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Socioeconomic Disparity Level and Telehealth Utilization Among Outpatient Healthcare Providers in California

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This is to certify that the doctoral study by

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2024

Abstract

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MS, Walden University, 2018

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

The recent expansion of telehealth in the United States has created an opportunity for increased access to care for all patients, especially those with historically limited access. Grounded in Bronfenbrenner's ecological systems theory, logistic regression analysis was used to determine if there is an association between community socioeconomic disparity level and telehealth utilization by healthcare providers. Secondary datasets were obtained through an independent insurance brokerage based in California. They contained claim level detail of patient visits conducted with outpatient healthcare providers in California. A random sample of 1,000 cases from the dataset were used for the completion of the study. Communities with higher disparity rates (lower socioeconomic status) were less likely to receive care through telehealth. The analysis demonstrated that low disparity communities were 3.72 times more likely to receive care via telehealth, and those in high disparity communities were .338 times as likely to receive care via telehealth than moderately disparate communities. The outcomes of this study demonstrated that higher disparity communities do not have the same level of utilization of telehealth, which has demonstrated benefits around access to higher quality care and better healthcare outcomes. Implications for positive social change include helping inform expanded healthcare access opportunities to patients in socioeconomically disparate communities, which can lead to improved physical and mental health.

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Dedication

This doctoral study is dedicated to my wife, Allison Goodgame, and to our children, Hudson and Harrison. Allison, I am endlessly grateful for your love, support, and encouragement. Nothing I have and nothing I have achieved in this world would have been possible without you. Thank you. My sweet boys, you have made me stronger, better, and more hopeful for the world than I ever could have imagined. I hope this will serve as undeniable proof that you are capable of anything. Your life is what you make of it.

Acknowledgments

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Section 1: Foundation of the Study and Literature Review

Introduction

Low socioeconomic status is one of the best predictors of poor health in the United States (Cunningham, 2018). There has been a well-documented relationship between the socioeconomic disparity level of an individual and the limited access to quality healthcare they will encounter during their lifetime (Lazar & Davenport, 2018). The recent expansion in the utilization of telehealth offers an opportunity to improve access to care for all patients, regardless of socioeconomic disparity level. However, further research is needed to determine if there is a relationship between the socioeconomic disparity level of a community and telehealth utilization by its outpatient healthcare providers.

Telehealth will continue to have broad implications within patient care long after the conclusion of the Covid-19 pandemic. Thus, it is imperative to add to the existing body of knowledge surrounding telehealth utilization by socioeconomic status. Further knowledge in this subject could lead to expanded opportunities for telehealth utilization in lower socioeconomic communities, improving access to quality care for a higher risk patient population.

Background

Telehealth has been extensively researched to provide better insight into the benefits, the challenges that impact implementation, and how it affects patient care. Telehealth has the potential to improve the patient care experience by providing enhanced patient healthcare outcomes, providing more convenient and available access to care

while also conserving resources and helping to reduce the threat of Covid-19 contact during outbreaks (Iyengar et al., 2020; Kane et al., 2020; Mahtta et al., 2021, Zhang et al., 2021).

Research has also shown significant barriers exist not only for the implementation of telehealth by healthcare providers but also for patients. Barriers such as a lack of infrastructure to support telehealth or training for providers and suboptimal reimbursement rates hinder adoption progress (Zhang et al., 2021). Patients have often cited barriers such as the availability of required technology and technical literacy as their most significant concerns with telehealth utilization (Zhang et al., 2021). These boundaries are particularly prevalent for patients with higher socioeconomic disparity as they have lower access to technology and internet and lower technology literacy levels (Dixit et al., 2021).

Health disparities and higher health burdens have been associated with patients with lower socioeconomic levels (Centers for Disease Control and Prevention [CDC], 2021. Social determinants of health and other socioeconomic factors significantly impact individuals' quality of life and general health status (Hawkins et al., 2020). Low-income patients also have less access to healthcare than their higher-income counterparts. Teixeiera de Siqueira-Filha et al. (2022) affirmed that healthcare facilities were often scarce in low-income communities, and those available were of poorer quality than in higher-income communities. The scarcity of healthcare facilities and low quality of available options leave lower socioeconomic patients sicker, with poorer health outcomes and less access to facilities and doctors that can support them. With higher levels of

illness and less access to traditional healthcare facilities, lower-income patients are more likely to benefit from the advantages afforded by telehealth.

Therefore, research is needed to determine whether healthcare providers provide lower-income communities care via telehealth at the same rate as their counterparts who serve higher-income communities. Finding lasting solutions to the lack of access to care facilities, inconvenient office visit hours, and transportation concerns can increase opportunities for care, including equity in access to care in lower socioeconomic communities. This study adds to the current body of knowledge and provides guidance that may help improve access to telehealth for more low-income patients.

Problem Statement

Despite the significant research available on the benefits of telehealth for the general population, there is a lack of research and knowledge on the utilization of telehealth in lower socioeconomic communities. There is no research currently available on the association between the community's socioeconomic disparity levels and telehealth utilization by its outpatient healthcare providers. While outpatient healthcare providers have used telehealth for years, it has become increasingly crucial to patient care since the onset of the Sars-CoV-2 (Covid-19) pandemic, which continues to limit the availability of in-person care. Telehealth utilization will continue to have broad implications for socioeconomically disparate communities long after the pandemic subsides. Further knowledge on the relationship between community socioeconomic disparity level and telehealth utilization can help outpatient healthcare providers adjust how to provide accessible, quality care to the communities they serve.

Purpose Statement

This quantitative study aimed to determine the association between a community's socioeconomic disparity level and telehealth utilization by its outpatient healthcare providers. The targeted population consisted of all outpatient healthcare providers practicing in California. The implications for positive social change include the potential for healthcare providers serving socioeconomically disparate communities to enhance their telehealth offerings and focus on the quality care needed in their service areas. Expanded telehealth offerings in these communities could improve equity in access to care and improved healthcare outcomes for traditionally underserved community members.

Research Question

The research question for this study was What is the association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California?

$H_0$1: There is no statistically significant association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California.

$H_1$1: There is a statistically significant association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California.

For this study, the independent variable, socioeconomic disparity level, was measured by the area deprivation index, as determined by the healthcare provider's zip

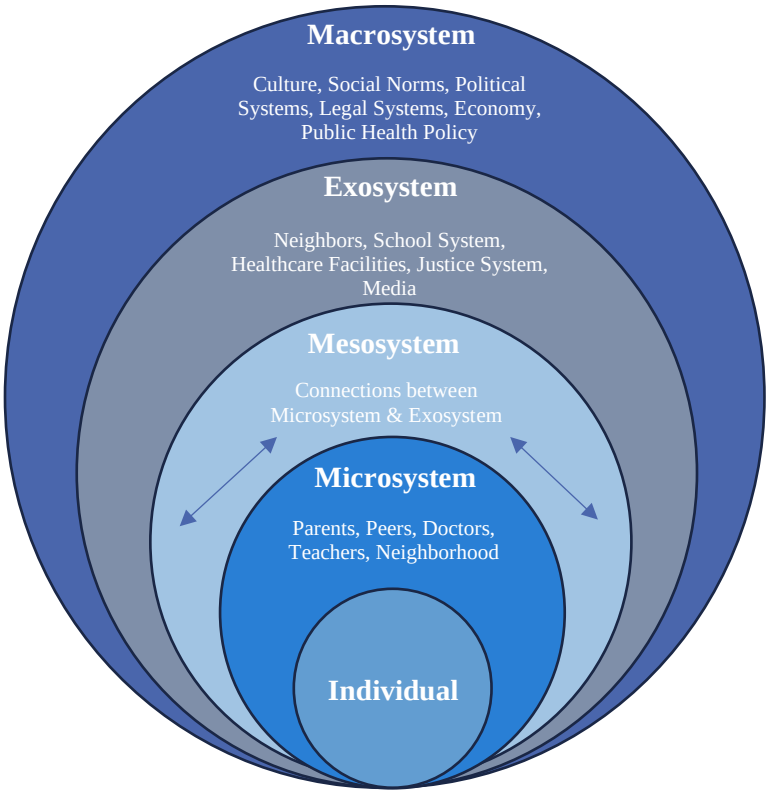
code. Telehealth utilization status was determined by the claim level detail available in the dataset that identified each claim as occurring in the provider's office or via telehealth. Telehealth utilization was the dependent variable for the purposes of this study.

