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RACE AND ETHNICITY DISPARITIES (L. BREWER, SECTION EDITOR)

"Can you see my screen?" Addressing Racial and Ethnic Disparities in Telehealth

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Abstract

Purpose of Review Telehealth is an innovative approach with great potential to bridge the healthcare delivery gap, especially for underserved communities. While minority populations represent a target audience that could benefit significantly from this modern solution, little of the existing literature speaks to its acceptability, accessibility, and overall effectiveness in underserved populations. Here, we review the various challenges and achievements of contemporary telehealth and explore its impact on care delivery as an alternative or adjunct to traditional healthcare delivery systems.

Recent Findings Given the COVID-19 pandemic, there has been a rapid acceleration in telemedicine adoption. Recent studies of telemedicine utilization during the pandemic reveal stark disparities in telemedicine modality use based on race, socioeconomic status, geography, and age.

Summary While telehealth has great potential to overcome healthcare obstacles, the *digital divide* stands as a challenge to equitable telehealth and telemedicine adoption. Achieving health equity in telehealth will require the mobilization of resources, financial incentives, and political will among hospital systems, insurance companies, and government officials.

Keywords Telehealth · Disparities in medicine · Race and ethnicity · Healthcare disparities

Introduction

While many challenges have emerged from the global impact of the SARS CoV-2 coronavirus disease 2019 (COVID-19) pandemic, the most egregious of them include the disproportionate burden conferred upon racial and ethnic minorities [1]. As the infection spread worldwide, not only did COVID-19 unveil the significant racial and ethnic health disparities but it further exacerbated these disparities as more black and brown individuals disproportionately succumbed to the disease [1]. To this point, urgent attention is now focused on how to bridge the access divide, which many view as the ill-intended consequence of historical oppression and current socio-political barriers to quality care.

Telehealth has been identified as a tenable adjunct and, in some cases, an alternative to in-person office or emergency department visits [2–4]. Many propose that this integration of technology and medicine presents an opportunity

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to increase access and reduce barriers for individuals with limited resources. Notwithstanding its promise, telehealth has not entirely eradicated disparities in health access. Some even argue that telehealth has further widened the aforementioned disparities by only being accessible to individuals who can afford internet and modern electronic devices [5]. How then do we achieve health equity during an era when health access is critically more important than in any other time in contemporary history given the global pandemic?

Here, we explore the features of telehealth and evaluate the deficits of this platform in reaching marginalized populations. We then provide possible solutions for health disparities through practical approaches to infusing telehealth into modern-day healthcare delivery.

Exploring the Context of Telehealth

Broadly defined as the delivery and facilitation of health and health-related services, telehealth includes provider and patient education, health information services, self-care (e.g., mental health services) via telecommunications, and digital communication technologies [6]. Though used interchangeably with telemedicine, telehealth has evolved to encapsulate a broader array of digital healthcare activities and data monitoring devices. Collectively, the term covers all components and activities of healthcare that are conducted through telecommunications technology [7]. Telemedicine refers to the deployment of internet-technology to diagnose, treat, and provide clinical care to patients who are geographically separated from providers [7]. Healthcare education, wearable devices that record and transmit vital signs, and provider-to-provider remote communication are examples of telehealth activities and applications that extend beyond telemedicine's scope.

Building a Bridge with Telehealth

Telehealth has a long history of decentralizing healthcare and bringing care directly to people in a variety of locations. For example, a Lancet article from 1879 discussed the utility of telephone visits in reducing unnecessary in-person office visits [8]. Similarly, telehealth was commonly used for ship to shore communication to relay medical advice to sea captains [9]. As technology has advanced, so too has telehealth. There are now numerous mechanisms by which disease management can be shifted from the hospital or clinic setting to the community via telehealth. Clinicians are now overcoming distance challenges by using real-time video communication platforms. Traditionally, video conferencing technology has been used to provide care for inmates, military personnel, and patients in rural locations. Also, healthcare suppliers, such as Kaiser Permanente and the Department of Veterans Affairs, use telehealth modalities to increase healthcare services and promote better quality of care [10, 11, 12•].

