Review Article

Heart Failure Patients Monitored With Telemedicine: Patient Satisfaction, a Review of the Literature

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ABSTRACT

Background: Remote monitoring of the clinical status of heart failure patients has developed rapidly and is the subject of several trials. Patient satisfaction is an important outcome, as recommended by the U.S. Food and Drug Administration to use in clinical research, and should be included in studies concerning remote monitoring. The objective of this review is to describe the current state of the literature on patient satisfaction with noninvasive telemedicine, regarding definition, measurement, and overall level of patient satisfaction with telemedicine.

Methods and Results: The Pubmed, Embase, Cochrane, and Cinahl databases were searched using heart failure−, satisfaction-, and telemedicine-related search terms. The literature search identified 193 publications, which were reviewed by 2 independent reviewers. Fourteen articles were included. None of the articles described a clear definition or concept of patient satisfaction with telemedicine. Patient satisfaction with telemedicine was measured with self-developed questionnaires or face-to-face or telephonic interviews. None of the articles used the same questionnaire or telephonic survey to measure patient satisfaction. Only one questionnaire was assessed for validity and reliability. In general, patients seemed to be satisfied or very satisfied with the use of telemedicine.

Conclusions: Measurement of patient satisfaction is still underexposed in telemedicine research and the measurement of patient satisfaction with telemedicine underappreciated with poorly constructed questionnaires. (*J Cardiac Fail 2011;17:684−690*)

Key Words: Perception, remote monitoring, satisfied, telemonitoring.

Heart Failure (HF) is a chronic condition characterized by periods of worsening symptoms and signs which may require hospitalization and frequent doctor visits.[1] Telemedicine offers a modern and emerging concept to monitor patients with HF at home and can be seen as a process of remote interpretation of the clinical status of a patient.[2] In the current discussion on optimal disease management of HF programs,[3] telemedicine might be a valuable addition.[4] During the past 10 years, remote monitoring using telephone support or patient initiated electronic monitoring has developed rapidly.[2] Different types of telemedicine interventions have been developed, such as invasive and noninvasive telemedicine, telemedicine with or without peripheral devices and video consultation with or without peripheral devices.[2,5] Telemedicine is also available in a diversity of other settings, with chronic diseases such as chronic obstructive pulmonary disease (COPD), dermatology, and psychiatry. Frequent monitoring and interpretation of the clinical status of a patient by a health care professional has been shown to enable earlier intervention to treat deterioration.[2] More importantly, telemedicine reduces the risk of all-cause mortality and hospitalization in patients with HF.[6]

In the past 10 years, most telemedicine research has had a technologic focus aimed at acquiring knowledge regarding bandwidths and resolution.[7] Patient-reported outcomes such as patient satisfaction emerged at that time as a by-product of the growing number of trials and pilot studies.[8]

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Now the use of patient-reported outcomes is considered to be important for several reasons. First, the U.S. Food and Drug Administration (FDA) recently released guidance for the use of patient-reported measurements in medical product development to support labeling claims of medical products.[9] The basic principles propagated by the FDA are relevant for other areas of research as well.[10] Second, patient satisfaction is increasingly considered to be an indicator of quality of care.[11,12] In terms of cost-benefit aspects, satisfied patients have fewer complaints, fewer second opinions, and fewer repeated investigations.[11] Furthermore, it is suggested that satisfaction is related to patients' adherence to medical treatment regimens.[13−15] Measurement and understanding of patient satisfaction is therefore a requisite for the successful treatment of HF.

