The COVID-19 pandemic: new concerns and connections between eHealth and digital inequalities

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Abstract

Purpose

Telemedicine has been advancing for decades and is more indispensable than ever in this unprecedented time of the COVID-19 pandemic. As shown, eHealth appears to be effective for routine management of chronic conditions that require extensive and repeated interactions with healthcare professionals, as well as the monitoring of symptoms and diagnostics. Yet much needs to be done to alleviate digital inequalities that stand in the way of making the benefits of eHealth accessible to all. The purpose of this paper is to explore the recent shift in healthcare delivery in response to the COVID-19 pandemic towards telemedicine in healthcare delivery and show how this rapid shift is leaving behind those without digital resources and exacerbating inequalities along many axes.

Design/methodology/approach

Because the digitally disadvantaged are less likely to use eHealth services, they bear greater risks during the pandemic to meet ongoing medical care needs. This holds true for both medical conditions necessitating lifelong care and conditions of particular urgency such as pregnancy. For this reason, the authors examine two case studies that exemplify the implications of differential access to eHealth: the case of chronic care diseases such as diabetes requiring ongoing care and the case of time-sensitive health conditions such as pregnancy that may be compromised by gaps in continuous care.

Findings

Not only are the digitally disadvantaged more likely to belong to populations experiencing greater risk – including age and economic class – but they are less likely to use eHealth services and thereby bear greater risks during the pandemic to meet ongoing medical care needs during the pandemic.

Social implications

At the time of writing, almost 20% of Americans have been unable to obtain medical prescriptions or needed medical care unrelated to the virus. In light of the potential of telemedicine, this does not need to be the case. These social inequalities take on particular significance in light of the COVID-19 pandemic.

Originality/value

In light of the COVID-19 virus, ongoing medical care requires exposure to risks that can be successfully managed by digital communications and eHealth advances. However, the benefits of eHealth are far less likely to accrue to the digitally disadvantaged.

Keywords

Healthcare | Social class | EHealth | Digital divides | COVID-19 | Pandemic

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Digital Inequalities and eHealth in Light of COVID-19

The effects of the COVID-19 pandemic are making the effects of digital inequality increasingly relevant in all life realms. In the United States, a Kaiser Family Foundation poll conducted between March 11-15th, found that 62% of adults reported being very or somewhat worried that they or someone in their family will get sick from the coronavirus (Hamel et al., 2020). Furthermore, 51% of adults reported being very or somewhat worried about putting themselves at risk of exposure to the virus. These concerns are heightened for those who need ongoing or acute care but fear exposure to COVID-19. This same study found that 41% of those living with someone with a chronic health condition were forced the change their plans or not to travel; 29% of this same population cancelled plans with another 35% stocking up on supplies and medications.

Therefore, the advantages of eHealth are especially apparent in this time. With social distancing measures in place, digital solutions are providing new way to provide medical care, services, and support to those most risk of contagion. Even before the onset of the COVID-19 pandemic, advantaged populations have been steadily scaling up their use of digital health resources in their daily lives through apps and services. Those with plentiful access to resources are able to capitalize on a number of user-driven devices such as Fitbit and access to healthcare provided resources such as lab reports and other e-records (Phelan, Link, & Tehranifar, 2010). This evolution towards eHealth has gradually become increasingly normative as embodied in virtual care training (Blignault & Craig, 1999) and would seem to hold promise for better healthcare in the future.

eHealth and Digital Disadvantage

However, as we will see, not all segments of the population benefit equally from advances in eHealth and telemedicine. It is important to note that deep socio-economic inequalities pose significant challenges to equal access to healthcare and to the use of eHealth services. Long-standing challenges to digital inclusion that may impact eHealth adoption, including education, income, broadband access, information-seeking skills, and rural residence. Scholars have identified these as first-level, second-level, and third-level digital divides touching on fundamental life realms of which health is one (Ragnedda, 2017).

As with other forms of digital inequalities, one form of inequality is often associated with another form of disadvantage. This holds true for eHealth as well. Groups experiencing socio-economic disadvantage are also least likely to garner the benefits of advances to medicine driven by digital technologies: "Disadvantaged social groups, who experience the greatest burden of poor health, also are the most likely to lack the access, skills, and attitudes associated with making effective use of eHealth systems. Inequalities in SES are a 'fundamental cause' of persistent health disparities due to the dynamic nature of changes in diseases, risks, and medical treatment" (Robinson et al., 2015).

