TELEHEALTH AND MEDICINE TODAY

ORIGINAL RESEARCH

Patient Satisfaction and Perception of Physician Empathy in Outpatient Community General Neurology Telemedicine

Karen A. Truitt, DO[1,2], Kogulavadanan Arumaithurai, MD[1,3] and Nathan Young, DO[1]

[1]Department of Neurology, Community Division, Mayo Clinic, Rochester, Minnesota, USA; [2]Mayo Clinic Health System, Red Wing, Minnesota, USA; [3]Mayo Clinic Health System in Albert Lea and Austin, Minnesota, USA

Corresponding Author: Karen A. Truitt, DO, Email: truitt.karen@mayo.edu

Keywords: empathy, general neurology, hub-and-spoke telemedicine, patient satisfaction, telemedicine, teleneurology

Abstract

Introduction: We assessed patient satisfaction and perception of physician empathy after implementing video telemedicine service for general neurology follow-up visits at two community spoke clinics serving patients in rural areas approximately 45 miles from a medical center hub. A hub-and-spoke telemedicine network is designed to extend specialty services and education into rural areas.

Methods: Consecutive patients who completed a telemedicine neurology follow-up visit from February 12, 2020, to January 13, 2021, at the spoke clinic in Red Wing, Minnesota, and from July 21, 2021, to January 21, 2022, at the spoke clinic in Austin, Minnesota were asked to complete a paper-based survey at the conclusion of their telemedicine visit. The neurologist conducted the telemedicine visit from the medical center hub site in Rochester, Minnesota, or from the neurologist's home using the InTouch (Teladoc Health™) operating system mobile telehealth platform. All patients previously completed an initial traditional face-to-face consultation at the spoke clinic, with the same neurologist performing the follow-up telemedicine visit. The two primary outcomes included Telemedicine Patient Satisfaction Measure and Consultation and Relational Empathy scores and mean total favorable survey responses.

Results: A total of 69 patients who participated in the telemedicine neurology follow-up visit and completed the survey were included in the final analysis. These included 31 patients at our clinic in Red Wing and 38 patients at our clinic in Austin. The mean Telemedicine Patient Satisfaction Measure score for all items on the scale of 12 to 60 was 55, with a range of 42 to 60. For all items, "agree" or "strongly agree" was rated, on average, 94% of the time. The mean Consultation and Relational Empathy score was 44 (range, 28–50), with a possible score between 10 and 50. For all items, "very good" or "excellent" was rated on average 90% of the time. Both neurologists conducting telemedicine visits reported that this model of care improved work-life balance with reduced travel time.

Discussion: We successfully implemented a telemedicine service for general neurology follow-up visits at two community spoke clinics serving patients in rural areas without compromising on perceived care. We were able to bridge the gap between patients' needs for local care and physicians' need for work-life balance. Patients' perception of physician empathy and satisfaction with telemedicine neurology follow-up visits was high. This telemedicine model avoids the barriers of limited internet access in rural areas and minimizes technology-related anxiety often present in telemedicine visits to patients' homes. This model allowed for high-quality neurological examination using a high-resolution pan-tilt-zoom camera on a mobile platform. Incorporating vital signs, nursing support, and lab services may have contributed to the patients' and neurologists' satisfaction. Our study supports our continuation and expansion of this telemedicine model in our community clinic spoke sites and may help improve access to neurological care for patients in rural areas.

Received: May 31, 2023; Accepted: June 30, 2023; Published: July 04, 2023

There is a growing shortage of neurologists in the U.S., accompanied by an increasing demand for neurological expertise due to population growth and an aging population.[1–3] There are about five neurologists per 100,000 people in the U.S., and an uneven geographic distribution of neurologists has resulted

in greater shortages in rural areas.[2,3] It is a challenge to recruit and retain neurologists to work in rural areas due to many potential barriers, which might include long travel distances, feelings of professional isolation for solo neurologists, limited support staff, and high volumes of consult requests with limited access to meet the demand for care.[4,5] Telemedicine is a promising practice that might help improve access to high-quality neurological care in rural locations while improving the work-life balance of the neurologist providing care.[6]

