Analyzing the Digital Divide in Healthcare: Minority and Low-Income Groups

Reagan Hughes

Note. All figures and tables excluding Figure 1 were created by the author.

Introduction

With technology and online resources continuously evolving each year, vast amounts of information can now be accessed online via the internet— "…the electronic network of networks that links people and information through computers and other digital devices allowing person-to-person communication and information retrieval" (DiMaggio et al., 2001, p. 307). "Today, 96% of U.S. adults say they use the internet", Pew Research Center finds (2024). Living within the age of the internet, people often rely on the internet and digital tools as a part of their everyday lives; online platforms, internet groups, and social networks are all examples of digital resources that many people rely on daily. However, the process of searching for health information online may vary among differing sociodemographic groups when associated with the digital divide (Rutten et al., 2019). The digital divide is defined as "gaps in physical access to computers and the Internet among various identity groups" (Gorski, 2003, pp. 145-176). From an underserved community's perspective, this social inequality introduces numerous constraints on the ability to interact in health services and information. For low-income communities, having limited access to affordable, accessible internet or devices could also interfere with the engagement of digital resources in the increasingly digitized world.

Ultimately, these groups could potentially be unable to have a reliable source of seeking out health resources and care, and in the United States, obtaining access to healthcare is "1 of 10 Leading Health Indicators, a high-priority objective sought out by Centers of Disease Control and Prevention that is essential towards living a healthy life (Johnson et al., 2010, p. 1122). Often times, medical personnel and patients use online platforms to seek health information and services. Therefore, as previously mentioned, a restriction of access to these resources could result in certain communities having an inadequate amount of readily available health resources. The digital divide introduces several challenges including technological barriers, digital literacy gaps, and language and cultural barriers onto minority and low-income communities— the most prevalent barriers affecting their ability to receive the essential health care that they need. To fully understand the impacts of the digital divide on low-income and minority communities within Tampa, Florida, the following research question was developed: How does the digital divide impact access to modern healthcare information and services in minorities and low-income communities in Tampa, Florida?

Literature Review

Limited Healthcare Access via the Digital Divide

Researchers, who used a range of diverse methods, all consistently reached the same conclusion: the digital divide has a significant impact on low-income and minority populations regarding their access to online health information and services e.g (Rutten et al., 2019). Researchers determined the most prevailing barriers in the digital divide— language, cultural, and technological— were particularly affecting these groups.

Language and Cultural Barriers

Cultural and language barriers refer to the difficulties that individuals from diverse cultural or ethnic backgrounds may encounter when trying to access digital technologies, online services, including healthcare. “Minority race or ethnicity has been linked to a lower likelihood of having a regular source of care, fewer physician visits, and lower total health-care expenditures” (Fiscella et al., 2002, p. 53).

Researchers in California used the California Health Interview Survey (CHIS), a survey that includes modules on health care access, health insurance modules on health care access, health insurance and selected chronic conditions, to analyze language barriers to health care access among a sample of Medicare seniors. The CHIS was conducted in multiple languages including English, Spanish, Cantonese, Mandarin, Korean, and more. The results showed that seniors with limited English proficiency (LEP) “were less likely to have a usual source of health care than those who spoke only English” (Ponce et al., 2006, pp. 68-69).

The evidence shown suggests that language and cultural barriers significantly affect minority communities’ ability to access health information online, demonstrating that these barriers are key determinants in the digital divide. Furthermore, these barriers show the relevance of the digital divide being discussed, illustrating the substantial disparity in the range of access minority populations can receive.

Technological Barriers

Digital literacy, in terms of health, is described as “the ability to access, understand, and communicate information to engage with the demands of different health contexts” (Hemming & Langille, 2006, p. 532). In underrepresented communities, it is essential to have a reliable source as well as an understanding of how to navigate the Internet. However, because many minority and low-income communities have limited access to devices that accommodate their specific needs, they are often associated with having lower health outcomes.

An effort was made to help minority and low-income communities with accessing a device and internet connection, since they were known to suffer from lower health conditions, one of the main enactments being the establishment of telecenters and cybercafes—areas where the

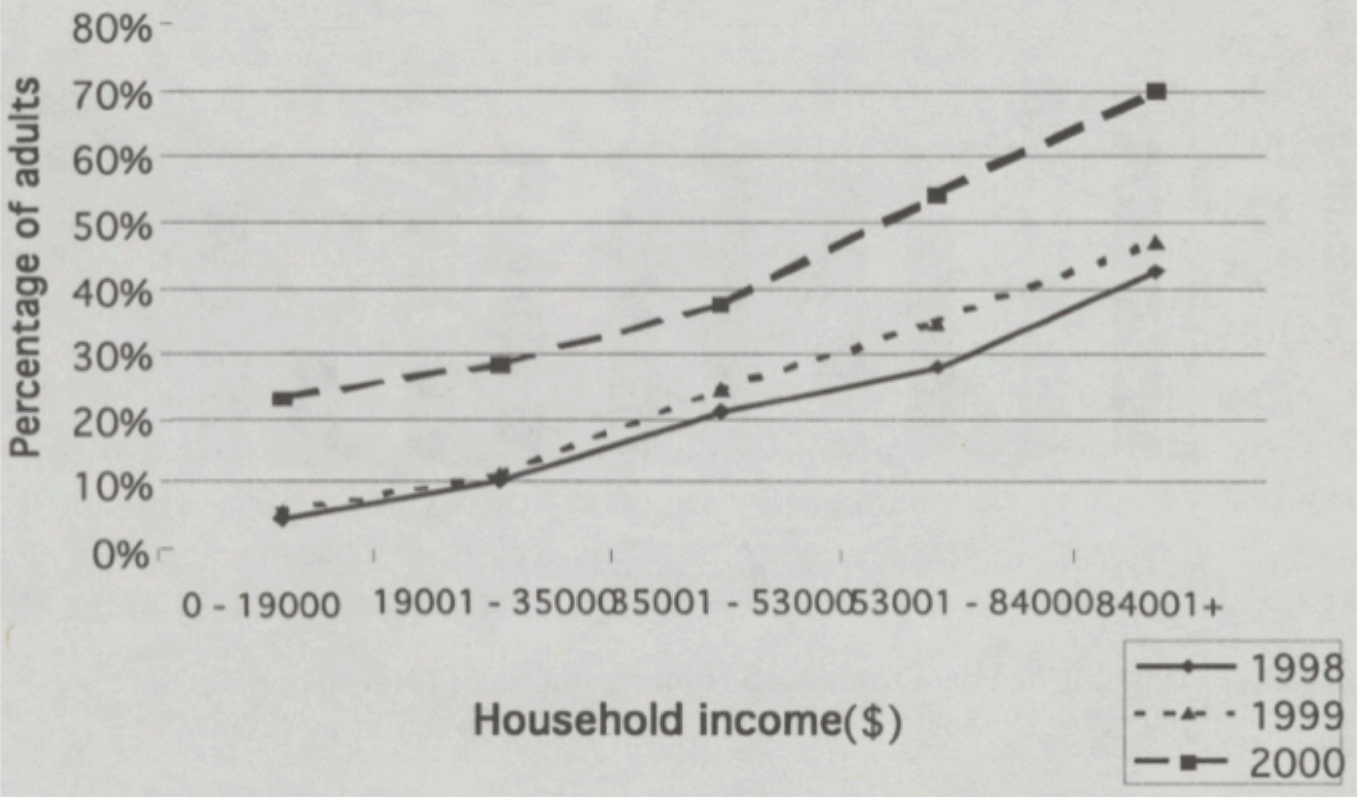
Internet was free to the public in telecenters while in cybercafes there was typically a pay-per-use system, where the public could access the Internet for a fee. Although individuals do have a choice in whether they go to a telecenter or a cybercafe, it was found that cybercafes have often more accessibility to non-computer owners than telecenters, offering more hours to the public. On the other hand, telecenters offer fewer hours, thus less Internet access (Medina et al., 2006).