Clinicians are also using Remote Patient Monitoring (RPM), which involves collecting, transmitting, and evaluating patient health data through electronic devices. For example, wearables and other electronic monitoring devices are frequently used to collect and transfer vital sign data, including blood pressure (BP), cardiac statistics, oxygen levels, and respiratory rates. These measurements not only enhance the ability of providers to capture more complete data about the patients they serve but they also offer an opportunity for patients to be monitored at home or in community settings as opposed to hospitals or clinics. Herein lies not only an opportunity for convenience but also cost-savings and equity.

How Telehealth Can Overcome Healthcare Obstacles

During the pandemic, telehealth played a critical role in maintaining healthcare access for millions of Americans. Numerous lessons were learned about how providers used telehealth during the pandemic's peak to overcome various healthcare delivery obstacles. To illustrate this, we present a real-world case of a 68-year-old non-English-speaking man admitted to the hospital in April 2020 with severe COVID-19 pneumonia. Upon discharge, he was enrolled in a virtual nursing and vital signs monitoring program. Post-discharge follow-up visits were conducted via video with assistance from the patient's children who helped him navigate the telemedicine landscape. Given his persistent dyspnea, he was asked to monitor his vitals daily. The use of telehealth, in this case, helped to overcome several barriers to care. The first obstacle was the inability to be seen in-person due to the surging pandemic, limited mobility, and positive COVID-19 status. Another barrier was technology adoption, facilitated by his children and the assistance of implementation ambassadors who taught the patient how to engage in telemedicine successfully.

Additionally, for this patient, measuring his vitals regularly was very important. He was given a toolkit that included an electronic BP machine and pulse oximeter linked and integrated into the electronic medical record. To overcome the language barrier, the telemedicine platform had language interpretation capabilities. Regarding cost, the Centers for Medicare and Medicaid Services (CMS) provided telemedicine waivers during the pandemic for telemedicine parity [13]. Additionally, the patient received the vitals monitoring toolkit for free through a hospital pilot program [14]. Thus, telehealth was extremely helpful in making care accessible to this patient, but it also required a significant amount of resources. This case highlights how useful and effective telehealth can be in improving access to healthcare and how it could inadvertently perpetuate disparities without sufficient financial support from hospital systems, insurers, and government entities to address social determinants of health and the digital divide.

The Digital Divide

While telehealth has great potential to overcome healthcare obstacles, the digital divide stands as a challenge to equitable telehealth and telemedicine adoption. Broadly, the digital divide refers to the uneven distribution of information and communication technologies in society. The digital divide incorporates differences in both access (first-level digital divide) and usage (second-level digital divide) of digital devices and the internet among various groups [5, 15].

The first-level digital divide can be further subdivided into (1) physical access such as access to broadband internet and smartphone devices and (2) material access, which refers to the ability to maintain services over time by paying maintenance expenses [5]. Factors that influence material access include education level, employment, socioeconomic status (SES), and social network. The second-level digital divide refers to internet skills, which more specifically refer to using the internet effectively. For example, the ability to initiate online sessions, find reliable information, and share content [5, 15]. Additionally, the second-level digital divide describes digital literacy or a person's ability to determine the trustworthiness of information online and safeguard their data [5, 15]. Digital literacy and the second-level digital divide overlap significantly with the concept of eHealth literacy, which is defined as "the ability to seek, find, understand and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" [16].

Based on Pew Research Center data, when it comes to the first-level digital divide, low-income Americans are more likely to report a concern about paying home broadband and cell phone service bills [17]. Additionally, lower-income Americans have lower levels of technology adoption. Americans who make less than $30,000 per year are less likely to own digital devices such as smartphones, laptops, tablets, and home broadband [17]. There are racial/ethnic digital device ownership disparities as well. Regarding computer ownership, 82% of Whites, 58% of Blacks, and 57% of LatinX own a desktop or laptop computer [18]. When it comes to home broadband, 70% of Whites, 66% of Blacks, and 61% of LatinX reported having home broadband [18]. For smartphone ownership, 82% of Whites, 80% of Blacks, and 79% of LatinX reported owning smartphones [18]. Although there are similar rates of smartphone ownership, Blacks, LatinX, and lower-income smartphone users are about twice as likely as Whites to cancel or discontinue service due to expense [18]. Notably, the Pew Research Center found that 29% of respondents who took the survey in Spanish reported not using the internet frequently compared to 14% of all adults [19]. Additionally, there are significant differences in smartphone ownership between LatinX born inside vs. outside of the USA. Up to 87% of US-born LatinX report owning a smartphone compared to only 69% of LatinX born abroad [19].