Within our Mayo Clinic Southeast Minnesota community practice, we have neurologists who live near our hub site, Mayo Clinic in Rochester, Minnesota, and travel to see patients in rural areas at Mayo Clinic Health System (MCHS) community hospitals and clinics that are approximately 45 miles (72 km) away. Total roundtrip driving time in good weather is about 1.5 to 2 h. Travel time is longer and less safe from late Fall to early Spring. Our neurologists sought increased flexibility to work closer to home without asking patients to travel to the hub site. Long distances to travel for traditional face-to-face care is especially challenging for individuals with limited transportation and financial resources, lack of family support or community assistance, and for those with disabilities, including cognitive or intellectual impairment.[7]

To mitigate these challenges, we implemented an outpatient telemedicine neurology service utilizing InTouch (Teladoc Health™) Operating System (OS), a mobile telehealth platform that allowed our neurologists to remain at their home or medical center hub while delivering care to patients located at the rural community clinic spoke site. We aimed to assess perceptions of physician empathy and patient satisfaction with this telemedicine model as well as the perceptions of practicing neurologists. Before starting, we confirmed that the reimbursement per visit for this telemedicine model was the same as for the traditional in-person encounter.[8]

Methods

Study Sites and Telemedicine Model

The study setting was a hub-and-spoke telemedicine environment involving the hub, Mayo Clinic Rochester, Minnesota, USA, and two spoke Mayo Clinic Health System (MCHS) clinics in Red Wing and Austin, Minnesota, USA, each located approximately 45 miles from the hub in towns serving rural communities. A hub-and-spoke telemedicine network is designed to extend specialty services and education into rural areas. This telemedicine model was implemented a month before widespread shutdowns in the U.S. because of the Coronavirus disease 2019 (COVID-19) pandemic.

Telemedicine follow-up visits were performed between the neurologist who had previously seen the patient for a traditional in-person consultation at the spoke site. The patient presented to the MCHS community clinic for the telemedicine visit while the neurologist connected from home or the hub site. Patients checked in with clinic staff for the visit. Patients were roomed by a licensed practical nurse (LPN) or medical assistant (MA) who obtained vital signs, including orthostatic blood pressures when indicated (e.g., patients with Parkinson's disease/parkinsonism); performed medication reconciliation; and prepared any necessary medication refills. When needed, the rooming staff remained present for the initial portion of the telemedicine visit. The patients were able to have laboratory or imaging services completed on-site before or after their telemedicine visit, if required.

The telemedicine visit was conducted using InTouch (Teladoc Health™) provider access software and a patient access device, InTouch Vici—a mobile telehealth platform linked via the internet over a secure broadband connection. The platform was positioned in the patient room and, when needed, moved to allow for a more comprehensive gait assessment. The InTouch Vici has a 36× zoom camera capable of 1080p video. It has a tilt range of 120 degrees and a pan range of 340 degrees. The provider remotely controls the camera, microphone, and speaker. The device is approved by the Food and Drug Administration and uses an internet connection that is Health Insurance Portability and Accountability Act (HIPPA) compliant.

Study design

The study protocol did not require approval by the Mayo Clinic Institutional Review Board as this was a quality improvement survey study. The survey was optional, and patients verbally consented. Patients were participating in a first-time telemedicine visit with their neurologist at the time of the survey. Using a prospective cohort study design, consecutive patients were administered a paper-based survey by rooming staff with instructions to the patient and caregiver (when present) to complete at the conclusion of the telemedicine visit. LPN or MA then collected the survey, and results were later reviewed and entered into REDCap (research electronic data capture)[9] by the neurologist who completed the telemedicine visit. Demographic information and the reason for follow-up were also included.

Patient Satisfaction Outcomes

Patient satisfaction was assessed using the Telemedicine Patient Satisfaction Measure (TPSM). This 12-question measure uses a five-point Likert scale and is scored as 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, or 5 = strongly agree. The TPSM score was calculated by summing the 12 items, yielding a possible score of 12 to 60, with higher scores reflecting greater patient satisfaction.[10]

Empathy Outcomes

Patient perception of physician empathy was assessed using the Consultation and Relational Empathy (CARE) questionnaire. Its 10 items are organized in a five-point Likert scale and are scored as 1 = poor, 2 = fair, 3 = good, 4 = very good, or 5 = excellent. The CARE total score was calculated by summing the 10 items with a possible score of 10 to 50, with higher scores reflecting greater perceived empathy.[11]

Analysis

Study data were collected, managed, and analyzed using REDCap tools hosted at Mayo Clinic.[9] Patient demographics and the primary reason for follow-up visit were tabulated and documented as frequency (*n*) and proportion (%). The mean scores and the percentage of responses for each item and all items combined in the TPSM and CARE questionnaire were calculated and summarized as frequency (*n*) and proportion (%).