Scholars have also shown how these forms of stratification can exclude individuals and groups from digital resources key to well-being related to eHealth. Less advantaged populations have not been able to adopt eHealth practices at the same rate, thus stratifying the benefits to eHealth along socio-economic status lines (Hale, 2014). Lack of adoption of eHealth resources and practices are yet another way that social inequalities often co-occur such that economic,

educational, occupational disadvantages often are simultaneously present and reinforce one another (Witte and Mannon, 2010).

According to Hale, (2013), digital inequalities are directly implicated in disparities in eHealth takeup on a number of levels, including rural residence and socio-economic class. For rural dwellers, these forms of inequality come together in a number of ways. According to Hale, 2013) research has documented that rural dwellers must travel longer distances to access healthcare services and providers; as a result they are less able to visit providers and also suffer from diminished health status when compared to urban dwellers. Individuals in rural areas are less likely to have access to the Internet for demographic and technological reasons.

For all of these reasons, we might expect rural dwellers to be highly incentivized to adopt eHealth practices. However the incentives offered by eHealth cannot make up for challenges to digital inclusion including educational level, income, and diffusion of broadband (Hale, 2013). In terms of digital inequalities, access to digital resources has long been identified as a critical challenge, particularly in terms of connection speed (Davison and Cotten 2003) and access to quality devices. Digital skills are also a significant predictor of eHealth disadvantage in terms of information seeking for health information (Goldner, 2006). Accessing eHealth resources via information seeking is also associated with education (Cotten & Gupta, 2004), as are using the internet for more diverse and varied eHealth activities including information-seeking for health purposes such as exercise (Hale, Cotten, Drentea, & Goldner, 2010).

In terms of the COVID-19 pandemic, the very populations that could benefit the most from eHealth are often digitally disadvantaged and unable to take advantage of the opportunities provided by eHealth advances. Significantly, these disparities have been resistant to change as documented by (Hale, Goldner, Stern, Drentea, & Cotten, 2014) among highly vulnerable populations. Differentiated use follows larger patterns of digital inequality in terms of age and socio-economic status, as well as multiple forms of digital disadvantage from network and device access to the skills to use them effectively for maximum benefit (Fang et al., 2019). For this reason, in this paper, we examine two case studies that exemplify the implications of differential access to eHealth: chronic care diseases such as diabetes requiring ongoing care and time-sensitive health conditions such as pregnancy.

Telemedicine and Chronic Care Management

eHealth as related to diabetes sheds light on other chronic diseases that require ongoing care. Six in 10 Americans currently live with at least one chronic disease, such as heart disease, stroke, cancer, or Type 2 diabetes (Centers for Disease Control and Prevention 2020). Like other chronic conditions, diabetes requires constant monitoring of blood glucose levels both to maintain health and to avoid critical care needed for Diabetic ketoacidosis, or DKA (Daneman, 2006) as DKA occurs when there is an overload of glucose in the bloodstream because there is no regulating insulin (Mallare et al., 2003). Consequently, people with Type 1 Diabetes must regularly monitor blood glucose levels, at a minimum of four times per day and inject insulin multiple times per day. The care of diabetes in the last 15 years has significantly evolved, through the use of insulin pumps and continuous glucose monitors (Battelino et al., 2003). Many of these patients need regular care, particularly, those who are newly diagnosed or “uncontrolled” as defined by an

A1C level greater than 7%. In particular, women with Type 1 diabetes who are pregnant may require consultations as frequently as once every other week to maintain in range A1C levels (Lannotti et al., 2006).

Consequently, telemedicine is an increasingly important vehicle to provide continuous care remotely during the COVID-19 pandemic where healthcare facilities such as hospitals may have been early hotspots for infection. eHealth offers an important way to provide remote care during the COVID-19 Pandemic for routine monitoring of physical indicators such as blood sugar in the case of diabetes (Boudreaux, 2020). However, eHealth requires a battery of resources and skills on the part of patient and practitioner. While eHealth has made it feasible to continue to adjust blood glucose levels, discuss health technology, and complications of the disease, clinicians have a number of challenges to harnessing eHealth alternatives to treat patients lacking digital skills and resources. For example, Anne Peters (clinical diabetologist at the University of Southern California and member of the Beyond Type 1's Leadership Council) identifies several obstacles to treating her patients. Regarding COVID-19 and Type 1 Diabetes, Peters is one of many clinicians advocating for the use of digital communication media to provide critical patient care. However, patients must have a digital device and network connectivity to use physician teleportals to videoconference in order for visits to be "covered" by many insurance providers. If patients are unable to access a broadband connection and a device capable of streaming live video, then they may be unable to receive covered eHealth care. As this indicates, patients (or their caregivers) must be able to provide their own digital resources and be able to engage with online appointment interfaces to receive covered care.

