Journal of Immigrant and Minority Health (2022) 24:1590–1593
https://doi.org/10.1007/s10903-022-01381-1

BRIEF COMMUNICATION

Disparities in Telehealth use During the COVID-19 Pandemic

K. H. Vincent Lau[1,2] · Pria Anand[1,2] · Alex Ramirez[1,2] · Sheila Phicil[1,2]

Accepted: 23 June 2022 / Published online: 17 August 2022

Abstract
The coronavirus 2019 pandemic led to rapid expansion of outpatient telemedicine. We sought to characterize patient factors influencing outpatient teleneurology utilization at an urban safety-net hospital. We reviewed all neurology televisits scheduled between June 15, 2020 to April 15, 2021. We used the chi-squared test and multivariate logistic regression to characterize patient demographic factors associated with televisit completion and video use. Of 8875 scheduled televisit encounters, 7530 were completed successfully, 44% via video. Non-English speaking patients, Black patients, Latinx patients, and those with a zip code-linked annual income less than $50,000 were less likely to successfully complete a scheduled televisit. The same demographic groups other than Latinx ethnicity were also less likely to use the video option. Our study found unequal telehealth utilization based on patients' demographic factors. Currently declining telemedicine reimbursement rates asymmetrically affect audio-only visits, which may limit telehealth access for vulnerable patient populations.

Keywords Disparities · Healthcare access · Telehealth · COVID-19

Background

The coronavirus 2019 (COVID-19) pandemic has led to the rapid adoption of outpatient telemedicine in both primary care and many subspecialties. This shift was aided by revisions to the Centers for Medicare and Medicaid Services (CMS) 1135 waiver structure in March 2020, which increased reimbursement across telehealth services and permitted incorporation of non-HIPAA vendors in telehealth infrastructure [1]. There was early speculation that expansion of telemedicine could improve access to subspecialty care, especially for patients in rural areas and those with limited access to transportation [2]. However, important studies have found that telehealth may paradoxically widen inequities in health access [3], secondary to high costs and limitations in patients' digital and health literacy [4]. These findings encompass both overall utilization of telehealth and nuances such as the use of video-enhanced televisits.

Many existing studies focus on state-level data, with few studies specifically characterizing the factors that influence telemedicine access among historically underserved communities, including racial and ethnic minorities. Moreover, although teleneurology is a particular area of interest given that patients with chronic neurologic conditions may have impaired mobility or other limitations that impede access to in-person care, no existing studies have focused specifically on neurologic health disparities as they relate to telemedicine. Although thought to be in its infancy with the exception of telestroke, teleneurology boasts improved access to subspecialty neurologic care especially given the upcoming shortage of neurologists, as well as team-based approaches to healthcare delivery for neurologic disorders spanning multiple subspecialties. Intuitively, its major drawback is the compromised physical examination [5]. In this study, we aimed to characterize and quantify inequities in telemedicine use in the outpatient neurology clinic of an urban safety-net hospital.

K. H. Vincent Lau and Pria Anand have contributed equally to this work.

✉ K. H. Vincent Lau
vilau@bu.edu

[1] Department of Neurology, Boston University School of Medicine, Boston, MA, USA

[2] Department of Neurology, Boston Medical Center, Boston, MA, USA

Methods

Setting

This observational study was conducted in the outpatient neurology clinics of Boston Medical Center (BMC), an academic safety-net medical center in Boston, Massachusetts. As the largest safety-net hospital in New England, over half of BMC's patients come from households making no more than $25,000 annually, two-thirds identify as racial and/or ethnic minorities, and over one-third are born outside of the U.S. Seventy-two percent of BMC's patient visits are made by underserved low-income and elderly patients who rely on government payors for insurance coverage [6]. During the study period, Massachusetts was third among U.S. states for both overall number of cases of COVID-19 and cases per capita, and BMC carried the second-highest COVID-19 caseload in the state [7].

