

Patient and Provider Satisfaction with the Use of Telemedicine: Overview and Rationale for Cautious Enthusiasm

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ABSTRACT

Telemedicine research addressing user satisfaction abounds in academic literature. Results from patient satisfaction studies indicate exceptionally high levels of perceived satisfaction, often above the rates of expected satisfaction for traditional forms of health delivery. Results from provider satisfaction studies are also generally quite positive; however, data from providers point to higher concerns with delivery barriers and challenges. Even though data from patient and provider satisfaction research suggests overwhelming optimism for this delivery modality, this paper urges cautious embracement of these results for several reasons. First, many of the studies exhibit serious methodological weaknesses related to design and data collection instruments. In addition, the construct of satisfaction is largely undefined and is not clear. Even recognizing these caveats, the results of the study do offer some evidence that patient satisfaction will not impede the deployment of telemedicine, but provider satisfaction merits additional study.

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Telemedicine possesses the ability to bridge gaps and overcome barriers in a way unthinkable to traditional forms of healthcare. For more than 50 years, telecommunications technology has played a role in spreading medical care to previously unreachable populations.^[1] Throughout telemedicine's bumpy start and deployment, researchers and practitioners have been concerned with user satisfaction,^[2] a key challenge that still remains for today's healthcare organizations.^[3] Insights supplied by patients and providers remain essential across the medical fields served by telemedicine projects, especially as the number of these projects continues to increase at a dramatic rate. In fact, only four active telemedicine programs existed in 1990, but 10 years later, the number has jumped to an unquantifiable level.^[4]

In general, investment in telemedicine by governments around the world spurred – and continues to spur – much of the growth. Infrastructure development and health alert networks in the United States are such a priority that the federal Departments of Agriculture, Commerce, Defense and Health and Human Services all offer government-provided grants to promote telemedicine applications.^[5] In addition, varying entities in Norway, Spain, Sweden, Ireland, Greece, Germany and else-

where maintain programs to encourage the development of telemedicine.^[6-10]

As the dramatic expansion of the last decade continues,^[11] a better understanding of how satisfied patients and providers feel will become increasingly important.^[12] A rapidly growing number of studies across several medical fields have demonstrated that the attitudes of patients play a significant role in health outcomes,^[13,14] further stressing the need to understand satisfaction.

Most of the currently available research on satisfaction describes a situation where patients and providers express pleasure with health care delivered through telemedicine, even if that approval is sometimes offered with reservation. Additionally, the two groups tend to maintain different motivations for their opinions. However, much of the satisfaction that literature reports comes from studies that are not experimental in nature. The publications generally consist of small sample, descriptive feasibility studies or advice to other telemedicine providers.^[15,16] Therefore, this body of work may not offer generalizable results.^[17,18] Furthermore, the very meaning of satisfaction remains ill-defined at best, lacking the specific

definition necessary to be a true theoretical construct.^[19] On the other hand, the conclusions can serve as a guide to how patients and providers view telehealth throughout a number of fields.

The goal of this paper is to summarize the perception of satisfaction as reported in literature from two perspectives – the patients and the providers. The paper begins with a review of the satisfaction literature from these two user groups followed by a discussion that critiques the contribution of this body of research to date.

Literature Review

While telemedicine can summarily be defined as using telecommunication technologies to support health care and education across some distance,^[20] defining satisfaction proves to be a more complex issue. Nonetheless, it remains an essential aspect of healthcare quality.^[21] Perceptions of satisfaction can be extremely nuanced and require the input of multiple perspectives, beginning with the patient and the provider. Satisfaction, commonly defined as when an individual's expectations of treatment and care are met, is of course only one area of focus found in telemedicine research.^[22] Studies also regularly examine barriers to care,^[23] outcomes,^[23–25] and cost.^[25,26] Satisfaction merits particular attention because it is a critical aspect both of quality of care^[21] and of health outcomes.^[27] Telemedicine applications and the ensuing user satisfaction has thus far been examined in a wide variety of areas: dermatology,^{[28]–[30]} oncology,^[31] primary care,^[32] emergency care,^[33] physical rehabilitation,^[34] surgery,^[35] paediatrics,^[36] psychology,^[37] radiology,^[38] and obstetrics,^[39] to name a few.