Theoretical Framework

The theoretical base that grounded this study was the ecological systems theory framework. Bronfenbrenner's (1977) ecological systems theory divides a person's environment into five different systems, each representing areas of the individual's existence that they interact with that have an impact on them, their environment and their opportunities. Bronfenbrenner theorized that the environment and circumstances surrounding an individual affect their social determinants of health and, thus, their general health status. Bronfenbrenner's ecological systems theory offers an impactful framework for exploring the influence the socioeconomic disparity level of the community plays in the availability of telehealth services for its community members. Bronfenbrenner's theory asserts that the opportunities afforded to individuals through their communities, such as the number of health facilities available and the quality of care providers, can promote health or health disparities from birth (as cited in Reifsnider & Forgione, 2005). The use of Bronfenbrenner's ecological systems theory as the foundation of this study was able to provide clear connections between the opportunities afforded by a patient's community disparity and their need for expanded and improved care models. Figure 1 is an illustration of the ecological systems theory.

Figure 1

Illustration of Bronfenbrenner's Ecological Systems Theory



Nature of the Study

To address the research questions in this quantitative study, the research design included a secondary data analysis using logistic regression to determine the association between community socioeconomic disparity level and telehealth utilization by its healthcare providers. The objective of this study was to determine the association between a community's socioeconomic disparity level and its outpatient healthcare provider's utilization of telehealth. While outpatient healthcare providers have used telehealth for years, this mode of care has become increasingly crucial to patient care

since the onset of the Covid-19 pandemic, which continues to limit in-person care. Telehealth utilization will have broad implications for socioeconomically disparate communities long after the pandemic subsides. This study aimed to expand the knowledge and understanding of telehealth utilization in communities with higher socioeconomic disparity levels by using a claims level dataset to complete a logistic regression to determine the relationship between disparity levels and telehealth utilization. Further knowledge of the relationship between these variables can help outpatient healthcare providers adjust how to provide accessible, quality care to the communities they serve.

In this section, I address a review of the supporting literature. First, current studies and findings on telehealth utilization are examined, as are the benefits and barriers of utilization for patients and providers. Health disparities and increased health risk burdens associated with socioeconomic disparity levels are also reviewed. Finally, I complete a thorough review of the literature on how the Covid-19 health crisis has impacted telehealth for providers and patients.

Literature Search Strategy

To provide context and insight into the issues that surround telehealth utilization and socioeconomic disparity level, I conducted a literature review. The review of available literature focused on the concepts of telehealth, patient care within socioeconomically disparate communities, healthcare disparities, adoption and implementation of telehealth or e-health modalities, as well as benefits and barriers of telehealth use before, during, and after the Covid-19 pandemic. The primary resource for

the identification of resources was the Walden University Library. The literature review was conducted through searches for academic, peer-reviewed articles in the following databases: Thoreau, Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, ProQuest Health and Medical, ABI/INFORM, and Academic Search Complete. The following terms were used to search for journal articles relevant to the study: *telehealth, telemedicine, socioeconomic communities, socioeconomic disparity healthcare, healthcare disparities, social determinants of health, telehealth adoption,* and *telehealth providers,* using various combinations and derivatives of each. Numerous articles on related topics of interest were limited to peer-reviewed academic journals, those published within the last 5 years, or were seminal pieces in their respective fields. All articles of potential interest were reviewed by reading the abstract, methods, and results to determine their relevance. The references of all articles were also examined to identify additional articles of interest or authors of significant contribution to the field. In addition, multiple governmental websites were consulted to identify helpful and relevant resources on official or legal descriptions and rulings. The literature review references 62 sources, of which 95% were published between 2018 and 2022. All references are organized and maintained using the Zotero reference management software.

Literature Review

History of Telehealth

Telehealth can be defined as the delivery of care and health-related services through telecommunications and electronic media (Rangachari et al., 2021). Typical forms of telehealth include patient encounters and provider consultations using a phone,

synchronous video visits, asynchronous message and chat exchange, and electronic monitoring devices. The use of telehealth allows healthcare providers to offer patient care, education, and resources through any technology outside of the traditional face-to-face office visit format.

While telehealth has become more readily available in the last decade, telehealth has been a part of the history of patient care for over 125 years. One of the first notations of telehealth utilization can be found in an 1879 Lancet article in which a physician discussed his use of the telephone to reduce unnecessary office visits, just 3 years after the invention of the telephone (Aronson, 1977). Cwiklicki et al. (2021) asserted that the practical applications of telephonic patient care expanded in the 1920s when the radio was used to communicate care regimens from land-based physicians to clinics on ships to care for passengers and crew. In the 1940s, telehealth was extended to radiographs used by doctor's offices and hospital facilities to help connect rural patients to specialty care (Morley, 2021). More modern attempts at bringing telehealth to direct patient care have been impeded mostly by technology limitations at the time (Mann et al., 2020). Access to the technology required to participate in telehealth services is not universal.

Telehealth has a long and transformative history. Today, synchronous and asynchronous telehealth continues to be used to provide access to care for patients around the globe. Telehealth has transformed everyday healthcare delivery by increasing access, reducing barriers for underserved communities, and reducing healthcare costs. Hoffman (2020) stated that while healthcare providers have advocated for the expanded use of telehealth for decades, it was not until the onset of the Covid-19 pandemic that there was

widespread use available for patient care. According to Lieneck et al. (2021), it took as large of a catalyst as a global health pandemic to right-size telehealth and bring it to a broader patient audience.

Benefits of Telehealth Utilization

The goal of telehealth is to make quality, cost-effective care more accessible to patients. Telehealth has been associated with significant benefits to patient care, such as improved health outcomes, increased access to care, reduced overhead and strain on provider resources, reduced patient costs, and improved efficiency (Moss et al., 2020).

Cost-Effective Care

Gaziel-Yblowitz et al. (2021) found that telehealth utilization among participating hospitals improved hospital cost-effectiveness and out-of-pocket patient costs. Mahtta et al. (2021) detailed that lower copays and coinsurance fees for telehealth visits made up significant savings for patients using telehealth as well as additional costs averted, such as those associated with travel and taking time off from work to attend in-person visits. Cabrera et al. (2021) conducted a cost minimization analysis in multiple otolaryngology practices and found that the average cost savings for patients using telehealth visits saved $68 to $900 per visit. An additional study conducted by Jacobs et al. (2020) on the patient savings experienced through the VA National Telehealth Tablet Initiative found that 89% of patients reported saving out-of-pocket costs. A thorough review of patient satisfaction rates associated with the use of telehealth conducted by Nguyen et al. (2020) identified reduced costs as one of the main drivers of patients' high satisfaction with telehealth use.

Improved Patient Outcomes

Patient healthcare outcomes also benefit from the use of telehealth. Mahtta et al. (2021) reported that telehealth visits were associated with improved patient healthcare outcomes. Moreover, Rush et al. (2018) reported that in 11 of 16 conducted studies on the healthcare outcomes associated with telehealth, virtually delivered visits and interventions significantly improved patient healthcare outcomes compared to their control. The remaining five studies showed comparable outcomes to the control. Further studies, as outlined by Noel et al. (2020), showed that patients who experienced telehealth visits were more likely to have medication reconciliation and were 7x more likely to adhere to their prescribed medication schedule than the control group. A study conducted by Wegermann et al. (2021) revealed that video visits, specifically, were associated with fewer medication errors.

Health outcomes have been proven to improve in specific diagnosis and care specializations. For instance, DeNicola et al. (2020) concluded that telehealth utilization was associated with improved healthcare outcomes for OB/GYN patients in nearly all aspects of care, such as obstetrics, breastfeeding, smoking cessation, and schedules for high-risk obstetric care. A 2018 study found that telehealth was linked to improved quality of care and outcomes for heart failure patients. Clark (2018) found that telehealth was linked to lower patient mortality and heart failure readmissions. Hong et al. (2020) showed that in application to physical therapy treatment, telehealth was found to have positive outcomes and symptom reduction in comparison to in-person visits.