Theoretical Framework

While the effect of race and ethnicity on health access has long been studied, the use of zip codes as a surrogate marker for income is less well-established [8]. It is thought that area-based measures, including zip-code-based measures, not only reflect the socioeconomic position of the population within an area but also capture community-wide resources that may affect the health outcomes of its inhabitants [9]. Thus, zip plus 4 codes have been used in epidemiological research, including for disparities related to the COVID-19 pandemic [10].

Data Collection

Using the electronic medical record, we extracted demographic information for all adult neurology encounters scheduled for a televisit from June 15, 2020 to April 15, 2021, including age, gender, race, ethnicity, language, and address. We used patients' addresses to identify zip plus 4 codes, which were then used to determine median household income using the American Community Survey. For each encounter, we used billing information to determine whether the televisit was successfully completed (as opposed to designated as no show or late cancellation) and whether it was conducted via video or only audio.

Data Analyses:

All analyses were completed using Microsoft Excel™ and Intel SPSS^{R}. The differences in patient characteristics associated with (1) televisit completion and (2) video-enhanced visits (versus audio-only) were compared using the chi-squared test. Multivariable logistic regression was used to characterize the patient characteristics associated with these outcomes.

Ethics

This study was found exempt from full institutional review board review by the Boston University Medical Campus Institutional Review Board under the category of research involving only the review of records collected for non-research purposes. Individual patient consent was not deemed necessary.

Results

A total of 8875 televisit encounters were scheduled during the study period, among which 7530 were completed successfully, 3344 via video (44%) and 4186 via telephone (56%). Demographic information is shown in Table 1. On unadjusted analysis, there were no differences in televisit completion rates based on gender ($p = 0.53$) or age ($p = 0.07$). Non-English speaking patients, Black patients, Latinx patients, and patients with zip code-linked annual

Table 1 Demographics information of patients scheduled for neurology televisits from June 15, 2020 to April 15, 2021

Characteristic	N = 8875
Age in years	
Median (range)	51 (15–101)
Gender	
Male	3427 (39%)
Female	5448 (61%)
Race/ethnicity	
White	3054 (34%)
Black	2715 (31%)
Latinx	942 (11%)
Asian	163 (2%)
Other or declined to answer	2001 (22%)
Language	
English	6283 (71%)
Spanish	1394 (15%)
Portuguese	269 (3%)
Haitian-Creole	254 (3%)
Other	675 (8%)
Median household annual income[a]	
< $50,000	3010 (34%)
$50,000-$100,000	4065 (46%)
> $100,000	1800 (20%)

[a]Based on zip code

income less than $50,000 were less likely to complete the televisit (82% vs. 86%, p < 0.001; 83% vs. 85%, p = 0.003; 81% vs. 85%, p < 0.001; 82% vs. 86%, p < 0.001 respectively). There was no difference in the rate of video televisits (compared with audio-only) based on gender (p = 0.45), although younger patients were slightly more likely to complete a video-enhanced televisit (mean age 49 vs. 52, p < 0.001). Non-English-speaking patients, Black patients, Latinx patients, and patients with zip code-based annual income less than $50,000 were less likely to complete a video-enhanced televisit (33% vs. 95%, p < 0.001; 42% vs. 45%, p = 0.014; 34% vs. 45%, p < 0.001; 62% vs. 90%, p < 0.001 respectively).

Based on multivariable analysis, Black patients, Latinx patients, non-English speaking patients, and those with a lower household income were less likely to successfully complete a televisit. Older patients, Black patients, non-English speaking patients, and those with a lower household income were less likely to use the video option and more likely to complete audio-only televisits. Independent factors used for multivariable analysis are shown in Table 2.

Discussion

Our study examining neurology televisits during the COVID-19 pandemic found that inequities in telehealth utilization persisted throughout the study period. Access to video-enhanced televisits was influenced by race, household income, English proficiency, and age. This disparity is particularly troubling given that large discrepancies currently exist between reimbursement rates for video-enhanced versus audio-only televisits, and CMS has signaled that it may stop reimbursement for audio-only visits altogether past the early phases of the pandemic [11].