Results

From February 12, 2020 to January 13, 2021, 33 patients at the MCHS community clinic in Red Wing, Minnesota, USA, and from July 21, 2021 to January 21, 2022, 38 patients at the MCHS community clinic in Austin, Minnesota, participated in a first-time telemedicine neurology follow-up visit with their neurologist and were asked to complete the survey at the conclusion of the telemedicine visit.

All but one patient completed the survey yielding a survey respondent rate of 99%. One patient inadvertently skipped one of the pages on the CARE questionnaire, so only the items answered for the TPSM were included. If a respondent skipped an item, then the average of all items was imputed for that response. One patient with a known delusional disorder rated one survey page with positive answers and the other with negative answers, so the entire survey for that patient was excluded due to the perception that the patient misunderstood the survey. In the end, 69 surveys were included in the analysis.

The mean patient age was 66 years (range 18–93). A total of 46% of patients were identified as female and 54% as male. A total of 94.2% were white/Caucasian, 4.3% Hispanic/Latino, and 1.4% black/African American (Table 1). The primary reasons for follow-up were Parkinson's disease/parkinsonism (36.2%), migraine (20.3%), dementia (17.4%), epilepsy (14.5%), and other (11.6%) (Table 2).

The mean TPSM scores (possible score of 12–60) were 55 (range 41–60), and for all items, "agree" or "strongly agree" was rated on average 94% of the time. 91% of patients indicated that care was as good as a traditional face-to-face visit (Table 3). The mean CARE scores (possible score of 10–50) were 44 (range 28–50), and for all items, "very good" or "excellent" was rated on average 90% of the time (Table 4). Both neurologists conducting telemedicine visits with this model reported decreased feelings of burnout and improved work-life balance with reduced travel time.

Table 1. Patient demographics ($N = 69$)

Patient demographics	Sample size (*n*)	% of total sample
Gender		
• Male	37	53.6
• Female	32	46.4
Race		
• White/Caucasian	65	94.2
• Hispanic/Latino	3	4.3
• Black/African American	1	1.4
Age (yrs)		
• 18–29	4	5.8
• 30–49	6	8.6
• 50–64	17	24.6
• 65+	42	61

Table 2. The primary reason for follow-up ($N = 69$)

Diagnosis	Patients (*n*)	Sample (%)
Parkinson's disease/Parkinsonism	25	36.2
Migraine/headache	14	20.3
Dementia	12	17.4
Epilepsy	10	14.5
Multiple sclerosis	2	2.9
Myasthenia gravis	2	2.9
Multiple system atrophy	1	1.5
Chronic inflammatory demyelinating polyneuropathy	1	1.5
Normal pressure hydrocephalus	1	1.5
Essential tremor	1	1.5

Discussion

In our telemedicine model, which utilized the InTouch (Teladoc Health™) mobile telehealth platform to provide care at our community spoke clinics, our patients' perception of physician empathy and satisfaction with first-time telemedicine neurology follow-up visits with their neurologist was high. Furthermore, 91% indicated that the telemedicine visit was as good as a face-to-face visit. For physicians, the model allowed flexibility to work remotely while minimizing the time needed to commute to a rural site.

While telemedicine for the care of stroke patients is established,[12] the role of telemedicine in general neurology or other neurology subspecialties is less clear. Before 2020, a limited number of studies across multiple neurology subspecialties reported the non-inferiority of telemedicine evaluations compared with traditional face-to-face evaluations regarding patient satisfaction. Reported benefits included increased access to care and reduced costs.[13]

Table 3. Telemedicine patient satisfaction measure ($N = 69$)