Disparities in access to the internet and technology are also seen when considering geography. Americans who live in rural areas report low rates of desktop/laptop ownership. The rates of smartphone ownership and home broadband internet access among rural Americans are 71% and 63%, respectively [20]. Additionally, those 65-year-olds are less likely to own a smartphone or have home broadband internet [21]. These disparities persist when it comes to the second-level digital divide. Racial minorities, specifically Blacks and LatinX, are more likely to report that technology and internet utilization training would help them build confidence in using computers, smartphones, and the internet [22]. Women also report lower digital readiness or comfort with using the internet when compared to men [14]. Rural Americans, seniors, those with less than a high school education, and low-income Americans have the lowest rates of internet utilization [21].

Telehealth Benefits and Challenges Based on Modality

Wearable Devices and Smartphone Applications

A variety of mobile methods have been designed and utilized for secondary prevention of disease. Mobile health (mHealth) is an aspect of electronic health specifically focusing on the use of mobile devices (phones, patient monitoring devices, or wireless devices) in medicine and public health [23]. Each generation of mobile health interventions, including wearables alone or combined with more complex smartphone applications, has their own strengths and limitations.

The first wave of wearables consisted of activity trackers. The history of activity trackers goes back centuries. Historically, Leonardo da Vinci has been credited with inventing the original mechanical step counter, which involved a device worn around the waist with a lever arm tied to the thigh with gears that rotated with each step [24]. Thomas Jefferson also had a step counter that he wore in his vest pocket with a string connected to a strap below his knee [24]. In 1820, Abraham-Louis Breguet, a Swiss watchmaker, created the first self-contained pedometer. In 1965, the Japanese Yamax company designed a pedometer called a manpo-kei, which means 10,000 steps in Japanese. The team believed that 10,000 steps correlated with the amount of physical activity required to decrease the risk of coronary artery disease [24]. The technology for activity trackers continued to improve to include accelerators, heart rate monitoring, and calorie consumption monitoring over the past several decades [25]. In 2010, there was a boom in activity tracker purchases with smartwatches (i.e., Apple watch and Fitbit) dominating the market [24]. Wearable devices and applications that promote self-monitoring and social connectivity demonstrate promising results in improving adherence to healthy lifestyle strategies and improving outcomes in various health metrics such as weight loss, smoking cessation, chronic disease management, and home exercise [26]. Similarly, according to one systematic review, the use of Fitbit-based interventions was associated with a significant increase in step count, physical activity, and decrease in weight, although the durability of these positive changes remains unclear and more longitudinal trials are needed for further validation [27].

A number of studies have evaluated methods utilized by mHealth and smartphone applications to promote effectiveness, engagement, acceptability, and usability [28]. Continuous quantification, gamification, and comparative social feedback are a few of the methods that commercial smartphone applications use to influence motivation and improve physical activity. Targeted smartphone applications have also been created in an attempt to address cultural and racial health disparities. For example, Fostering the African-American Improvement in Total Health (FAITH!) app was created in collaboration with African American churches to promote cardiovascular health in this population [29]. The pilot study reported high satisfaction and positive impact on the health-promoting behaviors that improve cardiovascular health [29]. Overall, however, in part due to the large variety and unique nature of smartphone applications, research has yielded contradicting findings on smartphone applications' effectiveness [29]. One of the noted challenges of evaluating smartphone applications and mHealth is their rapidly evolving nature [28].