A research study conducted by the National Cancer Institute Preventative Health Education Project evaluated Internet access through telecenters and cybercafes. It was found that although the presence of free public access telecenters has to potential in reducing disparities in Internet access, the digital divide continues to widen (Medina et al., 2006). This is primarily because those who can afford personal computers and Internet connection experience more higher rates of knowledge acquisition occurring more readily. While in comparison, individuals with limited financial resources, who cannot afford these resources, receive a slower and less readily rate in getting knowledge, further deepening the divide.

According to data from the Household Use of Technology Surveys that was conducted by the Australian Bureau of Statistics (ABU), in March of 2000 “64 per cent of adults had access to a computer at home and 37 per cent of adults had access to the Internet at home” (Cline & Haynes, 2001). ABU found that access to the Internet varied among differing income groups (Figure 1), with a household income of $84,000 having 70% access in March 2000, while in comparison to the household income of less than $19,000 having only 22% (Llyod et al., 2000, pp. 350-351). Additionally, as of 2001, while 82% of US households with incomes above $75,000 have Internet access, only 38% of those households who have an income of $30,000 and below can get that same access.

Figure 1

Internet Access Amongst Adults from Their Homes



Note. This figure represents the proportion of adults that have access to internet services from their homes within the years 1998 to 2000. The original title of this figure is: *Proportion of Adults with Internet Access at Home by Income Level, 1998 to 2000 (Lloyd et al., 2000 p. 351).*

As shown, digital health literacy as well as health accessibility also contribute greatly to minority communities' ability to access health information online.

Gap in the Research

Pre-existing research has addressed several aspects to the digital divide and how it affects access to health information and care (Gorski, 2003; Manganello et al., 2017). However, the existing body of knowledge does not delve into the effect of the digital divide specifically on low-income and minority residents who also are living in the Tampa, Florida area. Analyzing how the digital divide affects low-income and minority communities in Tampa, Florida is significant in the context of further understanding how unequal access to technology limits these certain populations in their ability to gain access to health resources.

Furthermore, pre-existing studies have focused primarily only on the perspective of the individuals being affected by the digital divide, rather than these communities and medical professionals as well. Few studies have included the perspectives of medical professionals in regarding how the digital divide affects access to health information and services. The purpose

of this study is to address these population gaps while providing a new viewpoint to the existing body of knowledge.

Hypothesis and Assumptions

Before conducting my study, I believe that the digital divide does have an impact on access to modern healthcare significantly, impacting specifically minority and low-income communities. Considering the previous research that was assessed, I believe that white, high-income individuals will not have a difficult time accessing modern healthcare information and services while older individuals who are considered a minority with a lower income will have a challenging experience trying to access modern healthcare information and services.

Research Design and Methodology

Study Design

This study analyzed the varying impacts of the digital divide on low-income and minority communities within the Tampa, Florida area. Tampa has both a unique cultural and economic makeup, that is why it was chosen to be the area of focus for this study. Low-income and minority communities were chosen due to the lack of research that has focused primarily on these populations, as explained previously.

The goal of this study was to determine whether there are any impacts that the digital divide introduces onto these certain communities. As shown in the literature review, it is important that the digital divide continues to be discussed to ensure that these populations have equal access to health resources.

To fulfill this goal, an explanatory research design was conducted through a standardized questionnaire and qualitative interviews that gathered both qualitative and quantitative data. Integrating both qualitative and quantitative data was the favorable approach to this research study due to the intricacy of the topic. Additionally, it was ideal to get both numerical data as well as descriptive data to support the results and conclusions more thoroughly, as these details would not have been shown if only one component of the method had been used.

Subjects

The participants involved in the study included medical professionals, as they often have to take into consideration if a patient has accessibility to their needed healthcare services and information, as well as various participants who were willing to share their opinions on the subject. The medical professionals were interviewed while the standardized questionnaire was open for anyone to take if they were willing. Medical professionals were chosen due to their general knowledge on what often affects a person's ability to get the resources that they need.

The standardized questionnaire was open for any individual to take in order to get a wide variety of responses from differing socio-demographic backgrounds.

These participants were gathered in several ways. In terms of the medical professionals, I reached out to medical professionals in the Tampa community through the app NextDoor, an app where residents of a community can connect with one another to know whats happening within their community. To reach a variety of individuals who have distinct backgrounds, the standardized questionnaire was also posted on NextDoor. By posting on NextDoor, I was able to reach both needed participant groups. Both of the posts on NextDoor included a link that took participants directly to the online standardized questionnaire and the interview questions for them to then complete. To see the entirety of each of these posts, refer to Appendix A and B.

Research Instruments

As mentioned, this study involved analyzing both qualitative and quantitative data. After carefully evaluating the many research methods to choose from, a standardized questionnaire with both open-ended and quantitative questions with qualitative interviews were the most effective methods for this study. This research study is based on analyzing large populations—minority and low-income— therefore, using a standardized questionnaire allows for a general understanding of these large populations while questioning only a small sample of the population. On the other hand, interviews instead give detailed and in-depth responses, allowing for a more thorough analysis of the topic that standardized questionnaire alone does not provide. By conducting both interviews and a standardized questionnaire, a more comprehensive understanding of this research study can be found.