The reimbursement disincentive for hospital systems to provide audio-only televisits limits access for Americans without broadband internet, most recently estimated at 42 million [12]. Lack of internet access may reflect financial instability, housing insecurity, or geographic limitations. One telehealth-based study found that nearly 40% of rural residents lacked high-speed internet access compared to only 3% in urban areas [13], paradoxically limiting access to telemedicine for a population that may also have difficulty accessing in-person care [14]. From a practical standpoint, a limited internet bandwidth may mean that in order for one family member to engage in a televisit, another has to sacrifice school or work during the same time period [15].

In an effort to improve rates of video-enhanced televisits, BMC has increased telehealth interpreter services, extended support for patients who encounter technical difficulties, and introduced pre-visit virtual rooming via medical assistants. Such interventions may aid in mitigating disparate access to care but require significant investment in time and personnel costs. At the local level, some municipalities have offered free or discounted WiFi. Experts have also proposed advertising telehealth services through diverse media outlets frequented by medically underserved communities and enlisting volunteers to help patients with low technological literacy navigate telehealth [15]. These efforts are important as individual communities may have differing needs regarding telehealth access, despite close geographic proximity [16, 17].

However, institutional and local endeavors are limited in scope and sustainability, and policy changes at the state and national levels are essential to create lasting change. Increasing reimbursement rates for audio-only televisits or

Table 2 Multivariate logistic regression on patient factors associated with completed televisits and video-enhanced televisits from June 15, 2020 to April 15, 2021

	Completed televisit (vs. no show or late cancelation)			Video-enhanced televisit (vs. audio-only)		
	Odds Ratio	95% CI	*P* value	Odds Ratio	95% CI	*P* value
Age	1.00	1.00–1.01	0.06	0.99	0.99–0.99	< 0.001*
Female gender	1.02	0.90–1.14	0.79	1.09	0.99–1.19	0.08
Race/ethnicity (in reference to White)						
Black	0.76	0.61–0.92	< 0.001*	0.86	0.74–0.98	0.015*
Latinx	0.79	0.57–0.99	0.03*	0.85	0.67–1.03	0.09
Asian	1.17	0.68–1.65	0.54	1.33	0.97–1.68	0.12
Other	0.93	0.75–1.10	0.40	0.99	0.85–1.13	0.94
Language (in reference to English-speaking)						
Non-English	0.73	0.59–0.88	< 0.001*	0.55	0.43–0.67	< 0.001*
Median household annual income based on zip code (in reference to > $100,000)						
< $50,000	0.80	0.63–0.98	0.02*	0.62	0.48–0.76	< 0.001*
$50,000-$100,000	0.96	0.79–1.13	0.64	2.09	1.89–2.28	< 0.001*

*Statistically significant

offering financial compensation to safety-net hospitals would prevent the penalization of those health systems that offer care to vulnerable populations who may not have access to video visits or require expensive additional services such as technical assistance or medical interpretation. Expanding reimbursement for asynchronous communication via web portals would also increase access for those patients who can communicate only through community WiFi hotspots or when other family members do not have the need for internet use.

The main limitations of our study include errors in recording and coding demographic information, as well as potential inaccuracies in providers' billing selections that would affect data on televisit completion. Our study was also conducted at a single safety-net hospital, which has specific challenges not generalizable to all institutions.

New Contribution to the Literature

The COVID-19 pandemic has already widened pre-existing chasms in healthcare access and outcomes, disproportionately affecting historically underserved communities in a multitude of ways [18]. Past the early phases of the pandemic, the expansion of telehealth services that it facilitated is likely to become a permanent part of the national health infrastructure and has the potential to either increase or impede access to healthcare for vulnerable communities. Our study found inequities in telehealth utilization based on race, household income, and English proficiency, highlighting the importance that ongoing decisions made at the systems level reflect a commitment to health equity.

