

The relationship between telemedicine tools and physician satisfaction, quality of care, and patient visits during the COVID-19 pandemic



Avijit Sengupta^{a,*}, Sumantra Sarkar^b, Anol Bhattacharjee^c

a
b
c

ARTICLE INFO

Telemedicine
Physician satisfaction
Quality of care
Patient visits
Regression

ABSTRACT

The objective of our study is to investigate the impacts of telemedicine technology and its specific tools on physicians' overall satisfaction, quality of care, and percentage of patient visits in ambulatory care settings after the COVID-19 lockdowns.

Data for our analysis was sourced from the 2021 annual National Electronic Health Records Survey (NEHRs), which included 1,875 complete questionnaire responses from physicians in the 2021 NEHRs. We used regression models to test the effects of telemedicine on physicians' overall satisfaction, quality of care, and percentage of patients' visits.

We report that telemedicine technology has significant positive effects on physicians' satisfaction with telemedicine and quality of care evaluation, both at an aggregate level and at the disaggregate levels of individual telemedicine features, and partially significant effects on patients' telemedicine visits.

Telemedicine features that contributed significantly to physician satisfaction and quality of care evaluation were telephone, videoconferencing, standalone telemedicine platform, and telemedicine platform integrated with EHR, while

physicians' experiences with telemedicine [13], and (5) comparison of service quality with traditional in-person care services [14]. However, the technological components or features of telemedicine (both communication media and platform) and their impacts on physicians' practices or experiences remain unexplored. Physicians and patients may not want to use this technology if they are dissatisfied with its features [15]. Though prior studies have investigated the impact of telemedicine on quality of care and patients' and physicians' satisfaction [e.g., 16–18], the relationships between specific telemedicine technology features and physicians' satisfaction, and quality of care evaluation or patient visits have received limited

(TelemQuality), and percentage of patients visits conducted through telemedicine technology as a proportion of overall ambulatory care visits (TelemVisitPct). Means and standard deviations of these

where β_i represents β_i or β_i or
for physician i , β_i in Equation (1) represents
the aggregate of all five telemedicine features, and

Beta coefficients (standard errors) for disaggregated models

Variable	TelemedSatisfaction	TelemedQuality	TelemedVisitPct
TelemedFeature: Telephone	0.149** (0.055)	0.154*** (0.041)	0.166*** (0.049)
TelemedFeature: Videoconference	0.146** (0.054)	0.146*** (0.040)	0.092 (0.048)
TelemedFeature: Telemedicine platform NOT integrated with EHR	1		

happened in person and only a few patient visits happened through telemedicine technology. This can possibly be attributed to different effect sizes for different ambulatory care clinics, suggesting a nonlinear relationship between the number of physicians practicing in a facility and percentage of patients' visits conducted through telemedicine

technology. However, future research should investigate these possibilities

Apart from that, comparison between three of our dependent variables also reveals that the dependent variable percentage of patients' visits conducted through telemedicine technology, TelemedVisitPct, is quite different from the other two dependent variables which are more subjective in nature.

For both aggregated and disaggregated model while other practice type (in comparison to private solo or group practice) have a significant positive impact on percentage of patients' visits conducted through telemedicine technology, it does not have any significant impact on both physicians' satisfaction and physicians' perception of the quality of care delivered using telemedicine. The dependent variable percentage of patients' visits conducted through telemedicine technology is quite different in nature from the other two dependent variables—physicians' satisfaction and physicians' perception of the quality of care delivered using telemedicine. While the other two dependent variables incorporate a lot of subjective evaluation and perception of physicians, patients' visits conducted through telemedicine technology is more objective in nature and it also depends on physicians' desire and ease of offering healthcare services through telemedicine. The value of this variable also indirectly depends on the number of other choices available to patients residing in an area. Therefore, though this outcome is surprising it is not completely implausible.

Besides that, it is quite likely that the other practice type incorporates government medical offices and clinics, ambulatory surgery centers, large government hospital outpatient departments, etc. which are better equipped with resources related to telemedicine technology and related informaticians which offers a better experience for patients, resulting higher percentage of patient visits through telemedicine technology. However, such resources don't necessarily significantly improve physicians' satisfaction and physicians' perception of the quality of care delivered using telemedicine.

This study is one of the earliest to examine the effects of telemedicine technology on physicians' satisfaction with telemedicine, physicians' quality of care evaluation, and patients' telemedicine visits during the COVID-19 pandemic. The rationale for this analysis is that if telemedicine usage is to continue after the pandemic, we must understand how it impacts physicians. It would be useful in identifying telemedicine features or capabilities which benefit and/or hinder physicians' utilization of this technology.

Based on our analysis of the data, we report that telemedicine technology has significant positive effects on physicians' satisfaction with telemedicine and quality of care evaluation, both at an aggregate level and at the disaggregate levels of individual telemedicine features, and partially significant effects on patients' telemedicine visits. Telemedicine features that contribute significantly to physician satisfaction and quality of care evaluation are telephone, videoconferencing, stand-alone telemedicine platform, and telemedicine platform integrated with EHR, while only telephone and stand-alone telemedicine platform seem to contribute significantly to patients' telemedicine visits.

Although there may have been some initial reservations about telemedicine-mediated online physician visits during the early stages of COVID, given the long-held tradition of face-to-face visits in the US healthcare system, our study confirmed that physicians are satisfied with this technology and believe that it increases quality of care. Our physician results are consistent with Saiyed et al.'s [25] study of telehealth at University of Pittsburgh Medical Center (UPMC) Pinnacle, which reported that 65 % of the physicians were satisfied with the physician-patient relationship during telehealth visits, and only 29 % were dissatisfied with that interaction. This study also found that physicians who experienced good video and audio quality were 3.68 times more likely to enjoy telehealth visits than those with less-than-optimal

video and audio quality. In a similar vein, Alqahtani et al. [26] reported that 59.6 % of the physicians in a