Limitations of patient satisfaction studies in telehealthcare: a systematic review of the literature
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Authors' objectives
To provide a systematic review of studies on patient satisfaction with telemedicine.

Searching
Telemedicine Information Exchange, MEDLINE, the Science Citation Index, the Social Sciences Citation Index, PsycINFO and CINAHL were searched. The various telemedicine and satisfaction search terms used were listed in the report. The searching began in 1999 and was updated in 2001. Conference proceedings (including Telemed 1999 and 2001) were searched manually.

Study selection
Study designs of evaluations included in the review
All empirical studies were eligible. The study design could be determined for 8% (7 studies) of the studies that were included in the review. The majority of the included studies were descriptive. Twenty per cent (19 studies) compared telemedicine with a control group. Ten per cent (9 studies) were randomised controlled trials (RCTs).

Specific interventions included in the review
Studies of a telemedicine service involving professional-patient interaction (synchronous or asynchronous) were eligible. The included studies were of telepsychiatry, multispeciality care, nursing, dermatology, general consultation, surgical consultation, orthopaedics, oncology, otorohinolaryngology, ophthalmology and neurology. Real-time video conferencing was used in the majority of the studies.

Participants included in the review
The inclusion criteria were not restricted to any particular group of participants. The included studies involved patients of various medical specialities. A fifth of the included studies had a sample size greater than 100, while a third had less than 20 patients. The included studies were conducted in the USA, UK, Canada, Scandinavia and Australia.

Outcomes assessed in the review
Studies that made claims regarding patient satisfaction with telemedicine were eligible. The outcomes reported in the included studies were largely quantitative with only a sixth reporting some qualitative component. The most common aspects of patient satisfaction that were assessed were professional-patient interaction, patient feeling about the consultation, and technical aspects of the consultation. A preference between telemedicine and face-to-face consultation was reported in a third of the studies.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
The validity of the included studies was assessed. The criteria used included whether the study had a control group, whether the study was a RCT, the sample size, and the number of patients missing from the analysis. It is unclear how many of the reviewers performed the validity assessment. Data on study design, which were used to assess validity, were extracted onto a structured form as part of the data extraction process.

Data extraction
The data were extracted onto a structured form, which was developed for the purpose through an iterative process of pre-testing and reliability testing. The form was included in the report. It is unclear how many of the reviewers performed the data extraction distinct from the pre-testing and reliability testing procedure. The data extracted included author, country, medical speciality, study design, telemedicine system, participants, satisfaction questionnaire, and results.

**Methods of synthesis**

**How were the studies combined?**

A descriptive summary was presented. Patient satisfaction was assessed from a subset of studies that reported percentages (rather than rating scores); the minimum and maximum percentages, mean and standard deviation (SD) were calculated.

**How were differences between studies investigated?**

Differences in location, medical speciality, telemedicine systems, methodological characteristics and findings were summarised in the text. The tables enabled a more detailed comparison between the individual studies.

**Results of the review**

Ninety-three studies were included. The sample size varied from 3 to 4,696 participants.

The methodological limitations of the included studies included: the absence of a control group; inadequate sample size; a lack of reporting the validity or reliability of instruments used to measure patient satisfaction; and variability in the number of items used to assess satisfaction, and the number of aspects of satisfaction measured.

The mean patient satisfaction with telemedicine overall was 92% (SD 11), based on 38 studies. The findings for specific aspects of satisfaction were as follows: technical aspects, 89% (SD 13, 17 studies); convenience, 88% (SD 14, 11 studies); professional-patient interaction, 85% (SD 12, 24 studies); patient's experience or feeling, 83% (SD 13, 26 studies); administration, 82% (SD 8, 3 studies); preference for teleconsultation, 66% (SD 29, 15 studies); and preference for face-to-face consultation, 28% (SD 20, 18 studies).

**Cost information**

In their discussion, the authors made reference to several studies included in this review that reported a separate analysis of factors such as cost and/or distance. However, no data were tabulated and cost was not mentioned further.

**Authors' conclusions**

Current evidence is limited and consists mostly of pilot projects and feasibility studies.

**CRD commentary**

The review addressed a broad question, as reflected in the relatively imprecise inclusion criteria. Several relevant databases were searched using a strategy designed to be inclusive, which is likely to have reduced the chance of relevant studies being missed. The additional search methods were not extensive. Language restrictions were not mentioned; however, all the included studies appear to be English language publications, which is surprising. The details of how the review was conducted were unclear, and this makes it difficult to assess the potential for bias. A large number of heterogeneous studies were included, as would be expected from the wide inclusion criteria, and these were summarised clearly in tabular format. The methodological quality of the included studies was assessed using only a few criteria, and the same criteria were applied regardless of study design. This enables general comment on the quality of research in the field, but is insufficient to assess how valid the findings are from particular studies. A descriptive summary was appropriate, and the findings are discussed in the light of methodological limitations of the research literature as a whole.

The authors' conclusions are appropriately cautious. A more focused question might have provided information more
readily applicable to practice.

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

**Practice:** The authors state that findings from the available literature are not easily generalised to situations where telemedicine may become a substitute for standard health care delivery.

**Research:** The authors state that the progression of telemedicine from research to routine health service must be supported by improved research on patient satisfaction. In addition, further investigation of factors that influence patient acceptance of telemedicine is needed. Studies need to be based on adequate probability samples and provide sufficient methodological details to assess the reliability and generalisability of the results.

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