Conservation of Resources

Another benefit of telehealth utilization is the conservation of resources for care facilities and providers. Constrained resources, personnel, and personal protective equipment (PPE) during the Covid-19 global health crisis have left care physicians burnt out and facilities overburdened with maintaining care for the public (Iyengar et al., 2020). Zhang et al. (2021) wrote that telehealth plays a crucial role in helping to maximize the use of human resources and conserving medical supplies and PPE while also protecting providers from exposure to the virus. Liu et al. (2020) also detailed telehealth's vital role in patient care during the health crisis by being put in place to help triage and consult with patients where resources were strained. Resource conservation and reallocation were a less pertinent concern prepandemic for many facilities, as noted by Jaffe et al. (2021); however, resources continued to be a major concern for smaller, more rural facilities. Those with limited personnel or access to specialty care will continue to benefit from the conservation of time for their providers and specialists postpandemic.

Convenience

Another commonly cited benefit of the use of telehealth is the increased convenience for patients. Patients often find telehealth visits more convenient with flexible connection options and low time commitment (Gibbons, 2005). Zhang et al. (2021) noted that patients commonly obtain telehealth visits more quickly than in-person visits with providers. Soegaard-Ballester et al. (2018) determined that postoperative telehealth appointments saved an average of 139 to 199 minutes, equitable to 94 to 96% of the time patients would have committed to obtaining an in-person visit when they

considered travel time, wait time, and time reserved for the visit. Donelan et al. (2019) determined that patients were more likely to make follow-up appointments via telehealth than in-person visits due to the perceived convenience level. Snoswell and Comans (2021) concurred, stating that video conference appointments reduced failure-to-attend rates. A study conducted by Powel et al. (2017) found that most patients who used the telehealth visit option were interested in continuing all their future visits through telehealth, and a majority expressed a preference to receive serious results via telehealth so that they had the convenience of being in their own, supportive environments.

Access to Care

One of the most imperative benefits of telehealth utilization is increased access to care for all patients. Providers can offer access to care to patients that would otherwise not be able to travel for in person appointments (Scurrey et al., 2019). Telehealth also improves access by increasing the number of visits available, as they are often less time-consuming for providers, making more appointment slots available each day (Kane et al., 2020). John et al. (2020) stated that the use of telehealth in the Veterans Affairs (VA) liver transplant process substantially reduced the time between referral and initial evaluation and placement on the transplant waitlist, improving access to timely care for countless veterans. The reduced time between seeking an appointment and speaking with a provider was also cited in Howard and Kaufman (2018), stating that finite resources in specialty disciplines often caused long wait times. Telehealth has increased access to appointments, and thus care, for all patients.

The benefits of increased access to care have been most notable for those with historically limited access. Gibbons (2005) detailed that telehealth helps to promote health equity as it allows for additional access to care for patients in underserved communities. Wegermann et al. (2021) expanded on the concept of telehealth in underserved communities when outlining their findings showed that telehealth could mitigate some healthcare disparities for minorities and low-income patients by promoting equal access to specialists and other facilities for those with transportation or social support barriers. Telehealth also aided access to care during the Covid-19 health crisis by providing safe access to all patients, including those historically at higher risk of infection (Zhang et al., 2021). In addition, telehealth has brought about the opportunity for higher-quality care in historically underrepresented neighborhoods. Low-income communities are less likely than higher-income areas to have convenient access to high-quality healthcare facilities and providers (Lazar & Davenport, 2018). Telehealth enables all patients, regardless of their income, to have access to a higher quality of care without concerns about transportation or geographic limitations.

As outlined above, the benefits of telehealth can be substantial to both healthcare providers and their patients. Telehealth helps to offer care options that are more affordable and accessible while resulting in better health outcomes. As issues with quality, cost, and access in low socioeconomic communities are well established in the literature, telehealth positions itself as a potential opportunity to improve care for low-income patients.

Barriers to Telehealth Utilization

While there are significant benefits to telehealth utilization for some, a thorough review of the literature resulted in a list of substantial barriers that patients and providers must surmount in telehealth implementation and utilization.

Infrastructure

One such barrier is provider concern about the lack of telehealth system infrastructure and low levels of training (Zhang et al., 2021). Because the Covid-19 pandemic served as an impetus to the rapid expansion of telehealth in 2020, not all hospitals and care providers were equipped and ready to manage the response with the telehealth infrastructure in place (Childs et al., 2020). Obtaining and maintaining the required hardware and software while navigating changing federal and state legislation was a significant challenge for many providers (Garfan et al., 2021). High-quality audio and visual services at the patient level were imperative for quality visits and accurate assessments; however, many smaller facilities and individual practices were not equipped (Childs et al., 2020). Similarly, Chike-Harris et al. 's (2021) comprehensive review of physician telehealth education showed no consistency in how telehealth or its required equipment was integrated into the curricula, nor was the breadth and depth of the material. Lack of formal training and clinical telehealth guidelines were significant barriers for providers during the rapid transition to telehealth as a primary mode of care delivery (Lieneck et al., 2021). Providers were more satisfied with their telehealth experience, and their transitions to telehealth were easier in situations where they had a large support network and access to strong infrastructure (Kryszak et al., 2022).

Technology

Technology continues to be a considerable barrier to ideal telehealth adoption and utilization by care providers. Saiyed et al. (2021) revealed in their study that many providers felt the available video and picture quality were insufficient to examine patients thoroughly. Zhang et al. (2021) confirmed that many providers reported that the technology did not allow them to note details like facial expressions and body movements, which can be crucial to a proper diagnosis. Without being able to identify these pieces, the inability of the physician to see physical cues leaves patients obligated to fill in the gaps, which can lead to them feeling overwhelmed. Hodgkins et al. (2021) agreed, writing that especially for complex conditions or patients with comorbidities, doctors must rely on all their senses and pick up on peripheral information to diagnose and treat effectively. Moss et al. (2020) showed that even enthusiastic telehealth adopters expressed sincere concerns over the limitations they experience during patient examinations. Ignoring these differences in examination capabilities could raise medical liability concerns. Lieneck et al. (2020) noted the concerns of care providers around the common law legal standard of care and how that will adapt to the limitations experienced by providers through telehealth.

Reimbursements

Reimbursement concerns were top of mind for facilities and care providers when considering telehealth implementation prior to the Covid-19 pandemic. Traditionally, providers were reimbursed at significantly lower rates for telehealth visits than those provided using the traditional face-to-face modality (Zhang et al., 2021). There was no

federal mandate requiring private payers to reimburse telehealth visits at the same rate as in-person visits; however, some states had passed individual parity laws (Harvey et al., 2019). Moss et al. (2020) asserted that the lack of parity in some states acted as a strong disincentive to providers. Harvey et al. (2019) showed that states with parity laws had significantly higher utilization of telehealth. The study noted that patients within parity states were nearly 30% more likely to receive a telehealth visit.

At the start of the Covid-19 pandemic, many providers quickly implemented telehealth to minimize direct-contact spread of the virus (Moss et al., 2020). As telehealth became the primary strategy to reduce transmissions, the Centers for Medicare and Medicaid (CMS; 2020) and private health insurers increased the reimbursement rates for telehealth. The state and federal governments passed the Consolidated Appropriations Act of 2021 and the American Rescue Plan Act of 2021 to quickly change reimbursement rates to achieve parity between telehealth and traditional in-person visits (U.S. Department of Health and Human Services, 2022). The adjustment of telehealth reimbursement rates corresponded with other regulatory changes made to incentivize swift telehealth adoption to limit face-to-face visits and slow the spread of Covid-19 (Lieneck et al., 2021). While these temporary changes in reimbursement policies have opened providers and facilities up to offering more telehealth to their patients, these policies will expire at the end of the global health crisis unless more permanent parity laws are made (Gaziel-Yblowitz et al., 2021). While the future of telehealth reimbursement is unknown, Moss et al. (2020) found that 73.9% of providers surveyed

said they would like to continue utilization of telehealth services postpandemic, while another 17.6% said they were unsure.

Technical Literacy and Access to Technology

Another barrier to the successful utilization of telehealth is the availability of technology and the technical literacy level of patients. Zhang et al. (2021) emphasized that the availability of technology capable of completing a telehealth visit is not available in all homes. Hodgkins et al. (2021) detailed that one in three households in the United States headed by someone 65 years of age or older do not have computer access in their homes. Furthermore, more than half of them have no smartphone access. For those with computers or smartphones, concerns around internet connectivity and technological literacy still exist (Zhang et al., 2021).