Methodologically, the studies also represent a diverse group, although a majority of the research consists of quantitative research done through questionnaires.^[15,31,32,40] A few employed qualitative methods^[30] or combined methodologies^[31,41–43] in attempts to parse out new perspectives on telemedicine. The most popular venue for satisfaction research to date involves studying the perceptions of patients.

Patient Satisfaction

Research into patient satisfaction has depended primarily upon surveys and not been methodologically rigorous, limiting any firm conclusions. Examining the variety of available results does, however, indicate that patients are generally satisfied with telemedical care, as reported satisfaction rates are consistently quite high. This must be viewed, though, through the general opinion of all healthcare, where most patients report being satisfied with their medical care. According to Carr-Hill,^[44] more than 80% of consumers find their healthcare to be satisfactory, a number that fits with statistics provided by hospital systems and research foundations.^[45] More recent research lowers the number slightly to just below 70%,^[46] but the total still sets a high standard of comparison for telemedicine applications. While the satisfaction results for telemedicine have been consistently positive over time, the nature of the projects has changed some. Along with the increase in the number of

projects, recent undertakings in telemedicine have increasingly begun to focus on specific medical disciplines^[41,47] instead of more general practice or a number of fields.^[8] The reasons suggested for high patient satisfaction have changed little, however. Reported reasons include: easier access to specialists, reduced travel, shorter waiting times for appointments, improved effectiveness, financial savings, a wider interaction system, accurate diagnoses, personalized care, and the ability to address cultural issues.

Examples of positive feedback are easy to find. Made *et al.*'s study looking at rural primary care offices noted that patients reported satisfaction scores of 5.7 on a six-point scale for video-based specialist consultations.^[48] Oncology patients using interactive videoconferencing conveyed high levels of satisfaction both at the time of the visit and at follow-up appointment in response to a 12-item survey instrument,^[49] just as Dick *et al.* had 71% of patients respond with scores of five on a five-point scale.^[50] This study also noted significant cost savings, often upward of \$1000 per patient. A study by Hicks *et al.* noted that 88% of its 258 respondents expressed satisfaction with dermatological consultations completed by telemedicine.^[47] On a seven-point Likert scale, almost all of these responses were in the top two categories.

Some of the highest scores in any study were reported by researchers from East Carolina University using data from 495 teleconsultations. They found 98.3% of patients to be satisfied with their telemedicine experiences.^[51] The authors surmise that the high satisfaction rate could be a result of telemedicine removing problems found to cause dissatisfaction in nontelemedicine care, including: appointment scheduling, travel time, and patient involvement in the physical examination. Overcoming common issues, as well as geographic barriers, can make certain patients more optimistic about experiences with telemedicine, an idea supported by a California-based study in a telemedicine clinic offering primary care services. Staffers there surveyed 657 consecutive patients and found high levels of satisfaction. They also noticed the differing needs and demands of rural patients when compared to urban or suburban sites.^[52]

Projects undertaken outside the US have produced similar results. Patient satisfaction results from a Spanish study also point to patients acknowledging increased access to specialists. The researchers provided televisits from two specialists and a nurse to 15 patients dealing with kidney, heart, or chronic pain issues. The patients reported satisfaction with the service, which may stem from more convenient access to necessary health care providers.^[8]

Rural patients consistently appreciate not having to travel great distances for certain consultations. While some studies show that patients recognize this as a trade-off and would prefer face-to-face sessions, telemedicine still earns high approval ratings from respondents.^[53] Sacrificing the in-person contact appears to be worth the improved access to specialists. Among older populations, who tend to be less comfortable with technology than younger groups, telemedicine receives posi-



tive satisfaction scores, again perhaps the ease of access to medical care. Almost all of the respondents in a Florida-based study of primary-care-centered telemedicine reported that using technology to consult with their doctor did not have a negative impact on the doctor/patient relationship.^[54] In fact, more than 60% of the group responding to the questionnaire thought that the technology had a positive effect on their relationship with their doctor.