The standardized questionnaire was made by reference of the Practical Research Planning and Design textbook (Leedy et al., 2015). This textbook included a guide for the construction of a questionnaire that could be applied to my standardized questionnaire. The standardized questionnaire was set up based off this questionnaire template on Google Docs, being a two-column table with the question being asked on the left side and the answer choices on the right side. The standardized questionnaire had sixteen questions that were mixed in the type of response being asked of the participants to input. These included a check all that apply response, a multiple-choice response, and an open-ended response. At the beginning of the standardized questionnaire was an overview, describing the value of the questionnaire, that doing the questionnaire was completely voluntary, and that it was anonymous as well. Below is the overview (Figure 2) being where the standardized questionnaire (Table 1) began.

Figure 2

Overview of Standardized Questionnaire

"This standardized questionnaire is intended to help me have a better understanding the gap between those who have access to technology and the internet and those who do not when it comes to receiving health information and services. Your responses will help me determine whether there is a link between the digital divide and healthcare access in different communities. Your participation is completely voluntary, and you may exit the questionnaire at any time if you prefer not to continue. This questionnaire is anonymous; no identifying information will be collected. Thank you so much for taking the time to participate!"

Table 1

Standardized Questionnaire

Question	Answer Choices
1) I have read the overview provided above, and I consent to participate in this survey.	□ Agree □ Disagree
2) What is your race/ethnicity? (Please select all that apply):	□ White or Caucasian □ Black □ Hispanic □ Asian – Indian □ Asian – Eastern □ Native American □ Prefer not to answer □ Greek, Swedish, or Scottish □ Middle Eastern □ Other…
3) How would you describe your gender identity?	□ Male □ Female □ Prefer not to answer □ Other…
4) Which category includes your age?	□ 17 or younger □ 18-20 □ 21-29 □ 30-29 □40-49 □ 50-59 □ 60+
5) What is your total annual income? (This information is anonymous and will only be used for research purposes)	□ $0-$30,000 □ $31,000-$60,000 □ $61,000-$90,000 □ $91,000-$120,000 □ $120,000+ □ Prefer not to answer
6) How often do you rely on public areas (cafes, libraries, or community centers) for internet access?	Never o Rarely o Sometimes o Frequently
7) How important is internet access in managing your overall well-being and health?	□ Very unimportant □ Slightly unimportant □ Neutral □ Slightly important □ Very important
8) How would you rate your ability to use the internet to manage healthcare needs?	□ Easy □ Somewhat easy □ Neutral □ Somewhat hard □ Hard
9) If you use tele-health services (remote monitoring of health conditions, online booking, or virtual doctor visits), how would you say your overall experience is?	□ Very poor □ Poor □ Neutral □ Good □ Very good

Question	Answer Choices
10) If you answered to the above question below the category "poor", what is the main reason you may be struggling using tele-health services?	□ I sometimes am not able to get internet access □ I do not have a compatible device □ I am not familiar with how to use tele-health or what is it □ My healthcare provider does not offer tele-health services □ I do not trust the security of tele-health services □ I didn't answer poor □ Other…
11) Have you ever missed a healthcare appointment or visit because you were not able to access or navigate the required technology?	□ Yes □ No □ Other…
12) Have you ever delayed seeking out healthcare services because you did not have the technology needed for scheduling or tele-health?	□ Yes □ No □ Other…
13) How do you feel your ability in using digital healthcare portals is (e.g., communicating with your doctor, checking health records)?	□ Very poor □ Poor □ Below average □ Average □ Above average □ Good □ Excellent
14) How would you describe your experience using digital healthcare platforms (e.g., patient portals, health apps)?	□ Easy and user friendly □ Somewhat easy, but there are a few challenges □ Difficult, I sometimes get frustrated □ I do not use healthcare platforms □ Other…
15) What do you think would most improve your ability to use online healthcare services? Check all that apply.	□ Better internet access □ Access to a more reliable device □ More user-friendly platforms □ Training on how to use the technology □ Other…
16) In your opinion, how do you think the digital divide has affected your healthcare outcomes?	Open ended response

The interview questions were made to give a detailed response to. At the beginning of the interview questions was a research consent form, to see this document refer to Appendix C. This was included along with a question asking if the participant has read and acknowledged the entire consent form. There were five interview questions for the participants to answer, as shown below (Figure 3):

Figure 3

Qualitative Interview Questions

1) How have you seen the digital divide affecting healthcare access for minority and low-income communities in Tampa and if you are able to, can you share examples of specific barriers these communities face due to limited digital access.

2) In what ways do you think the lack of reliable internet or digital devices has restricted access to healthcare resources for these communities?

3) Do you think that the inability to research symptoms, treatments, or health conditions online has affected patient care and outcomes?

4) How often do you encounter patients who struggle to use digital patient portals for scheduling appointments, viewing test results, or communicating with providers?

5) How do language barriers contribute to the digital divide in Tampa, particularly for minority groups? Do you think that this makes accessing online healthcare even more challenging?

Procedures

I began to carry out the study by publicly sending out the posts on NextDoor, one for the medical professionals and or staff and the other open for anyone within the Tampa community. Both of the posts were posted for the entirety of the Tampa community was set up for only Tampa residents to view and answer, making sure the study stays focused on only the Tampa, Florida area. This was done since NextDoor, being a community-based platform, allows users to limit their posts to a given area, thus, I was able to exclusively select for only Tampa residents to see and be allowed to participate in my standardized questionnaire and qualitative interviews.

As discussed earlier, before the participants began the standardized questionnaire they were presented with an overview of the study and had to agree to reading the overview and participating in the questionnaire. Similarly, before the medical professionals and or staff began answering the qualitative interviews, they were presented with a research consent form that they

had to agree to acknowledging and reading, as well as their participation in the interview (Appendix C). Once the participants agreed, they then completed the standardized questionnaire and or the qualitative interview. When about 15-30 participants had completed the standardized questionnaire, it was taken off the NextDoor app and not active for anyone to use or take. Once about one to three medical professionals had completed the qualitative interviews, that was also taken off NextDoor and no longer available for anyone to take. The standardized questionnaire and qualitative interviews were taken off NextDoor once about 15-30 participants and one to three medical professionals had taken each of them since as the data collection was coming to an end, I assumed there to be roughly about this amount of participants and medical professionals who had taken them. Both the data from the standardized questionnaire and qualitative interviews were then assessed to discover any common themes between them.

Ethical Considerations

Although the interviews can be shown to follow ethical guidelines, referring to the questionnaire questions numbered two, three, four and five, some may consider these questions as a possible privacy concern. This is due to them asking about the participants age, their gender identity, their total annual income, and their race or ethnicity. However, the information retrieved from the questionnaire is ensured to be completely anonymous.

Additionally, as mentioned previously, every person who participated in the questionnaire were asked to consent prior to taking the questionnaire while also having the choice to leave the questionnaire at any given time. The questionnaire also had a “prefer not to answer” and an “other” answer choice, allowing them to not input their response if they had not wanted to. Prior to sending out the standardized questionnaire and conducting the interviews, my research method was also approved by my school based Institutional Review Board (IRB).

