

# **Assessment of Patients' Acceptance of and Satisfaction with Teledermatology**

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## **ABSTRACT**

Teledermatology refers to the use of information and communications technology (such as videoconferencing or transmission of digital images) to enable the practice of diagnostic dermatology between participants separated by geographic distance. The objective of this study was to critically review the quality of evidence about patient satisfaction with teledermatology applications and to propose an outline for a satisfaction instrument for teledermatology. A literature search resulted in 14 studies assessing patient satisfaction. Sample size, reporting of validity and reliability, used instrument and its underlying constructs were determined in cases where information was available. The systematic review demonstrated that methodological deficiencies in the published research affect the generalizability of findings. A list of items that a proposed satisfaction instrument should include, was created using all items addressed in the 14 studies. The two types of teledermatology (video-based and store-and-forward) require different satisfaction instruments as they are based on different contexts of care delivery, with video-mediated communication being key in the former and patients' absence from the diagnostic process in the latter mode of care delivery.

## **INTRODUCTION**

Teledermatology has the potential to support the delivery of dermatology services by enabling patients at remote areas to have access to distant specialized dermatology sites. There are two types of teledermatology applications, those utilizing videoconferencing equipment enabling a real time interaction and the so-called "store-and-forward" applications based on the concept of sharing information in an asynchronous and place-independent manner using digital images and patient information transmitted for consultation to a remote expert.

As is the case with all innovative modes of care delivery, before its application as a routine service tool, teledermatology needs to be evaluated using

multiple criteria. Indeed, studies have addressed the reliability<sup>1</sup>, accuracy<sup>2</sup> and cost-effectiveness<sup>3,4</sup> of this mode of care delivery. While there is a considerable range of reported accuracy and reliability, evidence suggests that teledermatology has the potential to become widely utilized and integrated into traditional service delivery systems. One of the factors that will determine teledermatology's diffusion is patients' acceptance of or satisfaction with this type of care delivery. Satisfaction constitutes a crucial aspect of quality of care<sup>5</sup>, especially when determining the merit of innovative applications.

The aim of this paper was to review published literature, study instruments used to measure patients' satisfaction with teledermatology and analyze those findings in order to propose and develop a framework for a reliable and valid satisfaction instrument. Thereby, the two types of teledermatology (video-based and store-and-forward) were taken into consideration since they do introduce different contexts of care delivery.

## **METHODS**

The majority of published teledermatology studies focus on comparing diagnostic accuracy between different modes of care delivery (face-to-face, video based, store and forward). A limited amount of studies focuses on patients' satisfaction with teledermatology applications. We conducted a search of several electronic databases (Medline, Science Citation Index, Embase, Telemedicine Information Exchange) using combinations of the keywords "Telemedicine", "dermatology", "teledermatology" "satisfaction", "attitude", "perception", "acceptance." The reference lists of papers identified were hand searched for other relevant references. The search results were further limited to studies that have been published in English and that use quantitative and/or qualitative methods to investigate one or more of these parameters in a prospective or retrospective manner (thus review and concept papers were excluded).

The studies were reviewed with an emphasis on instruments that were used to assess patient satisfaction and their underlying framework. Any reporting of reliability and validity of the used instruments and the study sample size were recorded. A distinction was made between video-based and store-and-forward teledermatology. A list of all items included in the instruments was assembled in order to develop an exhaustive collection of factors and concepts related to patient satisfaction with teledermatology.

## RESULTS

Using the described search strategy, a total of 14 articles were identified<sup>5-19</sup>; two of those refer to the same study<sup>16,17</sup>. Some of the studies had the sole purpose of measuring patient satisfaction, whereas others assessed other parameters (such as diagnostic accuracy or cost-effectiveness) as main outcomes but also addressed patient satisfaction.

5 out of 14 studies refer to store-and-forward applications<sup>13-17</sup>, the remaining ones describe video-based systems<sup>5-12, 18-19</sup>. The earliest study was published in 1996<sup>7</sup>. Patient satisfaction was assessed with self-administered questionnaires in all but one case<sup>15</sup> where phone interviews were performed.