Not all satisfaction research is based on simple surveys, however. To provide a more accurate picture of patient satisfaction with telemedicine, some researchers performed comparisons to traditional in-person sessions. The results appear to follow the pattern of positive feedback laid out by other research.^[55] Collins *et al.*, for example, found no difference between a telemedicine group and a traditional group when asking about overall care.^[41] Qualitative interviews done as a follow-up also found no difference between the groups.

In a high-volume emergency room setting, patients in Brennan *et al.*'s study reported equivalent levels of satisfaction between telemedicine and traditional care. The telemedicine patients here were treated by a nurse in person and a doctor via telemedicine while traditional patients were diagnosed and treated by a physician. All telemedicine patients were evaluated in person by a physician before discharge. Along with equal satisfaction rates, the two groups had equivalent rates of 72-hour return visits or need for additional care. In addition, the average time from admission to discharge was 177 min for the traditional group and 106 for the telemedicine patients.^[56]

Working in a rural environment, Woods *et al.* assigned patients with sickle cell disease to telemedicine or standard encounter groups and provided treatments.^[57] Afterwards, they completed a questionnaire and had an opportunity to offer open-ended comments, which were recorded verbatim. Responses across the two 60-person groups were routinely positive, as well as comparable with no difference for any specific item. However, 95% of patients in the face-to-face group offered positive open-ended comments vs 70% in the telemedicine group. Negative comments within this group focused on concerns about the confidentiality of teleconsultations. Despite these concerns, the patients' high satisfaction rates stemmed from their appreciation of better access and continuity of care.

Other telemedicine projects took a different approach from examining only telemedicine care or doing comparison studies. Rather than replacing conventional care, a number of projects used telemedicine in support of traditional methods. For example, Mair *et al.* received positive patient satisfaction scores using a store-and-forward system to allow a general practice worker and a specialist to combine efforts in treating skin lesions.^[58] A general practice worker would capture images of suspicious lesions, add clinical data, and transmit an electronic medical record for viewing by a specialist. The expert then viewed the record and entered an opinion directly into the system within 2 days. Each patient had the opportunity to en-

gage in a face-to-face session within 7 days. As mentioned above, in this situation, the local clinic served to provide basic information to a specialist and also offer in-person consultations at a real clinic, both of which were raised as concerns in previous research.

Even in a low-bandwidth situation providing support to specialists, telemedicine applications earned high satisfaction marks from patients. Using a standard telephone line, low-resolution video, and high-resolution pictures, researchers conducted postoperative consultations by sending a nurse and medical student to the patients' home while a physician attended remotely from the office.^[59] Patients reported extremely high satisfaction with the home visits, rating them a 4.8 out of 5.

A Swedish study pointed out another support aspect of telemedicine that some patients may appreciate, the opportunity to have the patient's general practitioner present while consulting a specialist.^[9] Patients that traveled to a university hospital to be present in the same room as a group of specialists were more likely than the telemedicine group to feel "as if everybody was talking about me but not to me." The telemedicine participants, on the other hand, felt positively about their meetings with the specialists and appreciated taking part in these sessions from a more comfortable environment such as the local hospital.

This social support function has come up in other research as well. Holtan found that patients appreciated telemedicine's opportunities to interact through a wider range of channels and use different means to participate in healthcare sessions.^[60] The social situation of consulting or receiving support from multiple people proved to be important to patients. This stresses the importance of using technology such as video conferencing to open opportunities to patients, not cut them off from others.

