COVID-19 and Mental Health: Exploring the Impact of a Digital Application

A Dissertation

Presented to

the Faculty of the Graduate School

of Millersville University of Pennsylvania

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Social Work

By Michelle Sloane Palmieri

March 25, 2023

This Dissertation for the Doctor of Social Work Degree

By Michelle Sloane Palmieri

Has been approved on behalf of the

Graduate School of Millersville University by

Dissertation Committee:


Dr. Karen Rice
Committee Chair



Dr. Eva Szigethy
Committee Member



Dr. Marc Felizzi
Committee Member


<div align="right">
March 25, 2023
Date
</div>

ABSTRACT OF THE DISSERTATION

COVID-19 and Mental Health: Exploring the Impact of a Digital Application

By

Michelle Sloane Palmieri

Millersville University, 2023

Millersville University of Pennsylvania

Directed by Dr. Karen Rice

COVID-19 surfaced in 2020 and has impacted millions of lives. Many patients will manage long-term physical and mental health complications, referred to as long-haul COVID-19. An integrated modes of care has been identified as the recommended model of care to treat this population. Social workers play a crucial role in this model, however access to social workers to support patients' mental health conditions is scarce. To ensure in the patient's recovery, it was necessary to investigate alternative treatment options for mental health conditions. This qualitative and exploratory study examined patients perception of using a digital application to support their mental health conditions in the absence of social workers. This study validated that digital applications could support a patient's mental health conditions. The outcomes of this study will impact social work practice going forward and may be applied to other comorbid conditions similar to those with long-haul COVID-19.

Signature of Investigator:___ Michelle Sloane Palmieri ____ Date:_ March 25, 2023_

DEDICATION

This dissertation is dedicated to my husband, friends, and family. My husband Neil has been my rock, sounding board, and biggest source of love over the past few years. I would not have made it through this program without you, I am so lucky to have you. You are the blessing every person should have in their life. My mother passed away several months into this program and although she did not see me finish, I know she and my dad were there in spirit looking down on me smiling every step of the way. My friends Carrie, Todd, Haley, and Mim, who are truly my extended family, were cheering me on from day one and for that I will be forever grateful for your encouragement. My brother Justin, nephews Alex and Jacon, and sister-in-law Kelly, for making me smile, loving me, and encouraging me to visit as much as I could in order to find balance throughout this program.

I would also like to dedicate this to all of the patients managing the effects of COVID-19 and taking the time to share their stories with me. Each one was unique and special, and I wish them well as they continue to move through their journey.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

# LIST OF TABLES

## LIST OF FIGURES

**Chapter 1: Introduction**

Mental health refers to a mental, behavioral, or emotional disorder with varying levels of impairment (National Institute of Mental Health [NIMH], 2022). These levels range from no impairment to mild, moderate, or severe impairment. A total of 57.8 million Americans aged 18 or older, experienced a mental health condition in 2021 (Substance Abuse and Mental Health Services Administration [SAMHSA], 2021). This is an increase of 4.9 (9%) million from the previous year (SAMHSA, 2020). Adults between the ages of 18-25 (33.7%) had the highest number of conditions reported compared to other adults (SAMHSA, 2021). Multiracial adults experience a higher prevalence of mental health conditions (35.9%) than in other races and ethnicities (SAMHSA, 2021). According to SAMHSA (2020) females (25.8%) experience mental health conditions significantly higher than males (15.8%). Depression was the most prevalent mental health condition reported by adults aged 18 or older, accounting for 21 million (36%) people (SAMHSA, 2021). Although the number of Americans managing mental health conditions has increased, the number of Americans receiving mental health treatment remains below half at 26.5 million (47.2%) (SAMHSA, 2021).

In 2019 the Coronavirus disease (COVID-19), defined as a respiratory disease emerged and spread from person to person through contaminated droplets transmitted from an infected person by coughing, sneezing, or talking (Center for Disease Control [CDC], 2019). COVID-19 is comparable to other global threatening diseases such as Ebola and measles but evolved into a global pandemic due to the high rate of transmission (Wilder-Smith, 2021). As of January 23, 2023, there have been 664,097,132 reported cases and 6,716,108 deaths worldwide (World Health Organization [WHO], 2023). Patients diagnosed with COVID-19 endured a wide range of symptoms and illnesses coupled with many long-term implications. In the medical field this

group of patients are labeled "long-haulers" (Raveendran et al., 2021). The WHO (2021) has defined long haul COVID-19 as:

> Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms and that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyday functioning. Symptoms may be new onset following initial recovery from an acute COVID-19 episode or persist from the initial illness. Symptoms may also fluctuate or relapse over time.

As of May 2021, long haul Covid-19 has impacted 18 million people worldwide (Decary et al., 2021). Approximately 40% of patients who become infected with COVID-19 results in long-haul COVID-19 (Chen et al., 2021). COVID-fog or brain-fog is one of the long-haul implications, which includes fatigue, poor concentration, worsened memory, difficulty with executive function, insomnia, migraine, and neuropathic symptoms (Nordvig & Noble, 2021). Other reported complications are long-term tissue damage to the lungs, brain, and heart (Young, 2021).