Delimitations

As for the delimitations, the focus group method would have suited this study. Due to its similarity to a standardized questionnaire and interview design in that it gets responses from multiple participants, this method could have been used instead or in addition to these research methods to possibility get additional insight on this topic. However, a standardized questionnaire and individual interviews seemed more suitable for my study because these methods allowed me to get a wide amount of insight from current or former patients as well as detailed responses from healthcare professionals.

Results and Analysis

Standardized Questionnaire: Results

Quantitative Results

At the end of my data collection process for my standardized questionnaire, I had a total of 28 responses to my standardized questionnaire, a reasonable amount for me to determine if there is a link between the digital divide and minority and low-income groups. I begin to analyze my results by making multiple bar graphs on Canva of the following participants income levels and their races or ethnicity's that they identified with (Figure 4 and Figure 5). Amongst those responses, the groups that replied are as follows:

Figure 4

Race or Ethnicity

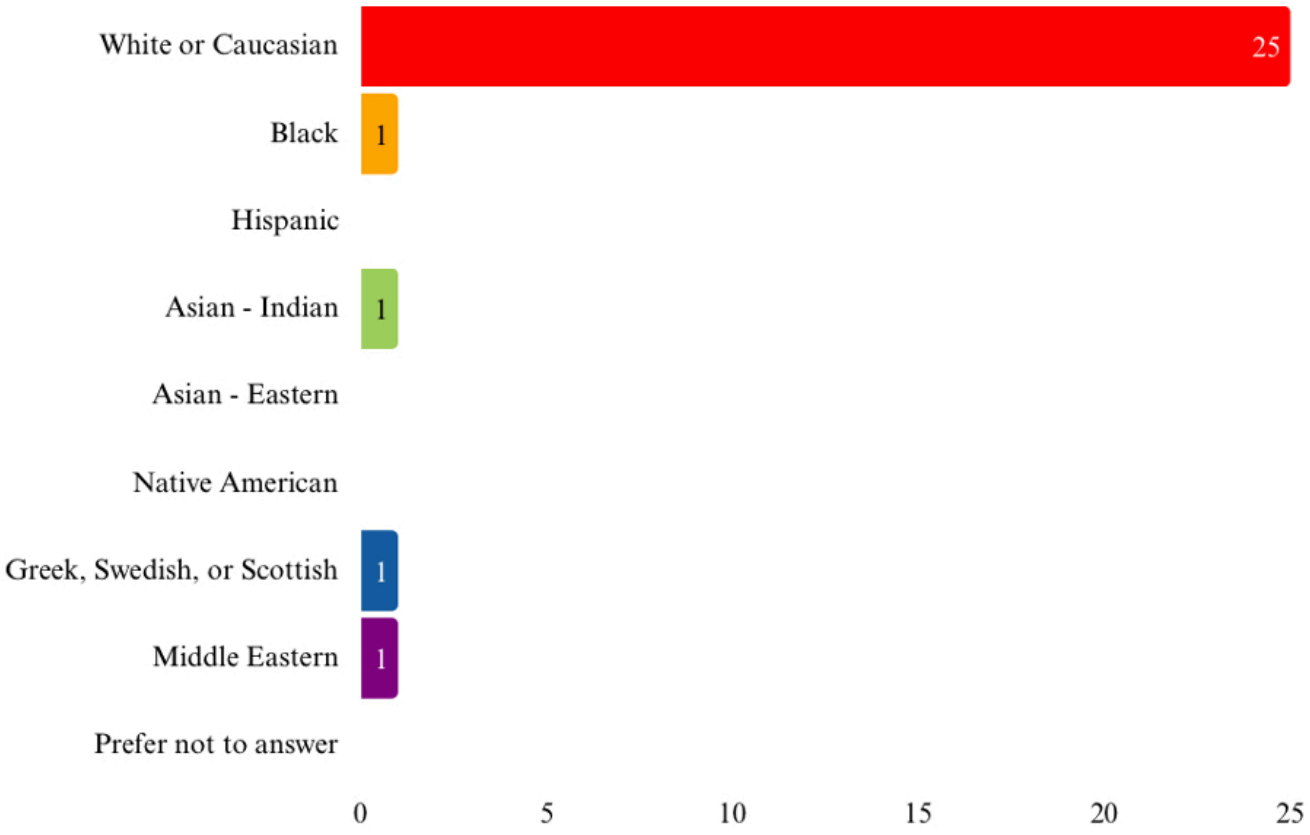
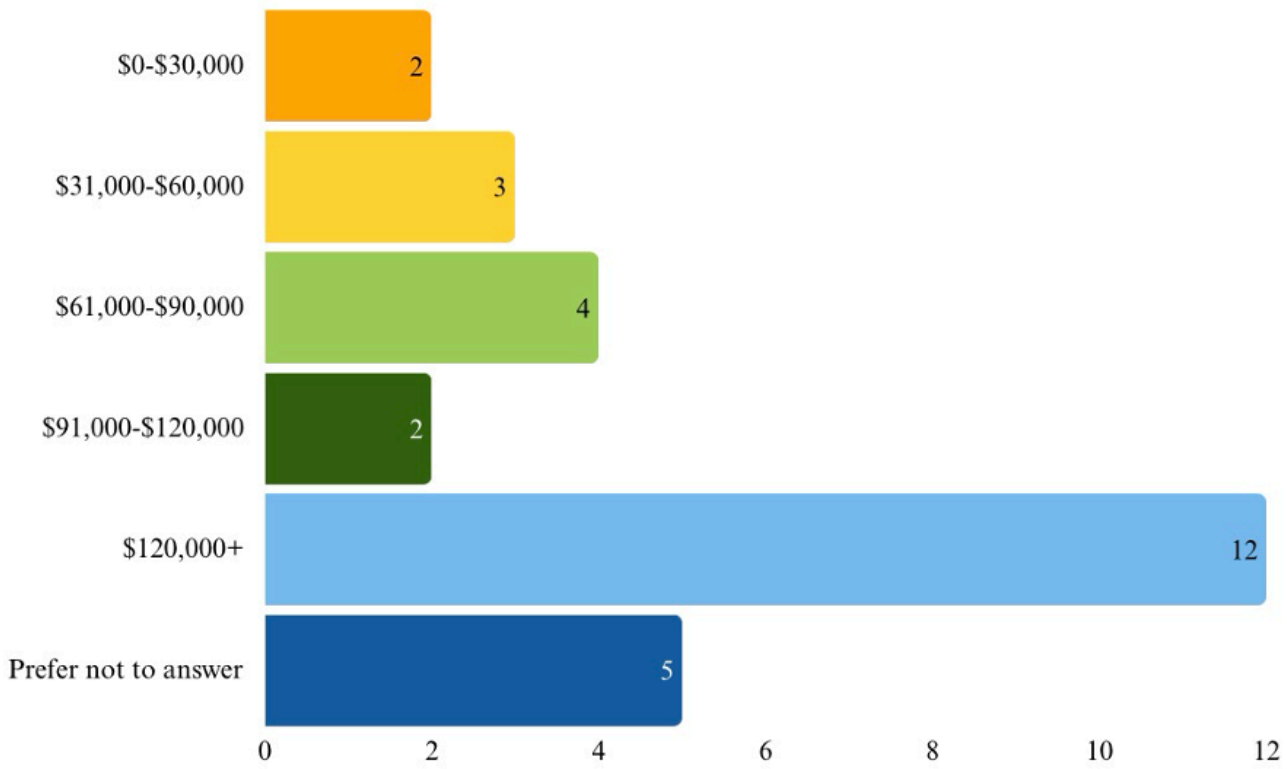