Relatively recent research has begun providing some answers about what telemedicine patients appreciate and why reported satisfaction rates are so high. Working in 18 rural California counties, researchers developed a standardized satisfaction questionnaire using a five-point scale and collected data from patients receiving consultations in 27 specialties. The score for mean satisfaction with telemedicine among the 793 respondents was 4.5 out of 5. In addition, their survey probed at other topics related to telecare. Respondents conveyed a willingness to continue using telemedicine (4.6), believed that they obtained the necessary information from specialists (4.5), and felt their questions were adequately answered by a primary care provider or nurse (4.7). Also, 741 of the patients noted travel information. Telemedicine decreased travel distance by 170 km on average and saved an average of 130 min.^[61] Obviously, these factors would influence a patient's opinion of telemedicine.

Even when the patient feedback is generally positive, concerns come up as well, particularly regarding privacy and the poten-



tial lack of a relationship with a provider. One example in the oncology field is a study by Mair *et al.* that found all the patients were satisfied with their teleconsultations, though half of this group qualified their approval with two factors: seeing the specialist in person from time to time and viewing the clinic as serving a “monitoring” function.^[58] Participants appreciated the improved access to care by qualified specialists, but they also saw limits to telemedicine, particularly as nurses continued to fill in for doctors during certain parts of physical examinations. Patients’ representations of satisfaction matter a great deal, of course, and get no shortage of attention in studies, but research is beginning to indicate the significance of providers as gatekeepers and barriers to effective telemedicine applications.

Provider Satisfaction

Early work from the provider perspective focused on the potential of the technology and offered enthusiastic views of the future, referring, for example, to telemedicine’s interviewing capabilities as “exciting and interesting” with the possibility to “teach us a great deal.”^[62] Work just a few years later still notes the potential but shifts slightly by mentioning the importance of examining why some providers and payers resist technological improvements.^[52] Like patients, providers still offer positive satisfaction reports, but their approval tends to be more measured. Even when telemedicine proves to be useful, providers also note room for improvement or offer suggestions.^[29]

Examples of provider-given suggestions come from multiple projects. A pan-European study of home-based telemedicine services found that the medical staff was satisfied with the support offered by telemedicine. However, despite feeling that healthcare quality could improve with telemedicine, they also expressed concern about being able to help patients in a critical situation.^[10] Importantly, providers also felt that information was treated with confidentiality and that diagnoses made through telemedicine were accurate. Richards *et al.* also received positive satisfaction feedback, particularly about telemedicine’s clinical utility and its ease of use.^[32] The results were similar to those noted in a study carried out by Guillen *et al.*, though, these individuals noted several potential barriers, including high associated costs, potential for extra work, and the need for training.^[32] In a teledermatology setting, providers actually expressed higher satisfaction than patients. Similar to the prior studies, though, they did express concerns about the ability of the telemedicine technology to handle high demand.^[63]

One reason occasionally suggested for providers’ more nuanced view is that these respondents are dealing with a new technology and the significant change it makes in daily routines. The initial change in routine can be perceived by providers as something that’s unnecessary and suspect – the healthcare workers feel they’ are already providing the best care.^[33] Change im-

plies that something is wrong. Despite these difficulties, future expectations of telemedicine remain high.^[42]

Fulfillment of these expectations depends upon overcoming and improving upon the limitations of certain telecommunications equipment, as technological issues can restrict physicians’ enthusiasm in some cases. Researchers testing low-cost technology have found that poor imaging, for example, can limit the usefulness and perceived effectiveness of technology.^[64] The amount of time initially required to set up and adapt to telemedicine technology also served as a barrier to attaining the support of healthcare providers, as did a perceived lack of compensation.^[30] For Guilfoyle *et al.*, problems with videoconferencing equipment and the environment surrounding consultations managed to help push medical staff into preferring face-to-face sessions, although telemedicine earned high marks for initial assessments.^[65] Without technological issues, telemedicine may have fared considerably better. The providers’ less positive view can cause issues for some patients. In one case, providers’ diminished enthusiasm for telemedicine caused patients to be frustrated that the providers did not offer more frequent telemedicine care.^[66]