eHealth Skills and Healthcare Consumption

In addition to the possession of digital devices, a number of other skills are needed for patients to effectively use eHealth resources to remotely communicate with their medical providers in terms of testing results that may be time sensitive. Patients must possess the skills to upload their device data to the cloud and access their own medical records (Boudreaux, 2020). In her own practice, Peters identifies older adult patients as more likely to struggle with skill deficits than younger patients (Boudreaux, 2020). This is in keeping with the literature on digital inequalities related to age. Previous studies have identified age-related disparities associated with access, usage and skills, as well as challenges with technostress and technology maintenance (Robinson et al., 2020) and likelihood of confidence using smartphones, and social media (Anderson & Kumar, 2019). The fact that older adults are more digitally disadvantaged compound disadvantage; in the United States in 2019, it was estimated that roughly 80 percent of older adults (over the age of 60) manage at least one chronic condition and more than two-thirds must manage two or more chronic diseases (Jain et al., 2019). Management of these conditions is critical in relation to the COVID-19 pandemic. During this time, eHealth can be an optimal the communication modality compatible with stay-at-home orders.

Just as older adults are more likely to be digitally excluded, those with economic disadvantage are also more likely to experience digital inequality. Another form of digital inequality also takes on fresh salience in light of the COVID-19 pandemic: online consumption for medical supplies. While many studies of online consumption favor inquiries on leisure products, they omit the crucial role digital consumption may play in securing medical supplies necessary to manage chronic diseases. For example, to manage Type 1 Diabetes, on a daily basis a diabetic needs

access to a blood glucose meter and test strips, insulin, a cooler (to keep insulin at the normal level), syringes or pen needles, an insulin pump, insulin site changes, numbing cream, alcohol swabs, medical tape, a lancing device, ketone testing products, fast-acting carbohydrates, glucagon emergency kits, and medical identification (Foster et al., 2019).

Those with the economic means, as well as network access, devices, and digital skills, are able to meet these supply needs to manage their chronic health conditions. By contrast, economic disadvantage has skyrocketed as a result of the COVID-19 pandemic. As of April 2020, in the United States, as many as one in five Americans reports difficulty paying bills since February of 2020; they also report increased difficulty paying for basic utilities, rent or mortgage, or food. In terms of health, one in ten reports difficulty paying for health coverage or prescriptions (Kirzinger et al., 2020). Also in this same study, when we look at these same economic challenges among those with household incomes below $40,000, 40% over all report problems affording health insurance or household expenses, as well as 57% of African Americans and 42% of Latinos, two groups particularly hard struck by the virus. Yet another segment of the study reports an increase in those who would have difficulty covering an unexpected medical expense of $500.

For such individuals managing chronic health conditions, every penny counts when paying for supplies and medical care. The ability to provide these digital affordances is directly related to socio-economic disadvantage, thus compounding the multiple ways digital inequalities are implicated in the management of disease during the COVID-19 pandemic. It is no small matter that those without the means and ability to provide their medical supplies via the internet, must

face additional exposure risks by venturing into public to find needed medical supplies. Further, those with access to online shopping are able to check the inventories from local suppliers and obtain supplies from remote locations if necessary. By contrast, those without digital resources who must go from store to store may be left without supplies and thereby at higher rate of infections and potential ensuing complications.

eHealth and Pregnancy

Public exposure is also a risk for pregnant women. Therefore, from issues of chronic care, we turn to the case study of pregnancy vis-à-vis the COVID-19 pandemic. With over six million pregnancies per year in the U.S., pregnant and breastfeeding women constitute a significant portion of the population impacted by COVID-19 (Arias & Xu, 2019). As with managing chronic conditions, eHealth may be a tool to achieve social distancing and nonetheless maintain healthcare management in a timely manner. As with care for diabetes, the need for eHealth alternatives are important whenever possible for prenatal care to reduce risk of infection. Also like diabetes, pregnancy exemplifies the implications of differential access to eHealth: chronic care diseases such as diabetes requiring ongoing care and time-sensitive health conditions such as pregnancy. For pregnant women, concern over COVID-19 may be even more elevated in comparison to the general population. Social distancing, which is now recommended as one of the main ways to protect ourselves from COVID-19 presents direct and distinct challenges to pregnant women. The schedule of prenatal visits in healthcare settings, for even a typical pregnancy, can prevent adequate social distancing (Rasmussen & Jamieson, 2020; Rasmussen et al., 2020).