Despite preliminary data supporting wearable devices' utility and efficacy in improving specific health metrics, notable disparities in utilization and access exist. Accordingly, the Pew Research Center reported, in June of 2019, about 21% of US adults reported regularly wearing a smartwatch or fitness tracker [30]. Utilization varied substantially based on SES, with 31% of Americans living in households earning greater than $75,000 reporting smartwatch or fitness tracker utilization compared to 12% of those whose annual income was below $30,000 [30]. Similarly, there was a notable difference in wearable utilization based on education level and gender, with college graduates and women using the devices at higher rates [30]. Additionally, some evidence shows that wearable devices are less accurate among those with higher BMI and darker skin tones [31].

Out-of-Office Blood Pressure Monitoring

Significant data supports the use of ambulatory blood pressure management (ABPM) and self-BP measurement (SBPM). Both methodologies can transmit patient information remotely and are superior to office BP measurement (OBPM) alone [32]. OBPM values are higher in about 20% of patients due to white coat hypertension making SBPM and ABPM more reliable when performed correctly. When comparing ABPM to SBPM, ABPM allows for more consistent and reliable BP measurements with an average of 50 automated BP measurements over 24 h [32]. The 24-h BP readings are then automatically recorded and stored for physician review [32]. The transmission of SBPM and ABPM data has been used in clinical trials and has demonstrated reasonable BP control rates when assessing antihypertensive drugs. Notably, numerous studies have found that ABPM is superior to OBPM in adjusting antihypertensive medications [32]. Additionally, ABPM is a better predictor of cardiovascular outcomes compared to OBPM [32].

According to a 2006 Gallup poll of hypertensive patients, 55% reported measuring their BP at home, up from 38% in 2000 [33]. Eighty-six percent of patients who were advised to purchase a BP monitor by their physician reported doing so. Of patients who did not own a monitor, 14% stated that expense was a barrier [33]. The uptake of home BP monitoring continues to increase in part due to recent guideline updates such as the 2017 and 2018 American Heart Association/American College of Cardiology (AHA/ACC) hypertension guidelines, which advocate for the utilization of SBPM and ABPM for detection, verification, and heart failure management of hypertension [34]. A call to action published in 2008 called for insurance companies to reimburse for ABPM and the cost of electronic home BP monitors. The statement reported that out-of-office BP monitoring is now part of evidence-based care and could improve access for those of lower SES and disadvantaged minority groups. Further, the statement projected that improved access could lead to reductions in disparities in hypertension control among racial and ethnic minority groups [33]. In 2019, CMS expanded coverage for ABPM, but SBPM device coverage remains limited despite the COVID-19 pandemic [35].

Text Messaging Interventions (TMIs)

While worldwide household computer penetration is about 57%, mobile phone penetration is about 96% [36]. Text messaging is the most frequently used form of mobile communication. Among US adults, texting is highest among LatinX individuals at 83%, followed by Blacks at 76% and Whites at 70% [36]. Utilization of other mobile-message applications such as WhatsApp, Kik, and Facebook Messenger is also high [36]. Additionally, studies have shown that receiving messages either by social media or via text message leads to an increase in dopamine release consistent with receiving a reward [36]. Thus, it has been found that 99% of text messages that are received are opened, and 90% are read within minutes of being received [36]. This addictive-like response to text messages and mobile phone penetration makes TMIs attractive for modifying behavior and potentially improving health [36].

Studies have shown that TMIs in the context of healthcare can improve both patient self-efficacy and health management [36–38]. A systematic review of TMIs revealed that they effectively improved diabetes self-management, weight loss, physical activity, smoking cessation, and medication adherence with antiretroviral therapy [36]. There were also positive trends in hypertension management [36]. Similarly, TMIs have been effective in improving maternal health. Text-based remote monitoring to control postpartum hypertension and meet clinical guidelines in women with pregnancy-related hypertension has proven more effective than standard office-based follow-up [39]. Thus, TMIs have the potential to help address the disparately high postpartum morbidity and mortality among Black women who have the highest rates of pre-eclampsia and eclampsia [40]. Phone-based interventions have also been found to increase compliance with prenatal care [41]. Significant research has also evaluated the impact of mobile phone interventions and TMIs on heart failure due to the high readmission rates and associated penalties [38]. TMIs for heart failure patients, particularly post admission, target medication adherence, dietary compliance, appointment adherence, symptom recognition, and management [37, 38]. Various studies have found improvement in management and self-efficacy [37, 38].