These are particularly challenging barriers for vulnerable populations with traditionally limited access to technology and broadband internet access (Benda et al., 2020). Lower access to technology and internet and lower digital literacy levels are found in socioeconomically disadvantaged communities (Dixit et al., 2021). A study completed by Albon et al. (2021) found that patients who identified themselves as low-income were less likely to think telehealth was easy to use than those that had not identified themselves as low-income. Chang et al. (2021) noted that socioeconomically disadvantaged patients disproportionally experience technology and digital health literacy barriers. These lower-income communities experience multiple barriers that lead to significant healthcare access and utilization disparities (Ray & Kahn, 2020). Darrat et al.

(2021) identified that the same characteristics associated with inequitable access to care for low-income communities are also associated with disparate access to telehealth.

The boundaries surrounding full implementation and adoption of telehealth are significant. Issues such as access to care and technical literacy pose real problems for the adoption of telehealth by patients, to which low socioeconomic patients are especially susceptible. Lack of meaningful infrastructure support and concerns around reimbursement rates for telehealth can act as justification for delaying the implementation of telehealth for patient care. The resulting lower rate of implementation culminates into the limited availability of telehealth for patients, thus limiting their access to the aforementioned benefits, such as improved access and healthcare outcomes.

Health Disparities for Low-Income Patients

Patients served in socioeconomically disparate communities are at higher risk for poor health outcomes and have the most to gain from the benefits of telehealth while suffering the most from the barriers discussed here. The CDC (2020) defined health disparities as preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health experienced by socially disadvantaged populations. According to Shavers' seminal 2007 study, socioeconomic status is one of the most common contributors to healthcare disparity experienced in the United States. Health disparities result from factors such as poverty, suboptimal environments, poor education opportunities, and limited access to healthcare. These factors are more commonly referred to as the social determinants of health (CDC, 2022).

Hawkins et al. (2020) emphasized that social determinants of health and socioeconomic factors significantly impact individuals' quality of life and overall health. Higher socioeconomically disparate populations have higher rates of chronic health concerns and are at a higher risk for infections and other health complications (Khatana & Groeneveld, 2020). Access to the goods and services that contribute to good health, like quality schools, healthy grocery stores, and quality care facilities are determined by an individual's community and access to financial resources (Shavers, 2007).

It has been established that socioeconomically disparate populations experience higher health burdens and poorer health outcomes. The Covid-19 pandemic has placed these populations at higher risk for viral infection while leaving them with fewer opportunities to obtain care (Maroko et al., 2020). Fefferman et al. (2021) found that low-income households have experienced increased poverty levels and a lack of access to healthcare services during the pandemic, limiting their ability to prevent infection.

The literature has shown that access to quality healthcare in low-income communities is a significant concern that contributes to their experienced healthcare disparities. Teixeiera de Siqueira-Filha et al. (2022) affirmed that healthcare facilities were often scarce in low-income communities, and those available were of poorer quality than in higher-income communities. Structural disparities in access to health facilities were especially noticeable in these communities, resulting in a lack of access for low-income patients (Guo et al., 2022). While facilities are less likely to be found in poor communities, these patients are also less likely to have stable transportation, making it burdensome to reach facilities outside their direct neighborhoods, leading to a lower

likelihood of maintaining preventative care (Lazar & Davenport, 2018). In the facilities these patients can access, they often find it more difficult to obtain quality care than in higher-income communities. Facilities with higher socioeconomic status experience lower wait times. Patients seeking care in facilities located in lower-income communities wait on average 53% longer than their higher-income counterparts (Ohlson, 2020). These logistical complexities often result in lower healthcare utilization for low-income families, perpetuating higher health burdens and poorer health outcomes (Lazar & Davenport, 2018).

Low-income individuals are more likely to work in hourly, or service positions deemed "essential" during the early pandemic shutdown days or in positions that were eliminated (Carethers, 2021). Those in essential roles were limited in their abilities to socially distance, which put them at higher risk of contracting the Covid-19 virus. Furthermore, socioeconomically disadvantaged communities are more likely to experience crowded living conditions and high utilization levels of public transportation, limiting opportunities to implement self-isolation and physical distancing (Mein, 2020).

Low socioeconomic patients are at risk for worse health outcomes due to health disparities. The results of these health disparities leave low-income community members with higher health burdens and poorer health outcomes compared to higher-income patients. Care quality and availability add another layer of complexity, as low-income communities often have more limited access to care facilities per capita. Socioeconomically disadvantaged patients find themselves sicker than their higher-income counterparts, with less access to quality care.

Telehealth and the Covid-19 Health Crisis

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), or Covid-19, was initially noted as a pneumonia outbreak in December 2019 (Ciotti et al., 2020). The Kaiser Family Foundation (2022) statistics show the virus eventually spread across the globe, infecting hundreds of millions of individuals, with over 6 million deaths recorded to date. Public officials began mandating lockdowns and stay-at-home orders to slow the spread of the virus and protect vulnerable populations. Baker et al. (2021) wrote that hospitals and other care facilities began to implement telehealth solutions to limit face-to-face health visits to control the spread of the virus. In their 2020 article, Shachar et al. stated that the rapid expansion of telehealth had been one of the most remarkable changes to occur in healthcare due to the Covid-19 pandemic.

Although telehealth has been utilized in some part since the 1800s, Chang et al. (2021) wrote that its uptake and adoption were slow prior to the pandemic. Despite the current public health emergency, the need to continue to provide care to patients forced care facilities and providers to push through many of the obstacles and barriers they had with full telehealth implementation (Lieneck et al., 2021). A McKinsey and Company study (as cited in Bestsennyy et al., 2021) showed that while there was an initial peak increase in the utilization of telehealth in April 2020, utilization has stabilized to approximately 38x the visit rates seen prior to the onset of the Covid-19 pandemic.

In their 2021 article on the opportunities and barriers for telehealth implementation, Zhang et al. pointed out that to help facilitate this unprecedented change in the primary mode of care delivery, the federal and state governments had to waive and

modify many pre-existing policies. Temporary emergency measures around telehealth reimbursements, privacy/cybersecurity, provider licensing, technology requirements, and liability coverage were all changed to allow for swift telehealth adoption by all willing facilities and providers (Hoffman, 2020). Moss et al. (2020) asserted that these policy changes incentivized providers to accelerate the implementation of telehealth services that many already had considered. In their 2021 systematic review, Lieneck et al. asserted that many of the policies that were temporarily changed to help facilitate the adoption of telehealth were initially purposeful in their desire to promote the more profitable in-person care model.

Telehealth experienced a rapid expansion in the face of the Covid-19 health crisis. Rapid, temporary changes were made to legislation to help adjust to the growth of telehealth, such as measures around provider licensing, liability insurance, and insurance reimbursement rates. These were all quickly implemented to allow for the expanded use of telehealth to provide an alternative to in-person care and facilitate social distancing and stay-at-home orders. The pandemic helped to renegotiate and facilitate quick resolutions on barriers that would have taken years or decades otherwise.

Definitions

The following terms are defined for the purposes of this study as follows:

Area Deprivation Index: A multifactored measurement of a neighborhood's socioeconomic deprivation and adversity level (Mora et al., 2021).

Asynchronous care: A care interaction in which the patient and care provider are not communicating simultaneously and experience a delay between transmission and receipt of information (Chan et al., 2018).

Healthcare disparity: Preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health experienced by socially disadvantaged populations (CDC, 2022).

Medication reconciliation: The process of creating an accurate list of the medications a patient is taking against those that have been prescribed while reviewing for allergies, side effects, and contraindications (Penm et al., 2019).

Social determinants of health: The conditions in which people are born, grow, live, work, and age. These circumstances are shaped by the global, national, and local distribution of money, power, and resources. The social determinants of health are primarily responsible for health inequities (Hill-Briggs et al., 2020).

Socioeconomic status: A measure of an individual's combined economic and social status (Baker, 2014).

Synchronous care: A real-time interaction between a patient and a care provider without delay in communication (U.S. Department of Healthcare Services, 2021).