Face validity refers to the degree to which an instrument appears to be appropriate and does not depend on established theories for support. This validity type can be addressed with minimum effort and is mentioned in two studies, in one case the instrument was peer-reviewed<sup>17</sup>, in the other the design was based on the indications that the most frequently surveyed factors in patient satisfaction are overall satisfaction with care, with explanations of care and with the providers<sup>15</sup>. Any other type of validity (e.g. construct or content validity) or reliability (e.g. internal, inter-rater) testing of the satisfaction instruments were not reported in any of the studies, thus limiting the generalizability of the presented results.

There was great variation in the study sample size ranging from 321 patients in the study by Hicks et al<sup>19</sup> to 7 in the study of Zelickson et al<sup>18</sup>. Patients seemed in general to be accepting teledermatology as a mode of care delivery, although several concerns were expressed with issues of privacy<sup>15-17</sup>, embarrassment being photographed<sup>16, 17</sup>, limitations to expression of problems and concerns<sup>17</sup>, completeness of information transmitted<sup>11, 14</sup>, anxiety about the unfamiliar technology<sup>14</sup>, frustration with technical problems<sup>7,14</sup>.

As the literature review makes clear, when examining the issue of acceptance of or satisfaction with teledermatology, an exact definition of these terms becomes challenging. Although satisfaction is one of the fundamental parameters when evaluating health care innovations, the term has been defined in diverse ways. As demonstrated by the published studies, the term refers to concepts such as utilization and future adoption, perception of risks and benefits, effectiveness and efficiency. Since the concept of satisfaction is multidimensional and subject to contextual influences when investigated in relation to a telemedical intervention<sup>20</sup>, a satisfaction instrument should cover many underlying factors. Based on the literature review, we propose following items that need to be addressed:

- Convenience with the mode of care delivery (accessibility, traveling, scheduling)
- Confidence in accuracy of diagnosis reached at a distance
- Confidence in remote physician
- Ability to express concerns, ask questions
- Lack of physical contact
- Comparison of teledermatology to face-to-face visits
- Use of equipment (if applicable; in some cases the patients are asked to move the camera whereas in others a technician is present)
- Thoroughness of the examination
- Preference for type of consultation
- Possible concerns about privacy and confidentiality of medical data
- Future use
- Other possible Benefits
- Other possible Risks

Open-ended questions are appropriate when aiming to determine patients' perceptions of benefits and risks that have not been included in the defined items. A generic patient satisfaction instrument is not applicable to all teledermatology applications; a distinction needs to be made between videoconferencing where an interaction does take place even if participants are at a remote location and cases of store-and-forward teledermatology where digital images of body parts are being captured and transmitted. The latter approach is characterized by the patient's absence from the diagnostic process and in many cases lack of communication between patients and specialists. In one of the studies assessing patient satisfaction with a store-and-forward teledermatology application<sup>15</sup>, respondents were concerned with the lack of a provider-patient

relationship, and with the fact that they never received the evaluation directly from the dermatologist. Some respondents expressed embarrassment caused by the transmission of images over cable lines. In another study<sup>16</sup>, 14 % of the 123 surveyed patients found being photographed embarrassing and 17% reported that they could not say all they wanted to about their condition since they did not have the opportunity to interact with the dermatologist. Similar were the findings of the study by Van den Akker et al<sup>14</sup> where patients felt that transmitting images over the Internet to a dermatologist without being able to interact with them had an impact on the completeness of the transmitted information which could have an impact on decision making and diagnostic accuracy. This points out the fact that video-based and store-forward teledermatology applications although both based on the use of advanced telecommunications, require different evaluation tools and approaches as they are based on different contexts.

### CONCLUSIONS

The systematic literature review demonstrates that published studies of teledermatology fail to provide underlying reasoning for patient satisfaction (or lack thereof) with this service. Due to methodological deficiencies and design limitations of these studies, it is difficult to generalize their findings. Extensive reliability and validity testing of suggested instruments is required. Furthermore, new instruments should provide opportunity for an in-depth examination of communication, quality of patient-provider relationship and include items already addressed in previous instruments such as convenience with teledermatology, confidence, ability to interact, ease of equipment use, and preference for type of consultation. A clear distinction needs to be made between video-based and store-and-forward applications since they are based on different approaches. Thus, patients' perceptions of communication and relationship to the provider need to be investigated differently since the goal is when evaluating video-based systems to determine how video-mediated communication impacts the perceived quality of care whereas in store-and-forward applications the goal should be to assess how patients perceive the lack of communication.

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