Funding The authors did not receive support from any organization for the submitted work.

Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare they have no financial interests.

References

1. Centers for Medicare and Medicaid Services. Medicare telemedicine health care provider fact sheet. 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet. Accessed 15 June 2021.
2. McGinley MP, Ontaneda D, Wang Z, et al. Teleneurology as a solution for outpatient care during the COVID-19 pandemic. Telemed J e-Health. 2020;26(12):1537–9.
3. Eberly LA, Khatana SAM, Nathan AS, et al. Telemedicine outpatient cardiovascular care during the COVID-19 pandemic: bridging or opening the digital divide? Circulation. 2020;142(5):510–2.
4. Truong M, Yeganeh L, Cook O, et al. Using telehealth consultations for healthcare provision to patients from non-Indigenous racial/ethnic minorities: a systematic review. JAMIA. 2022;29(5):970–82.
5. Wechsler LR. The teleneurology revolution. Ann Neurol. 2020;88(4):656–7.
6. Boston Medical Center. Boston Medical Center Home Page. 2021. https://www.bmc.org/. Accessed 15 June 2021.
7. Centers for Disease Control and Prevention. COVID Data Tracker. 2020. https://covid.cdc.gov/covid-data-tracker/. Accessed 15 June 2021.
8. Krieger N, Chen JT, Waterman PD, et al. Geocoding and monitoring of US socioeconomic inequalities in mortality and cancer incidence: does the choice of area-based measure and geographic level matter?: The Public Health Disparities Geocoding Project. Am J Epidemiol. 2002;156(5):471–82.
9. Thomas AJ, Eberly LE, Davey Smith G, Neaton JD. ZIP-code-based versus tract-based income measures as long-term risk-adjusted mortality predictors. Am J Epidemiol. 2006;164(6):586–90.
10. Chen JT, Krieger N. Revealing the unequal burden of COVID-19 by income, race/ethnicity, and household crowding: US county versus zip code analyses. JPHMP. 2021;27(Suppl 1):S43-s56.
11. Centers for Medicare and Medicaid Services. Proposed policy, payment, and quality provisions changes to the Medicare physician fee schedule for calendar year 2021. 2020. https://www.cms.gov/newsroom/fact-sheets/proposed-policy-payment-and-quality-provisions-changes-medicare-physician-fee-schedule-calendar-year-4. Accessed 15 June 2020.
12. Busby JTJ, BroadbandNow Team. FCC reports broadband unavailable to 21.3 Million Americans, BroadbandNow study indicates 42 million do not have access. 2021. https://broadbandnow.com/research/fcc-underestimates-unserved-by-50-percent.
13. Hirko KA, Kerver JM, Ford S, et al. Telehealth in response to the COVID-19 pandemic: implications for rural health disparities. J Am Med Inform Assoc. 2020;27(11):1816–8.
14. Jaffe DH, Lee L, Huynh S, Haskell TP. Health inequalities in the use of telehealth in the United States in the lens of COVID-19. Popul Health Manag. 2020;23(5):368–77.
15. Katzow MW, Steinway C, Jan S. Telemedicine and health disparities during COVID-19. Pediatrics. 2020;146(2):e20201586.
16. Ortega G, Rodriguez JA, Maurer LR, et al. Telemedicine, COVID-19, and disparities: policy implications. Health Policy Technol. 2020;9(3):368–71.
17. Lame M, Leyden D, Platt SL. Geocode maps spotlight disparities in telehealth utilization during the COVID-19 pandemic in New York City. Telemed J e-Health. 2021;27(3):251–3.
18. Tirupathi R, Muradova V, Shekhar R, Salim SA, Al-Tawfiq JA, Palabindala V. COVID-19 disparity among racial and ethnic minorities in the US: a cross sectional analysis. Travel Med Infect Dis. 2020;38:101904.