In a typical, uncomplicated, healthy pregnancy for weeks four through twenty-eight the mother will see the physician for one prenatal visit per month, from twenty-eight weeks to thirty-six weeks that would be one prenatal visit every two weeks, and from thirty-six weeks to forty weeks it will bump up to one prenatal visit every week till delivery (Carter et al., 2016). This prenatal care can play a vital role in sustaining a healthy pregnancy (Carter et al., 2016). Again, as with chronic healthcare needs, some patients will require more care than others. Should a woman have risk factors or health issues before even beginning the pregnancy she will likely need additional monitoring (Cohen, 2009). Some of these risk factors that necessitate additional monitoring and care include age and pre-existing health conditions such as diabetes. Furthermore, additional care is necessary for such pregnancy-related high blood pressure, or gestational diabetes (Cohen, 2009).

The need for quality prenatal care is essential to supporting a healthy pregnancy and early detection of risk (Cohen, 2009). One possible way to provide access to prenatal care during this outbreak is to expand the use of telemedicine during pregnancy. Telemedicine enables pregnant women to maintain their regular prenatal visit schedule and avoid unnecessary risk of COVID-19 exposure (Hernández et al., 2020). For example, at the Mayo Medical Clinic, virtual visits may be included as part of a bundled care model. In the United States, several major health insurance companies are shifting to telemedicine visits in response to the COVID-19 pandemic. Aetna is offering eHealth visits for any concern, including prenatal care without copays. Humana, another major insurer in the U.S. is waiving eHealth costs for urgent care visits for 90 days.

Several major medical centers have already piloted the implementation of home health services for expectant mothers and reported outcomes that promise similar success in managing COVID-19. Mayo Clinic's NYC Center pioneered the OB Nest program for low-risk pregnancies to take advantage of telemedicine and home monitoring was implemented for weight, blood pressure, and fetal heartbeat. Expectant mothers were also provided with access to text based communication with care teams. Researchers found that of the 300 women who were randomized to this OB nest in comparison to traditional care showed comparable maternal and fetal clinical outcomes. In fact, there were lower rates of pregnancy-related stress in the OB Nest, and higher patient satisfaction, with no difference in the perceived quality of care. Furthering the positive outcomes for online care, the OB Nest allowed for increased confidence and sense of control, and greater participation in pregnancy care (Tobah et al., 2016).

Similar positive results have been recorded by the University of Utah's virtual prenatal care program was implemented for low-risk pregnancies (Leighton et al., 2019) and Washington State's MultiCare virtual OB visit (Pflugeisen et al., 2016). The George Washington University's Babyscrips team created a prenatal care app available to patients to track blood pressure, weight and other measurements at home (Marko et al., 2016). As these indicate, monitoring devices can augment teleHealth services that can be reviewed by practitioners. However, just as with diabetes, these costs can be considerable. Home device costs may involve purchasing of a scale, a blood pressure cuff, a fetal doppler monitor and a glucometer (Marietta, 2001). These costs are prohibitive for many segments of the population as economic class is a strong predictor of access to tech-enabled healthcare. Even in highly developed and egalitarian countries such as the

Netherlands, there is a statistically significant income gradient in relation to access, use, and diversity of digital devices (Van Deursen & van Dijk, 2019).

Barriers to Digital Inclusion

Despite the benefits provided by eHealth, digital inequalities remain a constant challenge. Those with digital resources stand to benefit the most from digital advantage that allows them to use eHealth services effectively to communicate with healthcare professionals and caregivers, use cloud computing to manage diagnostic data with clinicians, and procure needed supplies over the internet. At the same time, those groups most vulnerable during the COVID-19 pandemic -- older adults and those with pre-existing conditions -- are also two groups that have historically been more likely to suffer from digital inequalities. Large connectivity shortfalls present in populations that already suffer from a variety of healthcare vulnerabilities including diabetes such as low-SES populations (Sarker et al., 2011), Native Americans (Clarke,Gomez-Lopez, and Chenoweth, 2020) and older adults (Hale et al., 2018). Therefore, the case of diabetes offers important insight into how eHealth is an important tool for clinicians to mitigate contagion risks while providing chronic care management during the COVID-19 pandemic—tools that are less likely to be used for those without resources thus compounding disadvantage in terms of age, healthcare, economic resources, and social status. These implications of COVID-19 for individuals with diabetes can be largely applied to other chronic illnesses in terms of digitally enabled care management and the ways that eHealth opportunities may impact those living with a long term-term chronic illness.