Figure 5

Income Level



As shown from the bar graphs above, there is a range of income levels as well as races or ethnicity's that took part in the standardized questionnaire. Of these participants's responses, I decided to only choose certain questions that they had answered to discuss and analyze that would most clearly represent if the digital divide had an impact minority and low-income communities from getting access to modern healthcare, being questions six, seven, eight and nine. I used Canva to make several pie charts representing the answers to the four questions from the standardized questionnaire. The following questions chosen and results to them are show below (Figures 6,7,8 and 9). For clarification, these results are from all of the 28 gathered questionnaire responses; the percentages represent the percent of participants who had chosen a certain answer.

Figure 6

Participants answers to question #9: If you use tele-health services (remote monitoring of health conditions, online booking, or virtual doctor visits), how would you say your overall experience is?

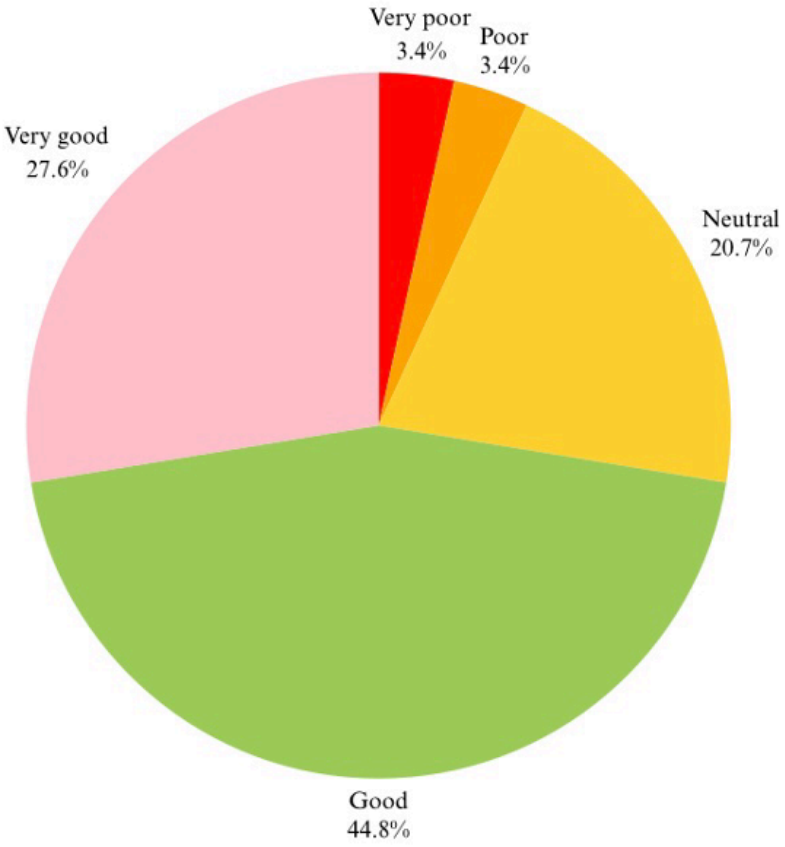


Figure 7

Participants answers to question #8: How would you rate your ability to use the internet to manage healthcare needs?

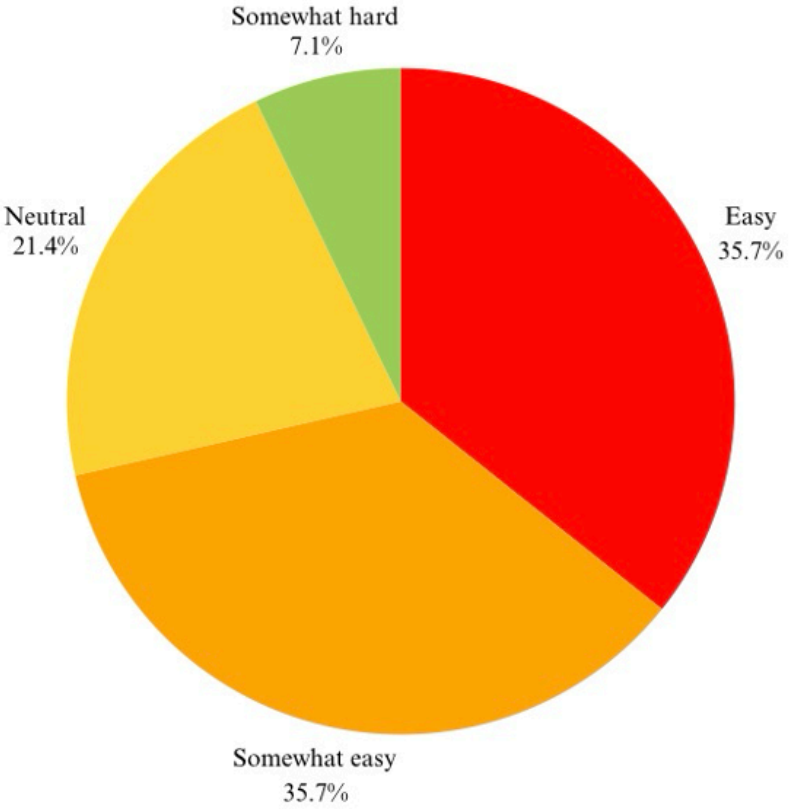


Figure 8

Participants answers to question #7: How important is internet access in managing your overall well-being and health?