In some applications, though, providers actually preferred some attributes of telemedicine, particularly its ability to speed up patient referrals.^[67] In situations dealing with electronic medical records, providers seem to appreciate the ability to examine high quality diagnostic images and offer expert opinions on a more flexible timetable.^[68] Another positive attribute for medical professionals is the possibility of consulting on surgeries without having to actually travel. More than 85% of surgeons expressed satisfaction with education-focused telemedicine and patient care in a study that followed two years of weekly surgical teleconferences held across six university hospitals in four countries.^[69] By working and conferring across the sites, participants managed a diagnostic accuracy rate of 95%. Gilmour *et al.* also reported that 75% of their participating practitioners found telemedicine sessions to be of educational benefit, in addition to having potential to diagnose and manage dermatology case referrals.^[55]

Other factors also play into providers’ opinions about telemedicine. The competency of the practitioner on the other end of the system and the completeness of the patient records both comprise important considerations for providers.^[40] Trust among healthcare workers influences and directly affects their attitudes toward the telemedicine set-up.^[70] Practitioners also appreciate the educational possibilities of teleconsultations, as well as the method’s ability to reduce unnecessary specialist referrals. If specialists can get initial views of the patients, they can make early decisions about the need for full office visits.^[48] Factors outside the realm of technology can influence providers’ opinions as well. Management opinions have the potential to affect providers’ thoughts about telemedicine. Supervisors who fail to understand the application and abilities of telemedicine can make its use difficult for healthcare workers.^[43]



Contributions and Shortcomings of Telemedicine Satisfaction Research

Based on the available research, both patients and providers appear to be generally satisfied with telemedicine care. Providers, however, have specific concerns to address, many of which could be resolved through more effective training. Patients seem to find telemedicine to be a good solution to overcoming many of the barriers they regularly face while seeking medical care. Use of technology allows them to work around distances, travel time, and scheduling issues that can be common while seeking specialist care. Aside from removing challenges, patients additionally appreciate the support options presented by telemedicine. Being able to simultaneously consult one's general practitioner and a specialist opens a comprehensive method of care that is unavailable from seeing the two separately.

For their part, looking at provider satisfaction levels shows they are more subdued in their enthusiasm for telemedical care. While they do tend to appreciate the reduced amount of travel to consult and the education possibilities, their concerns about the capabilities of telemedicine need to be addressed. Better explanations about telemedicine equipment and its uses could help providers gain confidence in the projects and handle technological issues. Of course, this also points to a need for telecommunication equipment-makers to construct user-friendly, dependable products.

In addition, more training could help providers prepare for and accept the initial change that comes with beginning to provide care through telemedicine. Patients seem to appreciate and see a greater need for telemedicine care. Providers remain less interested. Perhaps this is because providers benefit less from the reduced travel and easier schedule. Patients' lives change significantly, but it is possible for providers to see only changes in routine. Patients are the ones saving hours spent in car seats and waiting rooms.

Methodological Challenges

Instruments used to collect satisfaction data are often untested. For example, a review of telemedicine studies that focus on dermatological issues shows that few satisfaction-measuring instruments were ever tested for validity.^[18,21] Ways to measure satisfaction need to be standardized in order to get an accurate picture of user satisfaction. Using newly created instruments that apply only to a specific field will seriously inhibit any kind of broader conclusions about telemedicine. For the quantitative studies, reliable, valid instruments would allow some comparison across projects. Tools that consistently measure what they purport to measure would provide results that offer a better picture of what actually happened. In addition, rigorously tested surveys offer a better means of evaluating hypotheses and research questions. Combined with more representative samples, effective survey instruments could provide more insightful and accurate data on telemedicine projects.^[71]