Telemedicine

As mentioned previously, telemedicine is more narrowly defined than telehealth. Unlike the examples discussed earlier of telehealth, such as wearable devices and mobile applications, telemedicine refers explicitly to the synchronous use of telecommunication technology to provide direct clinical care between healthcare providers and patients [14]. In the USA, the utilization of telemedicine increased from 34 to 76% between 2010 and 2017 [42]. Similarly, there was a 53% increase in telemedicine provider claims between 2016 and 2017 [42]. The specialties with the highest utilization rates of telemedicine before the COVID-19 pandemic were neurology, psychiatry, and cardiology at 39.5%, 27.8%, and 24.1%, respectively [42].

The COVID-19 pandemic has undoubtedly accelerated telemedicine adoption. During the beginning of the pandemic in early March 2020, there was a precipitous drop in the number of ambulatory visits with a 60% ambulatory visit deficit [14]. Given the temporary cessation of in-person clinic visits, we saw a rapid rise in the number of telemedicine visits. By the middle of April 2020, the USA saw its highest telemedicine use with an estimated 8000% increase in telemedicine claims due to COVID-19 [14, 43]. At that time, telemedicine was used out of necessity as a substitute for in-person visits. After April 2020, telemedicine use increase declined as clinics and hospitals reopened; however, usage remains high and plays an essential role in providing care [14]. Given the unprecedented utilization of telemedicine, it is important to understand the data supporting its use, especially when many healthcare settings are using a hybrid of in-person and telemedicine healthcare delivery models.

Video and Telephone Visits

Data regarding the efficacy of video and telephone visits is limited given relatively low telemedicine use and lack of telemedicine reimbursement parity before the pandemic. One study seeking to compare video visits to telephone visits among a geriatric population looked at whether video visits were associated with longer visit durations, more visit diagnoses, and more advanced care planning discussions than telephone visits. They also investigated whether differences existed between visit types based on patient demographics [44•]. Out of 190 appointments, 47.7% were video visits. Compared to telephone visits, video visits were 7 min longer on average. Video visits were also associated with 1.2 more visit diagnoses. There was no significant difference, however, between video and telephone visits for advanced care planning [44•]. Additionally, minority patients, Medicaid patients, and patients for whom English is a second language were less likely to have video visits. Thus, although healthcare providers spent more time on video visits compared to telephone visits, half of the cohort of seniors did not use video visits and were more likely to be racial and ethnic minorities or on Medicaid [44•].

Similarly, a group at the University of Pennsylvania analyzed data for 148,402 patients scheduled for telemedicine visits during the COVID-19 pandemic and found that women, Blacks, LatinX, seniors, and low-income families were less likely to participate in video visits as compared to their counterparts [45, 46••]. A large cross-sectional study by Rodriguez et al. that looked at 231,596 telemedicine visits found similar telemedicine modality disparities based on race, SES, primary language, age, and geography [47••, 48]. Interestingly, they also found that clinician and practice-level factors contributed to the disparity in video use [47••]. The authors theorized that the clinician-driven elements existed because healthcare providers and the practices that treat underserved communities were less equipped to provide video visits due to lack of funding and infrastructure [47••]. Additionally, implicit bias may have played a role and led providers to assume that certain groups could not engage in video visits [47••]. Many other studies have also explored possible reasons for telemedicine utilization disparities. Along with access and digital literacy, cultural and community norms or preferences for digital resources and beliefs regarding the relative benefit and harm of digital health have also been proposed as reasons health inequity persists with digital health innovation [49].