Response(score): TPSM Item	Strongly agree (5) *n* (%)	Agree (4) *n* (%)	No opinion (3) *n* (%)	Disagree (2) *n* (%)	Strongly disagree (1) *n* (%)	Mean score*
Teleneurology visit allowed me to see my doctor sooner.	22 (31.9)	24 (34.8)	22 (31.9)	0 (0)	1 (1.4)	4.0
I felt comfortable talking with the doctor.	44 (63.8)	22 (31.9)	2 (2.9)	0 (0)	1 (1.4)	4.6
I could hear clearly.	47 (68.1)	21 (30.4)	0 (0)	1 (1.4)	0 (0)	4.7
The doctor spoke in a professional manner.	55 (79.7)	13 (18.8)	1 (1.4)	0 (0)	0 (0)	4.8
I could clearly see the doctor.	55 (79.7)	14 (20.3)	0 (0)	0 (0)	0 (0)	4.8
The doctor looked professional.	52 (76.5)	15 (22.1)	1 (1.5)	0 (0)	0 (0)	4.7
The doctor was intelligent and capable.	54 (78.3)	14 (20.3)	1 (1.4)	0 (0)	0 (0)	4.8
The telemedicine equipment did not make me feel more anxious.	35 (50.7)	27 (39.1)	6 (8.7)	1 (1.4)	0 (0)	4.4
The care I received was as good as a face-to-face visit.	35 (50.7)	28 (40.6)	3 (4.3)	3 (4.3)	0 (0)	4.4
I feel confident that my information was confidential.	43 (62.3)	25 (36.2)	1 (1.4)	0 (0)	0 (0)	4.6
The doctor and nursing staff work together as a team.	48 (69.6)	19 (27.5)	2 (2.9)	0 (0)	0 (0)	4.7
Overall, I was satisfied with the teleneurology visit.	52 (76.5)	14 (20.6)	2 (2.9)	0 (0)	0 (0)	4.7
Mean response for all items.	**65.7%**	**28.6%**	**4.9%**	**0.6%**	**0.2%**	**4.6**

*The mean score for all items on the scale of 12 to 60 was 55, with a range of 42 to 60. TPSM: Telemedicine Patient Satisfaction Measure.

Table 4. Consultation and relational empathy measure ($N = 68$)

Response (score): CARE item	Excellent (5) *n* (%)	Very good (4) *n* (%)	Good (3) *n* (%)	Fair (2) *n* (%)	Poor (1) *n* (%)	Mean score*
Made you feel at ease	40 (58.8)	19 (27.9)	7 (10.3)	2 (2.9)	0 (0)	4.4
Let you tell your story	42 (61.8)	20 (29.4)	6 (8.8)	0 (0)	0 (0)	4.5
Listening	45 (66.2)	17 (25)	4 (5.9)	1 (1.5)	1 (1.5)	4.5
Was interested in you as a whole person	45 (66.2)	17 (25)	6 (8.8)	0 (0)	0 (0)	4.6
Fully understood your concerns	44 (64.7)	19 (27.9)	5 (7.4)	0 (0)	0 (0)	4.6
Showed care and compassion	47 (69.1)	15 (22.1)	6 (8.8)	0 (0)	0 (0)	4.6
Was positive	45 (67.2)	18 (26.9)	4 (6)	0 (0)	0 (0)	4.5
Explained things clearly	46 (67.6)	17 (25)	5 (7.4)	0 (0)	0 (0)	4.6
Helped you take control	41 (62.1)	15 (22.7)	10 (15.2)	0 (0)	0 (0)	4.3
Made a plan of action with you	48 (70.6)	13 (19.1)	6 (8.8)	1 (1.5)	0 (0)	4.6
Mean response for all items:	**65.4.%**	**25.1%**	**8.7%**	**0.6%**	**0.2%**	**4.5**

*The mean score for all items on the scale of 10 to 50 was 44, with a range of 28 to 50. CARE: Consultative and Relational Empathy Measure.

Our Mayo Clinic Colleagues' results in a stroke telemedicine study[10] were similar to this study regarding patients' perception of physician empathy, with mean CARE and TPSM scores of 49 and 54, respectively. In that study, telemedicine consults were done utilizing a similar mobile telehealth platform with a high-resolution pan-tilt-zoom camera. Another study of patient satisfaction with ambulatory video telemedicine and telephone visits cited negative patient experiences with an inability to complete a neurological examination.[14] Our findings suggest that a mobile telehealth platform with a high-resolution pan-tilt-zoom camera may contribute to patient and neurologist satisfaction.