Telehealth: The delivery of care and health-related services through telecommunications and electronic media (Rangachari et al., 2021).

Assumptions

Using a secondary data source requires an assumption on the author's part. An assumption was made in this study regarding the accuracy of the data obtained in the

secondary dataset. The initial quality of the data and its collection method are out of the researcher's control, making secondary data sources nearly impossible to validate (Sorenson et al., 1996). This study cannot demonstrate that the data were gathered, billed, and reported accurately. There are shared responsibilities between the provider's office, insurance companies, and data analysts to ensure strict data accuracy. It was assumed in this study that all data obtained were accurate and credible.

Scope and Delimitations

The focus of this study was to determine the relationship between socioeconomic disparity levels and telehealth utilization in California outpatient healthcare settings. California has distinguished itself as the state with the highest utilization of telehealth visits while holding some of the most stringent laws and requirements for use (Lanning, 2022; Barden, 2022). The scope of this quantitative study was limited to California outpatient providers and is not generalizable amongst other states. The focus of this study was on the selection of a telehealth option based on socioeconomic disparity level, so providers where telehealth is not an option for care, such as chiropractic and inpatient care, were excluded.

Limitations

Limitations are potential weaknesses or restrictions that are out of the researcher's control but can affect the study design or results (Theofanidis & Fountouki, 2018). A limitation of this study was the use of a secondary dataset. The dataset consisted of claim-level details for patient care interactions collected by the insurance carrier and processed for their employers. As such, all patients represented by these claims have health

insurance through their employers. Uninsured populations or those that receive their coverage through programs like Medicare, Medicaid, or through privately funded health insurance were not represented in this study.

Significance

This study is significant in that it adds to the existing knowledge and study on the current utilization of telehealth in low socioeconomic communities. While there is a plethora of research on the existence of inequities in healthcare access in lower socioeconomic communities, no research has been completed to determine if there is a significant association between a community's socioeconomic disparity level and telehealth utilization by its healthcare providers. The outcome of this study could provide information to health service organizations in improving access to care by promoting the utilization of telehealth among healthcare providers serving disparate communities.

Summary and Conclusion

Previously completed research has demonstrated numerous potential benefits to the utilization of telehealth (Moss et al., 2020; Zhang et al., 2021). Research has also shown us that higher levels of socioeconomic disparity are associated with limited access to care opportunities (Lazar & Davenport, 2018; Teixeiera de Siqueira-Filha et al., 2022). In this study, I have added to the limited knowledge base surrounding these topics and determine if there is a relationship between the community's socioeconomic disparity level and the utilization of telehealth for patient care. This research can provide guidance to healthcare providers to increase the availability and utilization of telehealth services within socioeconomically disparate communities.

Section 2 of this study outlines the research design and dataset that were used to answer the outlined research question. Section 2 includes detailed explanations around design methodology, analysis plans, sampling strategies, threats to validity, and ethical policy adherence.

Section 2: Research Design and Data Collection

Introduction

The currently available literature has addressed how telehealth has significantly changed modern healthcare and the significant benefits associated with its implementation and use. Further literature has outlined how the barriers associated with implementing and using telehealth are more likely to affect providers serving in socioeconomically disparate communities. This quantitative study addressed the gap in the literature that reveals the relationship between the socioeconomic disparity level of a community and the telehealth utilization by its outpatient healthcare providers.

I analyzed the secondary data to determine if there is a difference in the utilization of telehealth services by providers in disparate communities compared to providers that serve higher-income, less disparate communities. Section 2 of this study addresses the research design used for this study and the rationale. Next, I describe the methodology used, including sampling procedures, how the data were obtained, and the data analysis plan used in the completion of this study. Finally, in this section, I discuss threats to this study's validity and the ethical procedures that were followed to ensure the validity and accuracy of the study process and findings.

Research Design and Rationale

This quantitative correlational study was able to determine the relationship between the socioeconomic disparity level of the community (independent variable) and telehealth utilization (dependent variable) among outpatient healthcare providers. A descriptive correlational study design was used to assess the relationship between the

independent and dependent variables (see Asamoah, 2014). This study used logistic regression analysis to determine the predictive relationship between the socioeconomic disparity level of the providers' community and the telehealth utilization by outpatient healthcare providers.

Methodology

Population

The target population for this study was outpatient healthcare providers in California. The sample for this study included all outpatient healthcare providers in California with the place of service identified within the dataset. The dataset was obtained with permission from a private insurance broker database accessible to me as an executive of the firm. The dataset used for this study included claims-level details for visits that were completed by outpatient healthcare providers in California. The data included in the dataset detailed the provider's address, the date of each visit, and the place of service, which is used as a telehealth utilization indicator. The dataset contained approximately 43,787 claims within the study timeframe. The exclusion criteria for this study included missing or invalid data, any visits conducted outside of California, or visits coded as inpatient services or outside the specified time frame for the study of January 1, 2020 – December 31, 2021.

Sampling and Sampling Procedures

Different study designs have varying requirements in terms of sample size and strategy. For logistic regression, the minimum sample size recommended is 500 to derive the statistical power that represents the parameters (Bujang et al., 2018). In this study, the

sampling strategy for utilization in SPSS was simple random sampling without replacement. Simple random sampling results in each sample having an equal opportunity and probability of being selected. Simple random sampling without replacement is a subset of random sampling in that each entry has an equal probability of being selected. However, once a number is selected, it cannot be selected again (PennState, 2022). Disqualifying the number for reselection ensures each unit in the population has an equal opportunity for inclusion while controlling to prohibit resampling after the original selection (Bhardwaj, 2019). Simple random sampling removes the potential for sampling bias and ensures a high level of accuracy compared to other sampling strategies available (Bhardwaj, 2019).

Data Access and Reliability

The secondary dataset used in this study was comprised of claims submitted for reimbursement by healthcare providers for services rendered to insured patients. The data were collected by commercial insurance carriers for billing and utilization tracking purposes. Permission was obtained to access the data for the purposes of this study from the president/CEO of the firm to which the dataset belongs. The data were pulled from Tableau, a data analytics tool with server access to the Snowflake database that acts as a repository of the firm's carrier data.

The accuracy and reliability of the dataset used in this study are high. As the information is created and maintained by the primary source, the insurance carrier, there is little room for error. Claims data uniformity and consistency are regulated by the U.S. government, making it reliable and consistent across all commercial and state-run health

insurance carriers and healthcare visits. The level of uniformity made the sampling the ideal dataset for this study. The uniformity of the data and large sample size made it ideal for utilization in answering the research question in this study.

The data were filtered to show only healthcare visits conducted by healthcare providers located in California. It was further filtered to remove visits that occurred in the inpatient setting or alternative settings such as ambulance, air transport, or laboratory. Finally, the data were filtered to show visits that occurred from January 1, 2020 through December 31, 2021. For this study, visits that were missing data, such as the place of service indicator or the healthcare provider's address, were excluded from the study.

Power Analysis

A Power Analysis is an analysis used to determine if a test has enough power to make a valid and accurate conclusion (PennState, 2022). Power is the probability of detecting an effect (UCLA, 2021). It is used to determine the minimum sample size that can be used in a study to result in a valid significance level.

To determine the required sample size needed to obtain a valid result, a G*Power priori analysis was completed. The G*Power analysis calculated the minimum sample size for a two-tailed logistic regression analysis as 573. The input parameters are an odds ratio of 1.5, an alpha of 0.05, and a confidence interval of 0.95, with a binomial x distribution. An alpha of 0.05 was chosen as it is the most commonly used level of significance in studies. While there is no statistical reason for the choice of 0.05, it has become conventional practice and a widely accepted standard (Lavrakas, 2008). A confidence interval of 0.95 is most commonly chosen, as it displays a high level of

confidence (Sullivan, n.d.). This study used a sample size of 1,000. A sample size of 1,000 surpasses the sample size needed to obtain a valid response according to the G*Power analysis. Larger sample sizes are preferred to closely approximate the population (Andrade, 2020).