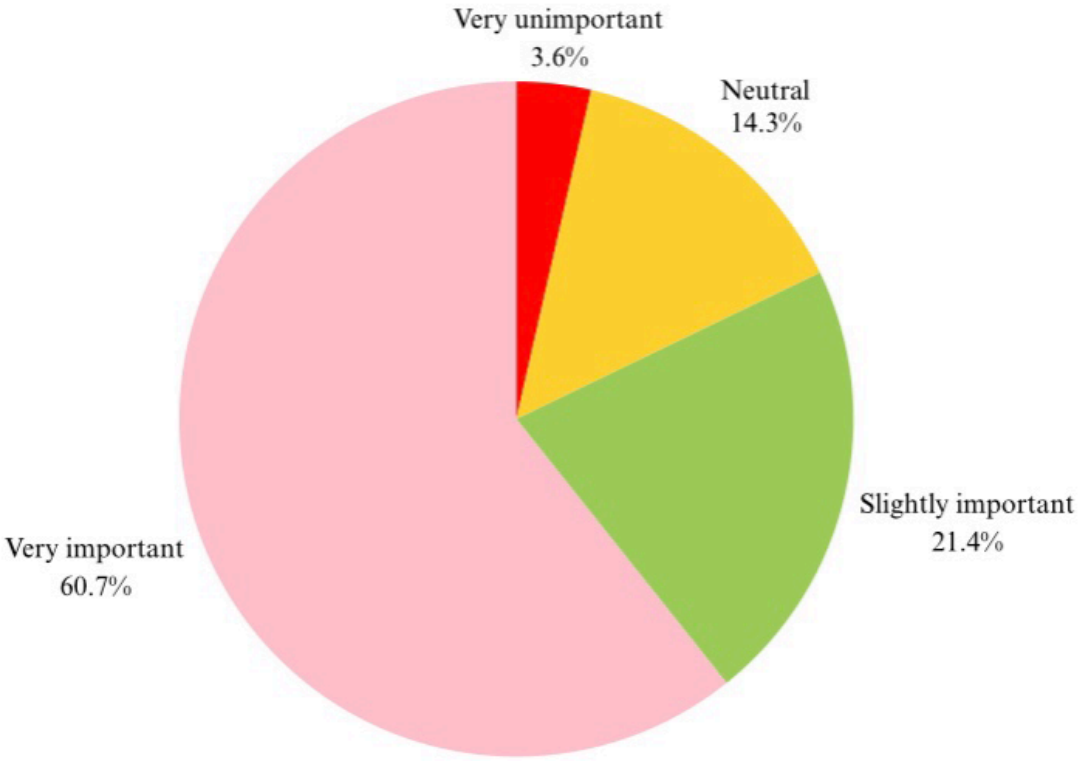
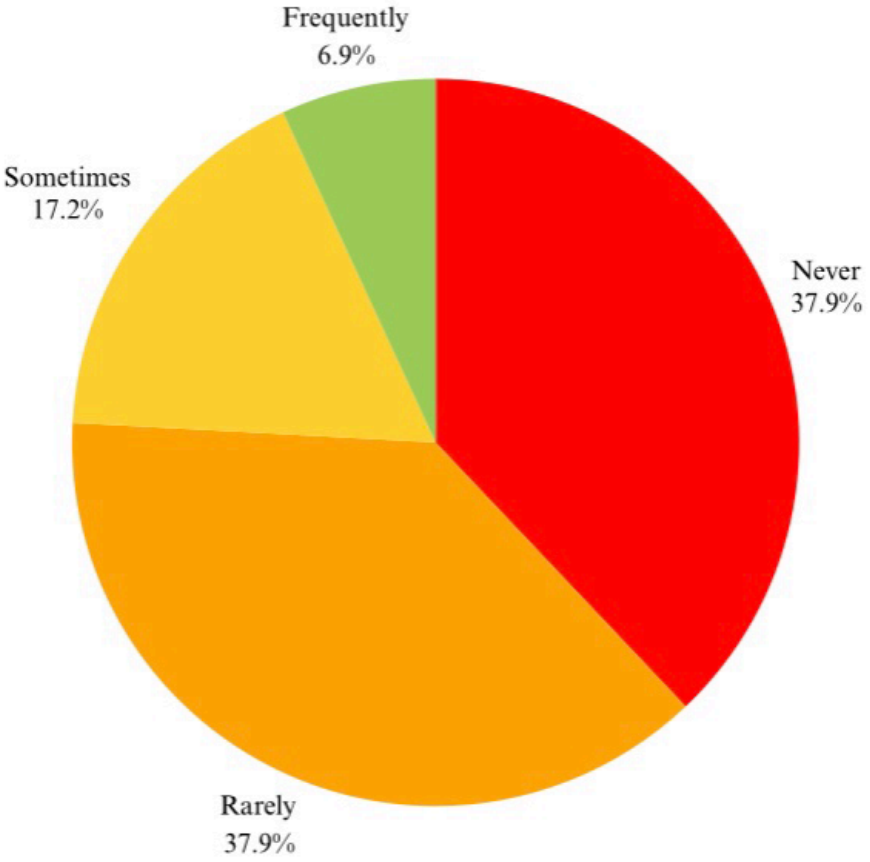


Figure 9

Participants answers to question #6: How often do you rely on public areas (cafes, libraries, or community centers) for internet access?



Of the data shown from the pie charts above, the participants results are as follows. However, to determine if there is a link between minority and low-income groups having a lesser amount of access to healthcare services and information, I specifically analyzed only those communities' responses rather than those communities who are not considered a minority. From my data, I cannot see who specifically took my standardized questionnaire since their information is kept anonymous. I can however see which individuals chose a certain answer to a question, allowing me to see if there is any links with minority and low-income communities having a more difficult time accessing modern healthcare information and services. I did this by analyzing a Google sheets document made from my Google questionnaire. This document presented all my data in an organized table, showing me, which individual choose what answer choice while not showing me anything that would identify them. In order to maintain my participants privacy, I decided not to include the entirety of the document into my paper, as it may pose as a threat to the participating groups anonymity.

Minority Groups

While using the Google Sheets document, I looked over the answers that only minority groups had chosen.

For question #7, all minority groups had answered the following question 'How important is internet access in managing your overall well-being and health?' with 'Slightly important' and 'Very important'. While for question #8 that asks 'How would you rate your ability to use the internet to manage healthcare needs?', the minority groups had a variety of answers, different than what the majority of the participants had picked to the question, with most of them saying that they think using the internet to manage their healthcare needs is 'Somewhat easy', and a few saying that it was either 'Somewhat hard' or 'Neutral'. For question #9, 'If you use tele-health services (remote monitoring of health conditions, online booking, or virtual doctor visits), how would you say your overall experience is?' had a response of 'Poor' for one minority participant, while the others answered either ' Very good' or 'Good'. Lastly for question #6 that asked, 'How often do you rely on public areas (cafes, libraries, or community centers) for internet access?', the answers ranged from 'Never', 'Rarely', and 'Frequently'.