Within the medical literature, patient satisfaction can be seen as a hierarchic structure with 3 levels: The broadest level is satisfaction with health care delivery, the middle level represents treatment satisfaction, and satisfaction with medication or medical device is at the narrowest end of the hierarchy.[15] The broadest level of patient satisfaction includes issues of accessibility, patient-physician interaction and perceived quality of staff and facilities.[15] These issues of patient satisfaction are important in telemedicine research as well. Ware et al (1983)[16] described patient satisfaction as a multidimensional concept consisting of 8 dimensions: interpersonal manner, technical quality of care, accessibility or convenience, finances, efficacy or outcomes of care, continuity, physical environment, and availability. These 8 dimensions represent the different domains of patient satisfaction with providers and medical services. In addition to a theoretic foundation, it is important to use a standardized method for measuring patient satisfaction with validated measurement tools as recommended by the FDA.[9] The aim of the present review was to describe the current literature regarding research on patients' satisfaction with telemedicine, based on the following questions: 1) How is the concept of patients' satisfaction with telemedicine defined? 2) How is patients' satisfaction with telemedicine measured? and 3) What is the overall level of patients' satisfaction with telemedicine?

Methods

Search Strategy

A comprehensive search was conducted through the Pubmed, Embase, Cinahl, and Cochrane databases of medical literature published until November 2010 with a customized search strategy for each database. The search strategy consisted of heart failure−, satisfaction-, and telemedicine-related search terms. To avoid missing relevant literature, the search was made as broad as possible by using the explode function (Table 1).

Selection of Articles

The literature search identified 193 potential relevant publications in Pubmed (n = 47), Embase (n = 39), Cinahl (n = 70), and Cochrane (n = 37). Forty-six articles were simultaneously present in >1 database. To be included in the present review, publications were assessed by 2 independent reviewers using the following inclusion criteria: Articles had to: 1) describe original studies; 2) describe studies performed in patients with HF; 3) be published in peer-reviewed journals; 4) be published in English; 5) measure patient satisfaction with telemedicine; and 6) describe studies with noninvasive remote monitoring with external equipment to measure physiologic data such as weight and blood pressure. As a result, 133 articles were excluded: 72 articles were not original studies (reviews, meta-analysis, editorials, and commentaries); 2 articles did not involve HF patients; 1 article was not in English; 8 articles were not published in peer-reviewed journals, and 38 articles did not use noninvasive remote monitoring with

Table 1. Bibliographic Search Strategy

Database	Access Date	Search Strategy	No. of Articles
Pubmed	Sept 11, 2010	(''Heart Failure''[Mesh] OR ''heart failure'') AND (telecare OR telehealth OR telehomecare OR ''Telecommunications''[Mesh] OR ''remote patient monitoring'' OR ''remote monitoring'' OR telemedic* OR telemonit*) AND (''Patient Satisfaction''[Mesh] OR ''satisfaction'' OR ''satisfied'' OR ''ease of use'' OR perception*) Limits: English	47
Embase	Sept 11, 2010	'heart failure'/exp OR 'heart failure' AND ('telehealth' OR 'telehealth'/exp OR telehealth OR telemomecare OR telecare OR 'telecommunications' OR 'telecommunications'/exp OR telecommunications OR 'telemedicine' OR 'telemedicine'/exp OR telemedicine OR 'remote patient monitoring' OR 'remote monitoring' OR telemedic* OR telemonit*) AND ('patient satisfaction'/exp OR 'patient satisfaction' OR 'satisfaction'/exp OR satisfaction OR satisfied OR 'ease of use' OR perception*) AND [embase]/lim AND [english]/lim	39
Cinahl	Sept 11, 2010	((MH ''Telecommunications + '') OR (TX telecare OR telehealth OR telehomecare OR telecommunication OR ''remote patient monitoring'' OR ''remote monitoring'' OR telemedic* OR telemonit*) AND (MH ''Heart failure, Congestive + '') OR TX ''Heart failure'') AND (MH ''patient satisfaction'') OR (TX satisfaction OR satisfied OR ''ease of use'' OR perception*)	70
Cochrane	Sept 11, 2010	(Telecommunications [Mesh] OR (telecare OR telehealth OR telehomecare or ''remote patient monitoring'' OR ''remote monitoring'' OR telemedic* OR telemonit*)) AND (''Heart failure [Mesh] OR heart failure) AND (patient satisfaction [Mesh] OR (satisfaction OR satisfied OR ''ease of use'' OR perception*))	37