Operationalization

The dependent variable of this study was telehealth utilization indicated as the place of service for the visit. Within the dataset, the place of service was listed as a telehealth visit or a non-telehealth visit, such as an in-person office visit. For the purposes of this study, the dependent variable was dichotomized, with 0 = not telehealth and 1 = telehealth. The independent variable for this study was the socioeconomic disparity level of the community in which the healthcare provider practices. Socioeconomic disparity level is measured by the U.S. Health Resources and Services Department's Area Deprivation Index (ADI), as determined by the provider's address. The ADI rating is a continuous level variable representing a national percentile of disparity from 0 to 100. The ADI is a composite score of an area's disparity rating, created from 17 census variables such as median income, average education level, percentage of families below the poverty level, and percentage of households without a vehicle (Maroko, 2016). For the purposes of this study, the ADI rating was broken into tertiles, with the scores discretized into low (ADI: 0-32), middle (33-66), and high-disparity categories (67-100); (Banwell et al., 2022; Callahan et al., 2020; Corkum et al., 2022). Within the data, the independent variable was sorted into categorical tertiles, with 0 = low disparity tertile, 1 = moderate disparity tertile, and 2 = high disparity tertile.

Data Analysis Plan

The analysis for this study was completed using IBM's Statistical Package for Social Sciences (SPSS) version 28. Once uploaded, the data were screened for accuracy and comprehensiveness by ensuring no identified data errors or missing values and rectifying any coding errors found (see IBM, 2021).

Research Question and Hypothesis

Research question: What is the association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California?

$H_0$1: There is no statistically significant association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California.

$H_1$1: There is a statistically significant association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California.

Statistical Analysis Plan

Logistic regression was used to test the hypothesis in this study and answer the research question. Some basic assumptions and conditions must be met when using logistic regression to ensure the outcome can be used to infer relationships or predict values. First, logistic regression requires the dependent variable to be binary or dichotomous in value (Harris, 2021). Second, the independent variable(s) must be continuous or categorical (Statistic Solutions, 2022). Third, there must be no multicollinearity amongst independent variables (Statistic Solutions, 2022). Finally, there

must be a linear relationship between the independent variable and the log transformation of the dependent variable (Hasan, 2020).

Prior to starting the data analysis, the dependent variable was confirmed as dichotomous, and the independent variable was confirmed as categorical. As the study only contained one independent variable, there were no concerns regarding multicollinearity. Finally, during the analysis completed on SPSS, the linear relationship between the independent variable and the log transformation of the dependent variable was tested using a Box-Tidwell Test. The purpose of this test was to determine the linearity between the predictor and the logit (see Leung, 2021).

For this logistic regression analysis, the confidence interval was set to the standard 0.95 or 95%. The alpha level for this analysis was set to 0.05 to determine statistical significance, which is standard practice in logistic regression analysis (National Institute of Standards and Technology, n.d.). With the alpha level set at 0.05, any *p*-value below the set alpha value signifies that a statistically significant relationship is present and the null hypothesis is rejected. The odds ratio was calculated during the SPSS analysis and used to help interpret the analysis results and determine predictability.

Threats to Validity

External Validity

External validity is a measurement of to what extent one study's results can be applied to a broader population or populations outside of the original study (Findley et al., 2021). This study is replicable, and the population included in the study is significant enough that it evokes external validity. However, the secondary dataset for this study was

created through claims data by insurance carriers. As such, these data do not include information on care providers that do not accept insurance for their visits. As only a small number of California doctors choose not to accept private insurance, this threat to external validity is minor (see Radcliffe, 2017).

Additionally, as the dataset used in this study was comprised of claims from private health insurance companies, none of the visits used in this study were conducted with Medicare or Medicaid recipients. Most healthcare providers that accept Medicare and Medicaid also accept commercial insurance, so the threat to external validity posed by this concern is minor (see Boccuti et al., 2015).

Finally, this study's population was healthcare providers in California. As such, the predictive relationship between the independent and dependent variables demonstrated in this study cannot be generalized to other states or territories.

Internal Validity

In contrast, internal validity examines whether a study allows trustworthy answers based on how the study was designed, conducted, and interpreted and to what extent systematic error is present (Andrade, 2018). In order to increase the internal validity of this study, proper data collection and analysis was strictly observed. Furthermore, the study design and sample size were carefully considered. A large sample size and statistical power was used within this study to increase internal validity (see Patino & Ferreira, 2018). While every reasonable consideration was taken in this study's design and analysis, the study still has notable limitations, such as the use of secondary data, as previously outlined in Section 1.

Construct Validity and Statistical Conclusion Validity

Construct validity is the measurement of how well a study measures or evaluates what it was intended to evaluate (Criteria, 2022). In order to improve construct validity, all measurements within this study were well defined in Section 1 and based on preexisting knowledge and term definitions. Statistical conclusion validity was ensured in this study through thoughtful study design and thorough analysis. The logistic regression analysis is widely used in similar studies and is a valid statistical analysis method.

Ethical Procedures

The dataset used for this study is not publicly published. Permission to use the dataset for this study was granted directly from the president/CEO of the organization to which the data belongs. The dataset used for this study included no identifiable information on patients or protected health information of any kind. When the data were downloaded, strict privacy and security measures were followed. The data were maintained on my personal laptop, used only for the purposes of this doctoral coursework. The file in which the data was held was password protected. Further, the computer is encrypted and password protected and was not removed from my personal office. Data will be maintained for 5 years after this study's completion, then destroyed for security purposes. The data obtained for this study were used solely for the purposes of this study in accordance with Internal Review Board (IRB) rules and guidelines. There are no conflicts of interest or power to note regarding the data obtained for the purposes of this study. The IRB approval number for this study is 06-23-23-0411223.

Summary

This section detailed the research design for this study and how the specific design addresses the association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California. Next, I reviewed this study's methodology and design, including the research design and rationale, data analysis plan, threats to validity, and ethical procedures. This secondary quantitative study used logistic regression to answer the research question. The sample population for this study was outpatient healthcare providers practicing in California. This section enumerated logistics regression assumptions that were confirmed and how results were interpreted. Threats to validity were addressed, including the specific steps to minimize threats and ensure validity. Finally, this section outlined ethical considerations and privacy and security measures that were taken to ensure the anonymity and security of the data. The next section will present the study's complete findings resulting from the data analysis and summarize the answers to the research question.

Section 3: Presentation of Results and Findings

Introduction

To complete the analysis for my study, I conducted a logistic regression to determine the relationship between the socioeconomic disparity level of the community and telehealth utilization among outpatient healthcare providers in California. I used logistic regression in this case to determine if the selection of visit type could be predicted by the disparity level of the provider's service area. I answered the following question: What is the association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California?

$H_0$1: There is no statistically significant association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California.

$H_1$1: There is a statistically significant association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California.

In Section 3, I provide results and findings from my analysis. This section of the study includes details around data collection and the characteristics of the dataset, as well as details on the analysis. Additionally, this section details the results from the analysis, including post-hoc analyses.

Secondary Dataset Collection

Time Frame and Response Rates

The dataset used in this study included healthcare visits conducted by outpatient healthcare providers in California from the timeframe of January 1, 2020 to December 31, 2021. The data were created and maintained by commercial insurance carriers during their billing processes. There was no response required of the patient or provider to complete the dataset used for the completion of this study.

Discrepancies From Original Research Plan

During the data scrubbing process and preliminary analysis, I encountered some areas of discrepancy from my original research plan. These areas of discrepancy included missing data elements and a reconsideration of sampling inclusion and exclusion strategy.

During the coding of the community disparity level, I determined some visits were unable to be assigned an ADI score. The ADI tool suppresses the assignment of an ADI score in instances where there is too low of a residential population or where there are found to be high levels of group quarters such as nursing homes, college dorm housing, and military barracks. When assigning ADI ratings to the cases in the dataset, a total of 728 cases were labeled as “Suppressed.” These cases were removed from the dataset, leaving the remaining 43,787 cases available to pull from for the final sampling.

The other discrepancy encountered occurred once I began my preliminary work leading up to the analysis. There was a notable imbalance in the frequency of occurrence of each option for Place of Service within my independent variable. Office visits accounted for 83.6% of all cases included in my dataset (see Table 1). In order to be able

to accurately calculate the relationship between the independent and dependent variables, I adjusted my sampling technique to pull a random sample of 500 cases of each Place of Service option, resulting in an even occurrence of each for a total sample size of 1,000 cases for this study (see Table 2).