Low-income Groups

The same process was done with the low-income groups by assessing the Google Sheets document. Of the groups that participated in my study, the people whose self-reported income were in the lowest income bracket were those who were considered low-income. This was the participants with the $0-$30,000 income range. Referring to the income level bar chart above, there were two participants who had an income of $0-$30,000, thus, these participants's results were the only ones analyzed.

For question #7, 'How important is internet access in managing your overall well-being and health?', the participants each picked 'Slight important' and 'Very important and similarly for question #8 'How would you rate your ability to use the internet to manage healthcare needs?', they both picked 'Somewhat easy' and 'Neutral'. Both participants picked 'Good' for question #9 that asks 'If you use tele-health services (remote monitoring of health conditions, online booking, or virtual doctor visits), how would you say your overall experience is?', and the same goes for #6 being 'How often do you rely on public areas (cafes, libraries, or community centers) for internet access?', with the answer being 'Rarely'.

Qualitative Results

For the qualitative results, questions 14, 15, and 16 were analyzed. As mentioned previously, only a couple of questions were chosen to evaluate that I thought would be best at presenting whether there is a link between the digital divide and these communities. Due to these questions being long-response and or open-ended, some participants did not include an

answer. However, they were given the choice to do so since there was a ‘prefer not to answer’ as well as an ‘other’ answer choice.

Minority Groups

For question #14, being ‘How would you describe your experience using digital healthcare platforms (e.g., patient portals, health apps)?’, they were answers of both ‘Easy and user friendly’ and ‘Somewhat easy, but there are a few challenges’. While for question #15 that asks ‘What do you think would most improve your ability to use online healthcare services? Check all that apply,’ there was a variety of mixed responses, being that some participants entered their own responses. Some had chosen to not answer, while others said that they thought ‘Better internet access’ and ‘More user-friendly platforms’ would improve their abilities. One participant had typed their own response that states, “Access to more reliable device, better privacy if required to use a public computer, and better internet access”. Finally, for question #16 that asks, ‘In your opinion, how do you think the digital divide has affected your healthcare outcomes?’, I created a table due to the responses being rather lengthy as well as to highlight the key words in them that were most significant to my study’s findings. There were two responses, most likely due to this question being open ended and not required, however one goes into extreme depth, giving a detailed response of their thoughts on this particular question as shown below in Table 2. Each participant is labeled Participant A or B.

Table 2

Participant Responses to Question #16

Participant	Open-Ended Responses
Participant A	I have a new perspective on this subject since being flooded out of my home in hurricane Helene. I have recently experienced the digital divide on the less fortunate side of divide. My home, belongings, car, etc including my laptop was destroyed. I have been staying with relatives for 4 months now 1.5 hours away from Tampa in a small rural area with poor cell coverage & no Starbucks etc. (I.e. limited public WiFi) I used the closest public library's computer & public WiFi for 2 health appointments to my docs in Tampa. I can't imagine having to do this all the time rather than in privacy of home. I was reluctant to keep appointments because of being in a public setting. I didn't ask as many questions and was flustered at times. The as screen froze or sound was inferior. Plus, it was inconvenient to actually get to the library without reliable transportation. I cannot imagine living this way all the time. I met many people & students at the public library who either do not have computers or WiFi at home. They via for use of a computer or the wifi when they need it. People with laptops or devices sit in their cars outside in parking lot close enough to use WiFi."
Participant B	"In my opinion, the Internet and technology have made it more convenient for me to access proper healthcare."

Participant A's response is extremely relevant to my study, being that their answer demonstrates how difficult it can be for those who may not have access to a reliable computer or cellular device, transportation, and public internet access to get access to their needed healthcare services and or information. This individual illustrates the challenges of being in unfortunate circumstances, that could lead to not having a stable way of accessing to healthcare services and information.

Qualitative Interviews: Results

At the end of my data collection for my qualitative interviews on the other hand, only one medical professional had participated in the interview. Although more responses were ideal, the doctor who took part in the interview gave very detailed, thorough answers to each question, still giving me the healthcare perspective needed to contribute to my study. As done for the standardized questionnaire, I only chose a couple of questions— being three and five–and responses to analyze that I thought would be the most contributing to my study that would simultaneously help determine if the digital divide remains an issue within the healthcare industry and show if there is any link between the participants who took the standardized questionnaire and a healthcare providers perspective on this subject. The responses are shown in Table 3 below.

Table 3

Qualitative Interview: Questions and Answers

Question	Open-Ended Responses
3) In what ways do you think the lack of reliable internet or digital devices has restricted access to healthcare resources for these communities?	" Individuals without reliable access to internet or digital devices are sometimes lost to follow-up, have difficulty finding appropriate care which delays treatments, and many times have an inability to access assistance with medication costs and obtaining insurance."
5) How often do you encounter patients who struggle to use digital patient portals for scheduling appointments, viewing test results, or communicating with providers?	"Sometimes once or twice a week a patient comes into the hospital that was lost to follow up for one reason or another. These patients usually needed interventions or surveillance for a known disease."

Aligned Results

Although there were a couple of participants who had said that they had been affected by the digital divide due to answers such as the ones shown for question #16, the majority of minority and low-income groups were not singled out by the digital divide. This was demonstrated by the Google Sheets form. Within it, I noticed that there were participants who had a difficult time using and understanding technology due to the digital divide who were not considered a minority or low-income group, as noted earlier. Thus, it is not reasonable to say that only minority and low-income groups are being affected by the digital divide, since as stated previously, there were people who were in the middle to high income range and who were white as well.

Looking at the responses from the healthcare provider indicate that the digital divide still continues to exist within the healthcare industry, as illustrated by their responses to questions 4 and 5. The participant explains in their responses to these questions of how often they encounter patients who have a difficult experience with using digital patient portals and furthermore how they have seen those who do not have the ability to access the internet through a digital device frequently having to go through obstacles in order to receive the healthcare services and or information that they need. In other words, this perspective from this healthcare provider helps to suggest that the digital divide does continue to have a significant effect on patients receiving and interacting with their healthcare needs.

Conclusion

New Understanding

The goal of this project was to determine whether the digital divide impacted access to modern healthcare information and services within minorities and low-income communities in Tampa, Florida. Through the data collection process of both the standardized questionnaire and the qualitative interviews, I have gathered ample data in which I could answer my research question effectively. From my findings, as mentioned earlier, my new understanding is that there seems to not be a link between these groups having a more difficult time accessing modern healthcare services and information due to the digital divide, and rather that although the digital divide does exist and continues to impact patients from getting reliable access to healthcare services and information, it does not seem to be associated with only minority and low-income communities. This evidence strongly opposes my hypothesis established in the initial phase of my research process.

