 studies that assessed economic endpoints reported positive results, two studies reported mixed results and none reported negative results.

**Authors' conclusions**

Studies showed predominantly positive results with a clear trend towards better results for behavioural endpoints compared to medical, quality of life and economic outcomes. A combination of technical devices and personal interaction with healthcare professionals provided promising results, especially in monitoring and supporting behavioural change.

**CRD commentary**

The review question and supporting criteria were stated clearly. Several databases were searched. The search was restricted by language and no attempts were made to identify unpublished studies, which increased risks of language and publication biases. No attempts were made to reduce the likelihood of error or bias during study selection. It was unclear whether any steps were taken to reduce error and bias during data extraction.

Study quality was not assessed which made it difficult to assess the reliability of the results. Details for individual studies were provided. A narrative synthesis seemed appropriate given the between-study differences in interventions, participants and outcomes. The authors' method of summarising results for each study into positive, negative, similar or mixed made it difficult to interpret the results as much of the meaningfulness about the outcomes was lost.

The lack of quality assessment and potential for missed studies means that the reliability of the authors' conclusion is unclear.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.
Research: The authors stated that development of concepts, systems and devices suitable for older people needed to be intensified, for example in terms of adapting technical systems and processes to the needs and resources of patients with cognitive and physical limitations and comorbidity. Future research should adapt telemedicine systems to the individual needs and resources of elderly patients within the specific framework of national healthcare systems.

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