Telecare is a valuable tool for hypertension management, a systematic review and meta-analysis

Verberk WJ, Kessels AG, Thien T

CRD summary
This review concluded that telecare led to a greater decrease in systolic and diastolic blood pressure than usual care, with larger decreases in systolic blood pressure in trials without treatment modification. These conclusions were partly based on non-significant results. The reliability of the authors' conclusions is unclear given unclear inclusion criteria, limited searching, unclear review processes, and no quality assessment.

Authors' objectives
To evaluate the usefulness of telecare for the management of hypertension.

Searching
PubMed, EMBASE, and The Cochrane Library were searched. Some search terms were reported. Reference lists of included papers were checked for eligible studies. It was not reported if the search was restricted by publication date or when it was conducted. Only studies published in English were eligible for inclusion.

Study selection
Randomised clinical trials (RCTs) that compared telecare of blood pressure with usual care were eligible for inclusion. Participants had to have a diagnosis of hypertension and self-manage their blood pressure at home. Blood pressure data had to be transmitted to health care providers by telephone, modem, Internet, or email. Eligible trials were required to measure change in blood pressure or the number of patients that reached a target blood pressure as an outcome.

Included patients had mild to moderate hypertension. Both treated and untreated patients were included. The mean patient age ranged from 53.2 to 77 years. The percentage of men ranged from 12% to 61%. At the start of the trials, average systolic blood pressure ranged from 133.9 to 156.8mmHg and average diastolic blood pressure ranged from 83.9 to 91.2mmHg. Most trials used telephone-based care; others investigated a computer-based approach. Some trials offered more than one means of transmission. Telecare procedures varied, but most involved the submission of several readings per week, some with multiple readings in one day. In over half the included trials, treatment was modified based on the self-management data submitted. Details of control group care were not reported.

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality
No quality assessment was reported.

Data extraction
Changes in systolic and diastolic blood pressure were extracted from trials to calculate mean differences. Effect sizes were also extracted.

The authors did not state how many reviewers extracted data.

Methods of synthesis
Data were combined using a meta-regression. Trials were weighted by inverse variance and adjusted for trial duration. Heterogeneity between trials was assessed using I². A sensitivity analysis was conducted by excluding the two smallest trials. A funnel plot was used to assess publication bias.

Results of the review
Nine RCTs were included in the review (2,401 participants). Sample sizes ranged from 15 to 517. Trial duration ranged from 36 to 365 days. The quality of the included trials was not reported.
Both systolic (nine RCTs) and diastolic (nine RCTs) blood pressure decreased significantly more in the telecare group than in the usual care group. The difference in change from baseline was significantly greater in treatment groups than in the comparison groups for both systolic (5.19mmHg, 95% CI 2.31 to 8.07) and diastolic blood pressure (2.11mmHg, 95% CI 0.52 to 3.69). The results of the funnel plots were interpreted to indicate the possibility of publication bias. The results did not change when analyses were repeated without two trials that were judged likely to bias the results. There was no significant difference between groups in the number of patients that reached their target blood pressure (three RCTs).

The benefit of telecare in reducing systolic blood pressure was not significantly greater in the four studies in which treatment was not adjusted based on the submitted blood pressure readings. For diastolic blood pressure the results were also non-significant.

Heterogeneity ranged from 0.69 to 0.72. Heterogeneity was not reported for specific analyses.

**Authors' conclusions**
Telecare led to a greater decrease in systolic and diastolic blood pressure than usual care. For systolic blood pressure, this decrease was greater in trials without treatment modification.

**CRD commentary**
The review question was clear. The inclusion criteria were somewhat unclear, as no definition of hypertension was provided. Relevant sources were searched. However, as only studies published in English were included and no search for unpublished material was conducted, there was a chance that relevant studies could have been missed. There was some evidence of publication bias but this did not seem to influence the direction or significance of the results. As no details of the review process were reported, there was a risk of the introduction of reviewer error and bias. One author was an employee of the company manufacturing blood pressure monitors (Microlife Corporation, Taiwan) at the time of writing.

No assessment of trial quality was reported, so the risk of bias for each individual trial was unclear. Appropriate participant details were provided. The method of synthesis was appropriate. Suitable measures were used to assess heterogeneity. Even though heterogeneity was not reported in detail for each analysis, it was clear that there was considerable variation between the trials included in the two analyses conducted. The authors' conclusions were partly based on non-significant results.

Due to the unclear inclusion criteria, the possibility that trials were missed during the search, the unclear review process, and the lack of quality assessment of the included trials, the reliability of the authors' conclusions is unclear.

**Implications of the review for practice and research**
**Practice:** The authors stated that telecare seemed to be valuable and useful in clinical health care provided sufficient training was received by health care professionals and patients.

**Research:** The authors did not state any implications for research.

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