Parallel to the challenges identified for chronic care management, access and device inequalities are highly correlated with economic class. For example Pew data (Anderson and Kumar, 2019) shows that in the United States, just under 30% of Americans earning less than $30,000 per year do not own smart phones compared to only 3% of those earning over $100,000; even greater divides exist in terms of broadband service gaps (44% compared to 6%). By contrast, over two-thirds of high-income Americans own multiple devices and services compared to only 18% of economically disadvantaged Americans (Anderson and Kumar, 2019). These vast differences translate into very different resource allocations among pregnant women—especially when we consider varied birth rate associated with different economic classes and the likelihood of chronic health care issues related to low-SES. Just as with chronic care management, pregnant women from economically privileged households are better equipped to use eHealth to protect themselves from risks associated with the COVID-19 virus. These eHealth inequalities are in keeping with the many ways that economic class and digital inequalities are mutually co-constituted (Ragnedda, Ruiu and Addeo, 2019). As with other life realms, those with greater resources gain greater benefits from the use of digital resources (Ragnedda and Ruiu, 2017 and Ragnedda, 2018).

eHealth and the Pandemic: Discussion

Finally, at the time of writing, Kirzinger et al. (2020) report that since the COVID-19 outbreak almost twenty percent of Americans have been unable to obtain medical prescriptions or needed medical care unrelated to the virus. In light of the potential of telemedicine, this does not need to be the case. As our review has shown, eHealth appears to be effective for routine management of chronic conditions (Levine & Goldschlag, 2015) such as diabetes and pregnancy. Both

pregnancy and management of chronic conditions requires extensive and repeated interactions with healthcare professionals, as well as the monitoring of symptoms and diagnostics. In light of the COVID-19 virus, this ongoing care takes on additional risks that can be successfully managed by digital communications and eHealth advances. Two central pillars of success are connectivity to medical care professionals and access to home monitoring devices. This successful combination is all-the-more important as those with chronic healthcare conditions and women who are pregnant are at greater risk of the negative effects of COVID-19. Being able to manage care via telemedicine is also important for mental health benefits that may accrue from using telemedicine as a risk reducer in a time of heightened anxiety (Hamel et al., 2020).

Yet, once again, we see that the benefits of eHealth are far less likely to accrue to economically disadvantaged individuals. Those at an economic disadvantage are the very people who can least afford to get sick, lose employment, or lose their health insurance when unemployment strikes given the employer-sponsored structure of much healthcare in the United States (Kirzinger et al., 2020). Furthermore, economically disadvantaged Americans have the greatest need to take advantage of telemedicine to minimize unneeded contact for medical care as they are already in high-risk groups on a number of other fronts. Regarding work, they are more likely to work in essential public services such as public transportation, where they are at greater risk from exposure to the virus. Even as others shelter in place, Americans from lower SES households have continued to work to provide essential services that disproportionately put them in harm's way.

As this indicates, digital inequalities manifested during the COVID-19 pandemic show us how health inequalities in the digital age exact the highest tolls from those already experiencing disadvantage. In terms of self-reliance and information seeking:

> About eight in ten adults (83%) say they feel they have enough information about how to protect themselves and their family from coronavirus while 16% say they don't have enough information. The share who feel they don't have enough information is somewhat higher among adults who are Black (25%) or Hispanic (22%), and those with a high school education or less (20%)" (Hamel et al., 2020).

Socio-economically disadvantaged Americans are more likely to be at additional risk when seeking medical attention related to the symptoms of COVID-19. As Hamel et al. (2020) tell us, economically disadvantaged Americans belonging to households earning $40,000 per year or less are far less likely use telemedicine to seek medical attention if they develop symptoms that may indicate the onset of the virus; rather, they are more likely to seek care at an ER or other facility where they might potentially be at greater risk. By contrast, those from households with an income of $90,000 or more are overwhelmingly (86%) likely to use telemedicine and stay at home while contacting a doctor (Hamel et al., 2020). As this shows, digital inequalities hinder those in most need from availing themselves of telemedicine in terms of devices and connectivity, as well as skills and information literacies. In closing, telemedicine is more indispensable than ever in this unprecedented time of pandemic. Yet much needs to be done to alleviate digital inequalities that stand in the way of making the benefits of eHealth accessible to all. Future research should take up these challenges.

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