Strengths of The Telemedicine Model

The patients were deemed appropriate for telemedicine follow-up by the neurologist who had previously seen the patient for a traditional face-to-face consultation. This eliminated the chance that a patient unsuitable for telemedicine might be scheduled. These telemedicine visits were conducted at the local community clinic where every aspect of the visit, except for the neurologist being present on video, was the same as a traditional face-to-face visit. This model of telemedicine avoids the barriers of poor internet connection and minimizes technology-related anxiety. In addition, this model allowed for high-quality neurological examination complemented by vital signs and lab services, thus contributing to the neurologists' and patient satisfaction. In addition, the ability to adjust the volume of the speakers for individuals who were hard of hearing was beneficial.

Cognitive assessments were easily conducted, and the neurologist could easily adjust speaker volume and use the zoom camera to view patient drawings. High-quality gait assessment was possible with the mobile telemedicine platform, and the ability to use the pan-tilt-zoom camera to visualize tremor and eye movements was especially important in evaluating our patients with Parkinson's disease/parkinsonism. For our patients, particularly those with epilepsy, it was convenient to present to the local clinic for the telemedicine visit and to have labs drawn when needed. An unforeseen benefit was that the neurologist and patient could be unmasked when in a room alone during the time of widespread COVID-19 when face masks were required.

Limitations of The Study

This telemedicine care model was initially implemented in February 2020, the month before the COVID-19 pandemic became widespread across the U.S. and when telemedicine visits at patients' homes were rapidly implemented. Because of this, our patients may have been more comfortable with the telemedicine visit. Our study sample was representative of a typical general neurology clinic patient population. There was a lack of racial and ethnic diversity in the patient population, which is consistent with the lack of diversity in the rural patient population in the region sampled. The lack of racial and ethnic diversity in our sample raises questions about the acceptance of this telemedicine model in the broader patient population.

The biggest limitation of this study was the small sample size. Several factors accounted for this, including simultaneous implementation of telemedicine visits to patients' homes, patients' fears about leaving their homes in the early days of the COVID-19 pandemic, and limited rooming staff at spoke clinics. Other limitations include only two neurologists conducting telemedicine follow-up visits to community spoke clinics and only two community spoke clinics implementing this telemedicine model. We did not compare our telemedicine visits at the spoke clinics to telemedicine visits to patients' homes, which limits any conclusion we might draw about our model of care resulting in higher patient satisfaction or perception of physician empathy.

Conclusion

InTouch (Teladoc Health™) OS mobile telehealth platform was utilized to conduct telemedicine follow-up care from a medical center hub to established general neurology patients at community clinic spoke sites. The platform was well received by this rural patient population, who had a range of conditions typical of a general neurology outpatient practice. The perception of physician's empathy and patient satisfaction with telemedicine was high. The overwhelming majority of patients felt the telemedicine visit was as good as a traditional face-to-face visit.

We successfully implemented telemedicine service to bridge the gap between patients' needs for local care and physicians' need for work-life balance without compromising perceived care. Going forward, more study is needed to assess clinical outcomes, cost and time savings, and access to care compared with traditional in-person visits. This telemedicine model allows for the virtual care of patients who do not have a computer or internet access. Advantages over virtual home visits include a mobile telehealth platform with a high-resolution pan-tilt-zoom camera that closely simulates a traditional clinic visit with rooming staff to obtain vital signs and access to lab and radiology services. Neurologists' travel time was reduced, leading to a reduction in feelings of burnout and improved work-life balance. Our results support our continuation and expansion of this telemedicine model in our community hospital and clinic spoke sites and may help to improve access to neurological care for patients in rural areas where access to neurology is poor and projected to worsen.[1]

Funding

None.

Disclosure Of Financial And Non-Financial Relationships And Activities

No relevant disclosures.

Conflict of Interest

No relevant disclosures.

Contributors

Dr. Truitt conceived of and designed the study, acquired, analyzed, and interpreted data and drafted the work, revised it critically for important intellectual content and final approval of the version to be published. Dr.

Arumaithurai acquired, analyzed, and interpreted the data and contributed to drafting the work, revised it critically for important intellectual content and final approval of the version to be published. Dr. Young interpreted data, contributed to drafting the work, revised it critically for important intellectual content and final approval of the version to be published.

Acknowledgments

Andrea Leep-Hunderfund, MD advised on study design. Lisa Weckerling, LPN and Angie M. McKenna, CMA administered the surveys to our patients.

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