Survey instruments for satisfaction are often hampered from the lack of construct development as few researchers define the term in surveys.^[18] So many elements go into constructing the concept, an effective instrument needs to measure a number of factors, such as technology use, future adoption, and perceived risks and benefits.^[18]

The development of instruments needs to extend beyond topical areas. The very meaning of the word "satisfaction" can be a challenge. Some individuals define being satisfied simply as receiving adequate care, according to in-depth interviews conducted as part of Collins and O'Cothain's study. Other participants in their sample used the term "satisfaction" to mean less than adequate, that some aspects of healthcare could be better.^[72] For them, satisfaction referred to care that was less than optimal. Optimal care was labeled "better than average" to "outstanding." These terms conveyed that the provided healthcare was more than adequate. In other cases, researchers using the term "satisfaction" actually meant another term entirely. Allen *et al.* for example, used satisfaction and confidence with a telemedicine application to indicate acceptance.^[73] Satisfaction, for them, was merely one aspect of another term entirely.

The variety of responses – from satisfied for less-than-perfect care to very satisfied for optimal care – shows that a "continuum of satisfaction" exists and that researchers should take note.^[72] Consideration of these linguistically slight differences can help researchers address topics of patient concern by developing more refined instruments capable of better determining patient opinions.

Dearth of Theory

Lastly, perhaps the largest challenge to accurately examining satisfaction is the lack of a theoretical definition or frequently applied theory.^[74,75] This prevents a unified, accepted definition of satisfaction from developing. Currently, acceptance, utilization, future adoption, perception of risks and benefits, effectiveness and efficiency are all at some point mixed with satisfaction,^[18] despite obvious practical differences amongst the various concepts. Throughout studies, satisfaction represents different things, meaning that when various researchers express high satisfaction levels, they, in turn, mean different things. Examination of the concept of satisfaction needs to move beyond untested surveys asking broad questions. Researchers could then explore why patients and providers consider telemedicine to be satisfactory and what they mean when they use the term. Satisfaction is a multidimensional concept and needs to be treated as such.

The limited, short-term measures applied in most studies also fail to remove other biases that may influence results. For example, recording only initial or short-term impressions leaves the results open to the influence of telemedicine's novelty for many of the users. The newness of the experience could lead respondents to provide positive answers because of the uniqueness of the encounters. Another bias stems from the fact that



the projects described in the research literature tended to be funded by grants of some kind, making it possible that many of the users received free care during the study or gained previously unavailable access to medical specialists. Situations like these obviously could impact users' perceptions of telemedicine.

The population under examination in certain studies can also serve to limit the generalizability of the published research. For example, studies involving prison population happen in a distinct environment unlike the rest of the population.^[76] Other research concerns rural or urban populations lacking other access to health care.^[77,78] As a result, these groups are most likely to maintain different standards that cannot be applied to different population segments.

Rural populations, in particular, constitute a unique demographic group in a distinctive situation. It brings its own set of biases. Part of the high satisfaction levels reported by rural patients could stem from a perceived increase in quality of care that comes with telemedicine.^[79] Rural health services face great challenges in finding support because providers have access to fewer patients and can not develop large enough client bases to financially sustain their practices. This, of course, is aside from the consistent problem of finding physicians willing to work in the rural areas. These challenges in rural medicine can lead patients to perceive healthcare quality as poor, negatively affecting a community's ability to maintain medical services. As a result, high satisfaction rates reported by rural patients may not be a result of their actual feelings about telemedicine, but, rather, it could simply be a reaction to their negative perceptions about readily available local options.

The field of telemedicine has developed tremendously in the last 50 years, especially as technology and acceptance have improved. More effective examinations of patient and provider satisfaction could play a role in moving telemedicine forward over the next 50 years. Understanding what users want and why they want it can guide future projects and help explain patient outcome, the most important variable.

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