A Review of Patient and Provider Satisfaction with Telemedicine

Emergent Research Forum Paper

Robert Garcia
DePaul University
rgarci11@cdm.depaul.edu

Olayele Adelakun
DePaul University
yele@cs.depaul.edu

Abstract

Advances in technology constantly change the state of telemedicine services. These changes can impact user perceptions and views of satisfaction. To examine these changes a systematic literature review of telemedicine satisfaction is being conducted. This review follows recommendations provided by the PRISMA guidelines and uses an instrument developed in previous research to collect and quantify results. In total 984 papers on telemedicine satisfaction were extracted from the PubMed database. Of these 621 have met the current selection criteria and 231 have currently been successfully coded. The study overview, rationale and some preliminary findings are discussed.

Keywords

Telemedicine, Satisfaction, Literature review

Introduction

Despite the potential benefits of telemedicine, there are still challenges to its adoption (Kruse et al. 2016; Saliba et al. 2012). One of the main factors in the acceptance and successful adoption of an information system is the degree of stakeholder satisfaction (Davis 1989). While many studies show high levels of satisfaction with telemedicine, there remain questions about potential methodological deficiencies that limit the extent to which findings are generalizable (Mair and Whitten 2000). It is unclear whether studies adequately capture provider satisfaction and how advancing technologies may impact results (Whitten and Love 2005).

Over the years there have been changes to both telemedicine technology and research on telemedicine satisfaction. Mobile technology is a fast-growing part of everyday life for many people. New technologies are providing consumers with access to technologies such as Augmented and Virtual reality that were once restricted to the laboratory. There are also more validated instruments for testing telemedicine patient satisfaction, such as the Telemedicine Satisfaction Questionnaire (Yip et al. 2003).

The objective of this review is to collect similar data on the current state of telemedicine satisfaction research while examining any differences between previous work and measures of provider versus patient satisfaction. To achieve this goal this research is focused on conducting a systematic literature review based on the PRISMA guidelines and using a tool created by Williams et al. (2001 for data collection. The tool was expanded to examine data for both patients and providers. This systematic review presents a recent overview of research on telemedicine satisfaction as published in the PubMed database. Using the expanded instrument, data was collected from the sample and the results are discussed. The findings in this systematic review suggest that there are still gaps in the data when it comes to measuring telemedicine satisfaction.

Literature Review

Satisfaction is an indicator of the relative advantage an innovation may provide and influences its adoption (Rogers 2010). Satisfaction also has a role in the attitudes of patients towards their healthcare and influences health outcomes (Chou and Brauer 2005). Many studies report some level of patient

satisfaction with telemedicine (Beste et al. 2016; Bradbury et al. 2016; Griffith et al. 2016). Some show comparable results between telemedicine and traditional methods with neither providing a clear advantage over the other (Brodey et al. 2000; Rossi et al. 2010). While some users are generally satisfied with telemedicine services, many still do not view it as replacing face to face consultations (Weatherburn et al. 2006). Other studies show improvements in satisfaction as the number of interventions increase (Finkelstein et al. 2004). While studies have examined patient satisfaction with telemedicine services, questions still remain as to why patients may or may not be satisfied with telemedicine and the extent to which methodologies adequately measure satisfaction (Mair and Whitten 2000; Whitten and Love 2005). This can potentially impact providers as well, and there is a need for more studies on comparing their perspectives (Marchell et al. 2017).

However, in general there are a variety of issues with the methodologies used in studies on telemedicine satisfaction. Many studies use self-developed questionnaires and interviews that are seldom assessed for validity and reliability (Kraai et al. 2011). As a result, some researchers are developing questionnaires specifically for evaluating telemedicine (Bakken et al. 2006; Yip et al. 2003). Others have questioned the extent to which results from studies are generalizable and the extent to which results from different projects may vary (Whitten and Mair 2000). For example, there are differences in patient perspectives based on the type of services and the locations in which they are provided (Kraai et al. 2011). Research in other domains has shown that patient and provider perspectives and needs can vary as well (McNulty et al. 2016). Although studies vary in sample size, studies using larger samples show generally high satisfaction with telemedicine projects for patients (Jacobs et al. 2016; Polinski et al. 2016; von Wangenheim et al. 2012). More recent findings are also showing similarly high rates of provider satisfaction (Bonnardot et al. 2015). However, a further difficulty arises due to an unclear definition of what exactly is meant by "satisfaction" (Whitten and Love 2005). Factors such as appointment scheduling, travel time, and patient involvement in physical examinations have been identified as influencing patient satisfaction (Gustke et al. 2000). Other predictors of patient satisfaction can include privacy, on-camera comfort, and perceived specialist competence (Dick et al. 1999). Some studies suggest professional-patient interaction, the patient's feeling about the consultation, and technical aspects of the consultation can also influence patient satisfaction (Williams et al. 2001).

There are differences in how stakeholders such as patients and providers view telemedicine. For example, patients may view telemedicine favorably based on treatment, while providers may have other concerns about its use and implementation (Whitten and Love 2005). Different factors can impact the way providers, patients, and administrators view the adoption of telemedicine (Menachemi et al. 2004). Studies show that in certain applications patients may view telemedicine more favorably than providers (Mair et al. 2005), while in other cases providers may view telemedicine more favorably than patients (Weinstock et al. 2002). Although many studies have examined patient satisfaction, there remains a need for studies on provider satisfaction. A provider is considered someone who is a producer/consumer of information, operates the telemedicine system directly, and has some decision-making control over the telemedicine system (LeRouge et al. 2007). Providers may include doctors, nurses, and other medical practitioners. Providers may interact directly with patients, but in other cases, providers may only interact with services like record-keeping systems. For some programs, such as training or consultation, providers may be providing services to other providers (Zollo et al. 1999).