The Future of Telehealth/Telemedicine and Next Steps

COVID-19 has undoubtedly changed how we use telehealth. Due to the pandemic, 87% of Americans now state that the internet is very important to essential [50]. Given the novel dependence on technology to maintain essential services such as education and healthcare, telehealth and telemedicine are likely here to stay. Therefore, it is vital to determine what clinical scenarios are most appropriate for telehealth and telemedicine use and how to achieve health equity. Arguably, the consensus among clinicians is that face-to-face or in-person patient encounters remain the gold standard [45]. This is likely due to the importance of the physical exam. In one study, 63% of surveyed physicians reported making a medical error or medical oversight due to not performing a complete physical exam [51]. In the same survey, physical examination inadequacy was associated with a missed or delayed diagnosis in 76% of cases. Additionally, physical examination inadequacy was associated with an incorrect diagnosis, unnecessary treatment, unnecessary diagnostic costs, and delay in therapy in 27%, 18%, 25%, and 42% of cases, respectively.

Data directly comparing in-person visits to telephone and video visits is lacking. To our knowledge, there are no formal non-inferiority studies comparing telephone and video visits to in-person visits. There is data showing that telephone visits reduce the length of encounters but are associated with more frequent appointment scheduling than face-to-face visits [52]. However, given the importance of the physical examination in diagnosing and managing specific conditions, it seems reasonable to believe that in-person visits are better suited for new patient visits, managing complex, severe medical conditions, and evaluating changes in clinical status. Thus, although telehealth can serve as a valuable tool in improving healthcare access, it is crucial to keep in mind that telehealth has not been proven to have equal efficacy to in-person visits. Hence, efforts to increase access to in-person healthcare provider encounters in rural, low-income, and minority communities should continue.

It is also essential to delineate the goals of telehealth and telemedicine as we move forward. We would argue that health equity should be a core tenant of telehealth [53•]. Determining evidence-based ways to achieve and measure health equity and to address the digital divide is essential. It is critical to ensure that as many Americans as possible have access to the internet, digital devices, and the education necessary to achieve telehealth proficiency and digital literacy. Achieving health equity will require the mobilization of resources, financial incentives, and political will among hospital systems, insurance companies, and government officials [40, 54•]. There is currently a lack of comprehensive local, state, and national policies that prioritize addressing healthcare disparities.

Additionally, as mentioned by Rodriguez et al., to ensure that the observed differences in telemedicine modality use (video vs. telephone visit) do not decrease healthcare access, CMS parity for telephone and video visits should be extended [47••]. More programs like the COVID-19 Telehealth program, which provided $200 million to healthcare organizations to develop and expand telemedicine platforms, are needed [47••]. It is essential that these funds are accessible to *under-resourced* healthcare centers that serve vulnerable communities in both urban and rural settings. At the hospital system level, telemedicine platforms should be simple to use and easily accessible. These platforms should also have the capacity to serve patient populations with varied English proficiency and literacy. Additionally, providers and hospitals should have an awareness of social determinants of health. By training healthcare providers to be familiar with the psychosocial and economic nuances of their patients' lives, the providers can tailor the implementation of telemedicine services to have the most significant benefit and impact for their patients.

Conclusion

Telehealth has changed how we practice medicine, and, in many ways, has successfully decentralized healthcare, making it more accessible to the general public. Concurrently, the rapid expansion and increased reliance on telehealth may further perpetuate extant disparities in access to technology, the internet, and digital literacy. These disparities mirror the national trends we see in the impact of COVID-19, disproportionately affecting racial and ethnic minorities and posing an additional barrier to equitable care within these communities. To ensure that telehealth promotes health equity instead of disparities, intentional integration of the social determinants of health, and broader health equity governmental policies are necessary.

Declarations

Conflict of Interest All the authors have nothing to disclose.

Human and Animal Rights This article does not contain any studies with human or animal subjects performed by any of the authors.

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et al. performed a review addressing how health equity was impacted on the rapid increase in telehealth use as a result of the COVID-19 pandemic. This review describes recommendations to address issues of health equity on multiple levels: (1) policy and government, (2) organizations and health systems, and (3) communities and patients. From the results of the review, the authors suggest that (1) simplifying user interfaces, (2) using supportive intermediaries, and (3) incorporating and improving marginalized member input are essential strategies to promote health equity in virtual care.

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