Fulfillment of the Gap

As previously described within the literature review, researchers have found that the digital divide does have an impact on low-income and minority populations in their abilities of accessing online health information and services, and specifically how language, cultural, and technological barriers significantly contribute to this. My research was specifically focused on addressing the knowledge gap of whether the digital divide has an effect on minority and low-income communities and healthcare providers who resided within the Tampa Florida area. The methods that were utilized for this study— being the standardized questionnaire and qualitative interviews— helped to effectively address this knowledge gap. This was done by demonstrating how the digital digital doesn't necessarily only effect minority and low-income communities through the use of the standardized questionnaire. The participants responses to my standardized questionnaire helped me conclude this since I was able to see which races and or ethnicities and income groups had chosen which answers, along with the other groups who were not considered being a minority or low-income.

From this, I was able to clearly see that there is no link between only minority and low-income groups having more difficulty getting the healthcare services and information they need. While the qualitative interviews gave a healthcare perspective on this subject. By incorporating the healthcare perspective into this study, it can be shown that people are being affected by the digital divide, but minority and low-income groups aren't the only ones affected by the digital divide.

Implications

The information gathered from my study can serve as both beneficial towards finding a way to put an end to the digital divide and looking at the population as a whole when considering who is being affected by the digital divide, and consequential, due to the unknowingness of who is specifically being affected by this and who should be of most importance to help guide through the digital divide. These long-term benefits and consequences can be utilized by future researchers, those in the healthcare industry, and those who want to find an ultimate solution to end the digital divide from continuing to exist. Future researchers could use my research as evidence that the digital divide affects more groups than only minority and low-income groups as well as certain solutions to the digital divide. While those in the healthcare industry can use my findings to develop ways for their patients to have access to healthcare services and information, whether that's through making their digital portals more user-friendly or giving them trainings on how to use their devices to reach their healthcare provider. Additionally, from answer choices from my standardized questionnaire to data collected from previous research, those who are looking for ways to help eliminate the digital divide could also use my research to help in ways to do so.

Limitations

The limitations of this study are that due to it being centered on only the Tampa Florida area, my research may not be applicable to other regions and also that the scope of this study was limited due to the time constraints throughout the data collection process.

Regarding specifically results and analysis section, this research study only involved the participation of 28 Tampa, Florida residents and one Tampa, Florida medical personnel. Due to the difficulty of reaching doctors who were willing to participant in my qualitative interviews, had a limited amount of insight gained from medical personnel. This was not ideal, as originally, I had planned to get up to three healthcare providers perspectives on this subject. However, through the app NextDoor, although being a social platform, I was only able to get one healthcare personnel to participant in my qualitative interviews. While my standardized questionnaire that was conducted was open to the public through NextDoor. NextDoor is open for 12-year-olds and up to have access to and the answers were anonymous. Thus, without any knowledge as to who took the questionnaire, it is unknown if the questionnaire can be considered completely accurate since the honestly of their answers cannot be proven.

Areas for Future Research

Replication of the Current Study

For one to replicate the study conducted, another researcher must develop both a standardized questionnaire that would gather both qualitative and quantitative data along with qualitative interview questions that are open-ended and detailed, ensuring that the participant

gives a thorough response. From there, they must post the standardized questionnaire and qualitative interview questions in form of a social media post on a social media app that allows the researcher to limit the area of where their post can reach, such as the one scrutinized in the current study being NextDoor. After posting, the researcher must wait for responses. As in my study, only a sufficient amount to responses is needed to be gathered. Once enough participants have took part in both the interviews and questionnaire, they then can start analyzing the data collected. Putting the information from the standardized questionnaire onto a spreadsheet is key to having the data displayed clearly and to avoid confusion with the different responses from each participant. For both the qualitative interviews and standardized questionnaire, choosing the most valuable questions and responses amongst the many is also important to ensure the quality of the answers. Finally, after assessing the data collected from each method, the researcher should then draw conclusions and infer on what the information they have collected means.

Different Directions

Research on how the digital divide affects certain groups from getting access to medical care could be expanded beyond the Tampa, Florida area and include other geographical areas in the United States or globally, since the results of this study cannot accurately apply to other areas. Further research could also be done that investigates if the digital divide affects another group besides minority and low-income communities, perhaps one specific race, ethnicity, age group, or income level. Additionally, one could explore further on if the digital divide affects educational, political, and employment opportunities due to it limiting access to healthcare, it is a reasonable assumption that it also prevents people from other things as well. Finally, future researchers could further explore this topic by wanting to find evidence that will provide a specific group that is mainly affected by the digital divide and or conduct their own research that includes more.

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Appendix A

NextDoor Post: Standardized Questionnaire

Hello former/current healthcare patients!

I am a high school student conducting a research study to better understand the possible impact that the digital divide has on minority and low-income communities getting access to health-related services and information. I am looking for health care professionals to share their insight on this topic. The questionnaire will close around January 31st.

I value your feedback! If you have decided to take this questionnaire, know that your input is greatly appreciated and will help me further understand whether there is a correlation between the digital divide and access to health services and information.

Follow the link below to take the questionnaire:

https://docs.google.com/forms/d/1yY0DnGE52fwyxbOfszooRxpSGQyZokRTw3OKReoEDHk/viewform?edit_requested=true

Thank you for taking the time to share your thoughts.

Appendix B

NextDoor Post: Qualitative Interviews

Tampa Medical Professionals/Staff/Doctors!

I am a high school student in AP Research looking for only 1-3 Tampa health care professionals/staff to share their thoughts on the digital divide in healthcare by answering 6 brief questions that should only take 5 minutes. If you can help me out it would be greatly appreciated!

To answer these questions, follow the link below:

https://docs.google.com/forms/d/e/1FAIpQLSccG1v2QOhxnLWXxDM_qqRlWtexYJOA0QWrK2GYj2DES4czZg/viewform?usp=header

Thank you!

Appendix C

Research Study Consent Form: Qualitative Interviews

Title of Project: Analyzing the Digital Divide in Healthcare: Minority and Low-Income Groups

Overview: I am asking for your voluntary participation in my research project. Please read the following information about the project. If you would like to participate, please sign in the appropriate sign below.

Purpose of the Project: To discover whether the digital divide has any affect on low-income and minority communities receiving access to health information and services to have a better understanding of the impact that the digital divide has on these certain communities.

If you participate, you will be asked to: Give a detailed answer(s) of your beliefs on whether the digital divide has an impact on certain communities' accessibility to health information and services.

Time required of participation: 15-20 Minutes

Benefits: Giving medical insight and beliefs on the digital divide and how it may have an affect on low-income and minority communities.

How confidentiality will be maintained: Name or profession will be held confidential if participant(s) want to do so, this will be asked before the interview takes place.

Voluntary Participation: Participation in this study is completely voluntary. If you decide not to participate, there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time, and you may decide not to answer any specific questions.

By agreeing to this form, I am attesting that I have read and understood the information above, and I freely give my consent to participate.