Methods

The methods described here will be discussed according to the items provided in the PRISMA checklist (Moher et al. 2009).

Protocol and Registration: As described in the literature review there are a number of studies which have conducted reviews of the literature on specific aspects of satisfaction with telemedicine. Despite the number of studies on telemedicine satisfaction there are no established protocols for conducting telemedicine satisfaction literature reviews.

Eligibility Criteria: This study is attempting to examine telemedicine satisfaction in studies that specifically examine the satisfaction of users with different telemedicine technologies. Therefore, studies such as literature reviews or theoretical papers were not considered as eligible for inclusion.

Information Sources: Rather than attempt to examine all available databases that contained publications on telemedicine, we constrained our search to the PubMed database. The PubMed database contains over 25 million citations from MEDLINE, life science journals and online books that cover a broad range of topics that can provide greater insight into telemedicine use in practice as opposed to purely experimental uses. Articles were selected that were published between 12 / 31 / 2009 to 08 / 31 / 2016. The end date for the search was based on the most current available data at the time the study was performed. The study used the search criteria Telemedicine AND Satisfaction.

Study Selection: In order to gauge the eligibility of studies three research assistants examined the initial list of papers to determine whether they were empirical or non-empirical and whether they were solely theoretical or just proposed research as opposed to actual research.

Data Collection Process: All studies from the results were included and downloaded in a spreadsheet directly from the website. Studies were examined over the course of several months by four graduate research assistants.

Data Items: Data from PubMed includes the title of the publication, along with additional identifiers such as URL, description, details, shortdetails, resource, type, identifiers, database, UID and additional properties. The details include information such as name of the publication and date.

Risk of bias: To reduce risk of bias only the studies from Pubmed are being evaluated without any additional examination of perceived quality of the publication. Provided the publication meets the eligibly requirements they are included.

Summary Measures and Synthesis of Results: To synthesize the results this study uses a tool designed by Williams et al. (2001). Williams et al. (2001) developed an instrument specifically for examining patient satisfaction with telemedicine. The instrument captures descriptive information about studies' publication details, purpose of telemedicine, type of telemedicine system, study design, participants, patient satisfaction measurement used, and the studies' results. The instrument was reported as providing a reliability of approximately 80% consistency between raters. The instrument was designed to extract characteristics of a study's design and not the quality of the study. As the goal of the previous work was to gain a broad overview of what was being examined by researchers in the field, quality was not among the criteria for inclusion (Williams et al. 2001). The instrument was expanded by adding an additional section for provider satisfaction. The questions are exact replicas of the questions used for patient satisfaction measurement. A question in the original instrument is asked about satisfaction with specific aspects of telemedicine. This is copied into two additional questions one about patient satisfaction with specific aspects of telemedicine and one for provider satisfaction.

Results

In total 986 studies were extracted from the PubMed database. Of these two were removed because they were found to be repeats. The resulting 984 studies were then examined to determine which ones met the eligibility requirements. Of these the team was not able to access 161 papers because of paywall restrictions. 200 papers that were examined were excluded because of eligibility reasons. Most were literature reviews but several of the papers were also just proposed research. 2 of the papers did not include sufficient information in English and were not reviewed. 621 papers were available to be evaluated. The team has currently completed coding 231 papers using the expanded instrument.

While most studies used quantitative research methods (67%) to study telemedicine satisfaction, only 12% used qualitative research methods, and 21% used both quantitative and qualitative methods. Of the quantitative studies 61% examined patient satisfaction, 15% looked at provider satisfaction, while 18% looked at both. Most studies for both patient (81%) and provider (80%) contained questions that examined "overall" satisfaction. There were slightly more questions concerning convenience (34%), patient provider interaction (34%), and patient experience (26%) used in patient questionnaires. Convenience (32%), patient provider interaction (30%) and patient experience (15%) were slightly lower in provider results than in those that examined patients. Preferences between telemedicine and other care was more likely to be analyzed for patients (13%) than for providers (4%). In respect to the categories identified by Williams et al. (2001), 56% fell into the "other" category. The next largest groups were Cardiology (8%), Psychiatry (7%), Oncology (6%), and General Practice (6%). Orthopaedic (3%),

Dermatology (3%), Nursing (3%), Radiology (2%), Emergency (1%), and Otolarygology/Otorhinolaryngology (1%) were the least examined. Researchers attempted to categorize elements in the "other" category. Among the more frequent types of studies in the "other" category were pediatrics (8%), diabetes care (6%), physical therapy (6%) and neurology (5%). No medical services were offered in 3% of studies. Of these results overall satisfaction for patients had a maximum of 100%, a minimum of 43% and an average of 90%. In provider studies the maximum was 100% the minimum 45.5% and the average 86%. A mode of 90 was calculated for patient studies and 85 for provider studies. Studies also varied by region. The majority of studies had ties to North America (42%), with Europe (30%) coming in next, followed by Australia (10%), Asia (9%), Africa (4%) and South America (3%).

Discussion

Although our test data mainly focused on a sample of studies in the Pubmed database, our current findings indicate that telemedicine covers a growing range of medical specialty areas. However, like previous studies have indicated, there are still areas with fewer studies taking place, particularly in Africa and South America. Satisfaction does tend to remain high for both patients and providers but there are slight differences in the average satisfaction rates. There are slight differences in what is being explored for patients and providers.

Conclusions and Future Work

While it is too early to provide any definitive analysis of the results, the early results show the type of analysis that this research can provide. We are currently working to complete the coding of the remaining papers. Once completed a thorough analysis will be performed. The data will be analyzed to determine what the current state of telemedicine satisfaction research is for both patients and providers.

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