Table 1

Frequency by Telehealth Utilization Prior to Random Sampling

Modality of care	Frequency	Percentage
Office	36,618	83.6%
Telehealth	7,169	16.4%
Total	43,787	100%

Table 2

Frequency by Telehealth Utilization After Random Sampling

Modality of care	Frequency	Percentage
Office	500	50%
Telehealth	500	50%
Total	1,000	100%

Baseline Descriptives and Demographic Characteristics

The study sample included all outpatient healthcare providers who conducted an office or telehealth appointment during the selected timeframe (N = 44,806). Cases that were missing information required for the study, such as address or place of service, were excluded (N = 44,515). Additionally, any case where an ADI score could not be assessed due to suppression was excluded (N = 43,787). The final dataset in which I could select a random sample included represented a total of 43,787 cases (see Table 3).

Table 3

Sample Exclusion Overview

Exclusion Criteria	Cases	Total Cases
Total initial sample size	44,806	
Cases with service address	44,605	
Cases with place of service	44,515	
Cases with assigned ADI	43,787	
Final dataset		*N* = 43,787

Sample Proportionality

The dataset used for this study was a private dataset composed of claims from commercial health insurance companies. As such, care providers who only provide care to patients with Medicare or Medicaid coverage were not included. As only a small number of California doctors choose not to accept private insurance, this threat to external validity is minor (see Radcliffe, 2017). Additionally, the scope of this study was limited to outpatient healthcare providers in California. Generalizability outside of the California healthcare landscape is unknown and cannot be assumed across other states and territories. Probability sampling, specifically random sampling, was used to select the cases for this study. The results and related findings of this study are generalizable within the initial scope.

Results

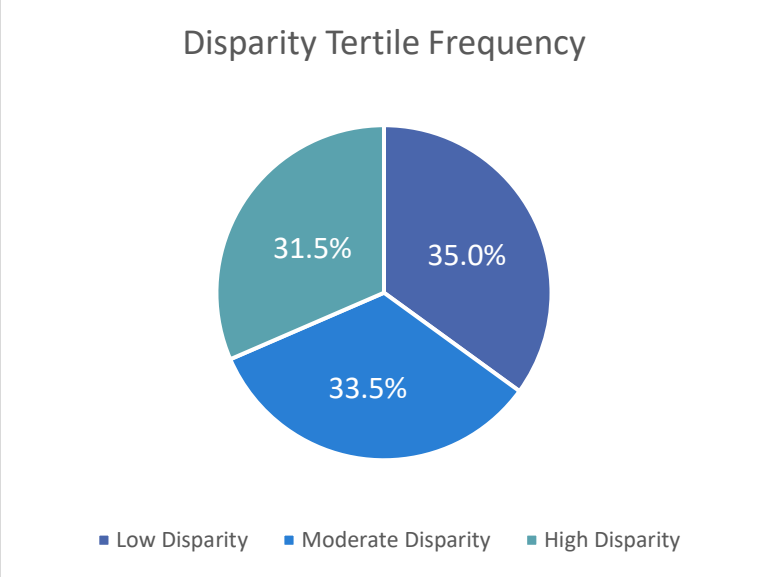
Descriptive Statistics

The secondary dataset used for this study contained 43,787 cases usable within this study. This was reduced via random sampling to a total of 1000 cases (see Tables 1 and 2). A total of 315 cases were found to have occurred in high disparity communities

(31.5%), 335 cases were associated with moderately disparate communities (33.5%), and the remaining 350 cases were associated with low disparity communities (see Figure 2).

Figure 2

Disparity Tertile Frequency



Statistical Assumptions

Prior to completing the analysis of the dataset, I confirmed the data fit the requirements of a binary logistic regression analysis and as well as the required assumptions such as dichotomous dependent variable, at least one independent variable that is either continuous or nominal, and independence of observations (see Laerd Statistics, 2018).

Prior to analysis, the dependent variable, telehealth utilization, was confirmed as dichotomous. The variable was measured as 0 = office visit, and 1 = telehealth visit. This met the assumption requirements for binary logistic regression.

Binary logistic regression analysis requires all independent variables be expressed as nominal or continuous measurement. The independent variable for this study, disparity level, was confirmed as nominal. This met the assumption for this analysis model.

Finally, binary logistic regression requires that all variables selected for study are independent of one another and mutually exclusive (Laerd Statistics, 2018). Both telehealth utilization (dependent variable) and disparity level (independent variable) are independent from each other as each finding of telehealth has demonstrated they can be found on all disparity levels. This satisfies that the assumption has been met.

Statistical Analysis Findings

Binary logistic regression was used in the assessment of the relationship that exists between the use of telehealth by outpatient healthcare providers in California and the community disparity level. I used IBM's SPSS version 28 to complete my analysis. A total of 43,787 usable cases were included in the secondary dataset (see Table 3), of which 1,000 were random sampled for use in this study.

The study was a favorable fit for a logistic regression. The findings detail the chi-square at 203.198, degrees of freedom of 2, and a *p*-value of < 0.001. The full model was calculated with a *p*-value of < 0.001. A Hosmer and Lemeshow goodness of fit test was conducted to show a *p*-value of 1.00 (see Table 4). As a statistically significant result ($p < 0.05$) would indicate a poor fitting model, the *p*-value of 1.00 is further indication the model selected is a good fit for this study (see Laerd Statistics, 2018). Table 5 demonstrates observed and predicted classifications, indicating sensitivity and specificity.

Table 4

Hosmer and Lemeshow Goodness of Fit Test

Step	Chi-square	*df*	Sig.
1	.000	1	1.00

Table 5

Observed and Predicted Classifications

Step			Predicted utilization		
1	Observed utilization		Office	Telehealth	Percentage correct
		Office	419	81	83.3%
		Telehealth	231	269	53.8%
	Overall %				68.8%

Table 6 identifies identified the independent variable, community disparity level, as a tertile. The high disparity and low disparity tertiles were statistically significant (p = <0.001), while the moderate disparity tertile was found to be statistically insignificant (p = 0.299). The data shows that low disparity communities had 3.72 times higher odds of receiving care through a telehealth modality ($p < 0.001$) comparative to the constant reference, moderate disparity. Those in highly disparate communities had 0.338 times lower odds of receiving care through telehealth comparative to the reference ($p < 0.001$).

Table 6

Contribution of Independent Variable to Model

Step	Disparity tertile grouping	Sig.	Exp (B)
1	State grouping	<.001	
	High disparity	<.001	.338
	Low disparity	<.001	3.720
	Constant (moderate disparity)	.299	.893

Based on these findings, I rejected the null hypothesis as I was able to demonstrate a correlative relationship between telehealth utilization by outpatient healthcare providers in California and the community disparity level. The model was statistically significant, $x^2(2) = 203.198$, $p < 0.001$. According to the Nagelkerke R^2Summary results, the model was able to explain 24.5% of the variance (Laerd Statistics, 2018). Sensitivity was 53.8%, specificity was calculated at 83.8%, and the positive predictive value was 76.8%. Lower disparity communities are more likely to have access and receive telehealth care than high disparity communities.

Summary

For this study, I used a binary logistic regression to determine there was a statistically significant relationship between telehealth utilization by outpatient healthcare providers in California and community disparity levels. The results demonstrated that lower disparity communities are more likely to receive care using a telehealth modality than high disparity communities.

In the final section of this study, I review the purpose and nature of the study, explain how these findings extend the knowledge of telehealth use in relation to socioeconomic disparity in patient care, discuss the limitations this study subject to, and identify my recommendations for further research to extend the knowledge base on this topic. Finally, in Section 4, I discuss the implications of these findings to professional practice and positive social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

Low socioeconomic status continues to be a significant predictor of poor health, access to care, and quality of care received in the United States (Cunningham, 2018; McMaughan et al., 2020). Telehealth offers a growing opportunity to provide an increase to access to quality care as well as other identified benefits such as reduced out of pocket costs, increased patient outcomes, and increase in convenience. Despite the research available on the benefits of telehealth for disparate communities, there has been limited research on the availability of telehealth in these care service areas.

With this study, my goal was to add to the current body of knowledge around telehealth in disparate communities and identify if this modality of care was readily used to the same extent as it was in higher income communities. With the use of a private secondary dataset, I completed a quantitative research study to determine if there was a statistically significant relationship between telehealth utilization by outpatient healthcare providers and a community's disparity level. I found a statistically significant relationship between telehealth use and community disparity level. Telehealth use was 3.27 times more likely to occur in a low disparity community. Similarly, telehealth use was 0.338 times less likely to occur in a high disparity community. While telehealth is likely to result in better health outcomes and better access to care, it is not as heavily utilized in high disparity communities. This research was needed to build on existing research and knowledge in the field and encourage further conversations in the professional practice of patient care around treatment in disparate communities.

Interpretation of the Findings

The research question was as follows: What is the association between socioeconomic disparity level and telehealth utilization among outpatient healthcare providers in California?

While previous literature documented the benefits of telehealth utilization as well as the disparity in access, quality, and patient outcomes for low socioeconomic communities, there was a gap in available research on whether low socioeconomic communities had equal access to and utilization of telehealth.

I completed a binary logistic regression that determined there is a statistically significant predictive relationship between a community's socioeconomic disparity level and utilization of telehealth among its outpatient healthcare providers. I found that there were higher rates of telehealth utilization in higher income, lower disparity communities while lower income, higher disparity neighborhoods saw less telehealth utilization by its outpatient healthcare providers.

The findings of this study are consistent with findings on benefits and barriers of telehealth utilization found in the available literature. Many of the barriers to telehealth implementation and utilization such as initial investment costs, technology barriers, and technical literacy are more likely to impact patients in high disparity communities (Moss et al., 2020; Zhang et al., 2021). Lower use of telehealth in these communities is likely due to lower technology literacy levels and lower availability of the technology and internet access that is sufficient for telehealth visits. The higher use of telehealth in higher income, less disparate communities is reflective of the increased likelihood that patients

in their service area would have access to the needed technology and a higher literacy level. Additionally, providers who serve a higher income community are more likely to support patients with health insurance coverage and sufficient capital to invest in the initial infrastructure.

The results of this study contribute to the existing knowledge base by extended the available, quantifiable data than could further discussions on professional practice in low socioeconomic communities. Previous literature available on telehealth utilization by socioeconomic status did not provide comparison analysis. This study provides proof of decreased utilization in more disparate communities and a higher utilization in less disparate communities, consistent with available literature.

Findings in Context of Theoretical Framework

The findings of this study are in line with the selected theoretical framework of this study. Bronfenbrenner's ecological systems theory asserts that the opportunities afforded to individuals through their communities, such as the number of health facilities available and the quality-of-care providers, can promote health or health disparities from birth (as cited in Reifsnider & Forgione, 2005).

A core component of Bronfenbrenner's theory was the five levels of influences on individuals, arranged based on the level of effect it has on an individual's upbringing and wellbeing. Bronfenbrenner stated that an individual's microsystem has the largest effect on their outcomes, of which their community or neighborhood belongs (as cited in Guy-Evans, 2023). The availability of healthcare and access to telehealth has the potential to have significant long-term effects on overall wellbeing and health outcomes.

An individual's socioeconomic status is also considered a part of their microsystem, as such was considered by Bronfenbrenner to have a significant impact on their wellbeing and health (Guy-Evans, 2023). As noted in the study, a more disparate community was associated with less opportunities for telehealth, which studies show improves health outcomes (see Moss et al., 2020).

The findings of this study corroborated that telehealth, a care delivery modality with many well-established benefits, were not as readily available in higher disparity communities. This study proved there is a statistically significant disparity in its availability based on one's community.

Limitations of the Study

There are notable limitations to this study that are applicable. First, the secondary dataset was limited to the use of cases of outpatient healthcare providers in California. Therefore, the results are not generalizable to other states or territories.

The use of a secondary dataset in and of itself does represent another notable limitation of this study. The results of this study rely on the accuracy and validity of the data provided. The data were created and managed by commercial insurance carriers, created for the internal purpose of billing and documentation. As they are subject to state and federal regulations on the collection, processing, and storing of the care data used in this study, this represents a very small opportunity for reliability limitations.

The secondary dataset used for this study required sampling. The initial dataset had a notable uneven number of in office visits (36,618) and telehealth visits (7,169). In order to determine the predictive relationship that existed between the independent and

dependent variable, I had to use a random sampling of 500 in office visits and 500 telehealth visits for a total of 1,000 included cases in the study. The choice of using an even number of cases for each type of visit for this study could be considered a limitation of this study as it was not representative of the actual cadence of use demonstrated in the dataset. As the purpose of the study was to determine the relationship between telehealth use and disparity level, I believe it had very little effect on the generalizability of the results.

Finally, as the secondary dataset used in this study was comprised of data created by commercial insurance carriers, uninsured populations or those that receive their coverage through programs like Medicare, Medicaid, or through privately funded health insurance were not represented in this study. Most healthcare providers that accept Medicare and Medicaid also accept commercial insurance, ensuring the provider still has an equal chance of appearing in the dataset through visits provided to their commercially covered patients (Boccuti, 2015). As such, the threat to external validity posed by this concern is minor.

Recommendations

The findings of this study demonstrated the need for future research around care modalities in socioeconomically disparate communities. This study was limited by available secondary data to include other imperative data points such as ethnicity/race and household income levels. The availability of similar studies that incorporated these variables would greatly contribute to the existing knowledge base.

Similarly, my dataset was exclusive of care visits that were conducted with uninsured patients or those with government sponsored coverage, such as Medicare and Medicaid. An increase in available research findings on how patients' insurance coverage status affects their access to telehealth would be valuable.

As outlined in Section 1, I identified numerous barriers to implementation of telehealth options for care providers. Future research on how much of a role the barriers identified played in the lack of availability in the high disparity communities would help to inform those involved in professional practice and encourage further communication on how facilities and healthcare providers should move forward with both telehealth care as well as care of socioeconomically disparate communities.

Implications for Professional Practice and Social Change

The findings of this study have provided important data relevant to the utilization of telehealth in socioeconomically disparate communities in California. The findings are important to helping address this growing care modality and the need for its increased use in high disparity communities. This section covers the potential implication for professional practice as well as the prospect for positive social change.

Professional Practice

The findings of this study have added to the available research and knowledge on the disparities that exist in the access to care afforded in socioeconomically disparate communities. As telehealth becomes more widely available and used by care providers, it is essential that those in professional practice address the disparity in its access for high disparity communities. Literature shows the use of telehealth helps to improve access to

care, quality of care, as well as patient health outcomes. Further disparity in access for higher disparity communities puts them at further disadvantage comparative to low disparity communities. Based on these findings, I recommend healthcare facilities, providers, and policy makers collaborate to address regulations around the equitable availability of telehealth. The finding of this study is also significant for healthcare consumers as it does highlight access equity concerns within their communities.

Social Change

There exists great opportunity for positive social change in the findings of this study. The results of this study can help to draw attention and acknowledgement of the continued lack of equity around access and quality of care for socioeconomically disparate communities. Socioeconomic status is the greatest predictor of health in this country. By bringing further light and evidence of its continued effect on patients, this research can help bring key stakeholders and lawmakers to lobby for policy change in favor of equitable access to all modalities of patient care.

Potential policy change could help to reduce disparities in access to health, quality of care available, and overall healthcare outcomes based on socioeconomic disparity level. Every patient should have an unalienable right to access to quality care regardless of the community in which they live or their socioeconomic status. Updated research and policy change would help to ensure equitable access to care becomes a human right.

Conclusion

Providing equitable access to all care modalities regardless of socioeconomic status must become a priority in U.S. healthcare. Socioeconomically disparate

communities continue to have proven disparities in access, quality, and outcomes. In this study, I determined there is a statistically significant relationship that exists between telehealth use by care providers in California and the community's disparity level. High disparity communities were less likely to use telehealth while low disparity communities had higher access rates. This research adds to the existing knowledge body around inequitable access related to socioeconomic status. Previously available research on disparities in access to care overall, in addition to this new study specifying its prevalence within the telehealth care modality, offers those in professional practice as well as policy makers with additional research findings that can be used to help address gaps in public policy. Acknowledgement and action around these gaps can lead to an increase in access to care for our most vulnerable and at-risk patient populations.

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