COVID-19 triggered an increase of 41% in anxiety and depression symptoms among members in society compared to 2019 prevalence rates (Czeisler et al., 2020). A few reasons for this increase are the epidemiology of the disease, quarantine, coexisting factors, fear of illness, impact on social life, finances, and disruption of daily life due to COVID-19 (Gordon, 2021; Hossain, 2020). There is increased evidence of stress, panic attacks, sleep disorders, and suicide due to the pandemic (Gover, 2020; Lopez-Leon, 2021). Lopez-Leon (2021) utilized a systematic review of 15 studies that indicated patients who were diagnosed with COVID-19 are at higher risk of being newly diagnosed with a psychiatric disorder. Patients who endured mental health

conditions prior to a COVID-19 diagnosis, reported worsening in their mental health symptoms (Vindegaard & Benros, 2020). Neuropsychiatric symptoms can appear at the onset of the disease or even weeks to months post-diagnosis (Lopez-Leon, 2021; Rogers, 2020). One specific study verified that 96.2% of patients managing COVID-19 endured Post-Traumatic Stress Symptoms (PTSS) and exhibited higher rates of depression and anxiety (Vindegaard & Benros, 2020). Patients with existing mental health conditions who contract COVID-19 are at higher risk for mortality when compared to patients with COVID-19 and who do not have an existing mental health condition (Fond, 2021). Patients who are diagnosed with schizophrenia and/or bipolar disorders have the highest risk. Furthermore, the diagnosis of bipolar disorder is estimated at 4.4% of the US population (NIMH, 2017). This information identifies a vulnerable group to be at high risk for further complications and that enhanced prevention, management, and intervention are acute.

**Approaches to Treatment**

One treatment approach for patients with physical and mental health conditions that has been utilized for years is an integrated model of care. The World Health Organization (2016) describes integrated models of care as:

> Health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course. (p.2)

Integrated models of care are utilized to treat physical and mental health conditions simultaneously. Eighty percent of patients with complex physical health conditions also have

mental health comorbidity (Kathol, 2010; Struckman, 2018) defining why integrated models of care are vital to recovery.

Integrated models of care are mainly delivered in primary care offices. Primary care offers essential healthcare made available to individuals in the community, by means suitable to them, and at a cost the community can afford (WHO, 2021). Integrated care within primary care is intended to affect services within healthcare through collaborative practice with all healthcare professionals. Integrated models of care are used in primary care settings to support positive patient outcomes; however, there is evidence that supports an unmet demand for mental health services. In 2018, 4,900,000 patients were seen in the emergency department for a mental or neurodevelopment diagnosis, whereas 55,700,000 patients were seen in a physician office that resulted in a primary diagnosis of a mental and/or neurodevelopmental disorders (CDC, 2020).

Sporinova (2019) examined the yearly cost of care for patients with a chronic physical health condition, which affirmed the average to be $22,280. However, when that was paired with a mental health condition the average cost of care was $38,250 per year. Chua (2020) conducted an analysis aimed at examining the average yearly amount of healthcare costs spent for patients who were diagnosed with COVID-19 and results indicated a range of $21,387-$42,200 based on insurance type. Unmet mental health needs can potentially lead to larger issues along with increased costs of healthcare. The lack of mental health professionals and increase healthcare costs were two factors relevant for this research.

Patients managing long-haul COVID-19 symptoms will need specialized care to manage their physical and mental health conditions associated with the disease and there is evidence that this treatment should include an integrated model of care, outside of the primary care setting (Decary, 2021; Heightman, 2021; Leon-Lopez, 2021; Parkin, 2021). Specialty care clinics are

one type of treatment setting that may support patients with long-haul COVID-19. Patients in specialty care clinics require even more holistic care due to managing chronic and comorbid conditions. A chronic condition is defined as a patient who endures their illness for long periods of time, the illness does not disappear, and it is not resolved by medication (Bernell & Howard, 2016). Comorbidity indicates a patient having two different diseases at a higher rate than expected (Bonavita & De Simone, 2008). This complex disease, layered with patients needing care in specialty care clinics, and the shortage of social workers poses many barriers to an integrated model of care.

**Relevance to Social Work**

The Patient Protection and Affordable Care Act (ACA) of 2010 had many goals related to helping individuals access affordable healthcare (Centers for Medicare and Medicaid Services [CMS], 2010). One area of focus was on service delivery, which included a holistic integrated physical and mental health model of care. Ideally, having healthcare professionals from multidiscipline working together to offer easier access, better quality of care, higher patient satisfaction and efficiency, through one treatment plan that would result in better patient outcomes (Kuramoto et al., 2014). Integrated models of care initially occurred in primary care offices. Healthcare professionals assessed factors such as social and economic environments, which affected the physical and mental health of patients. By examining the whole person and identifying social determinants, the inclusion of social workers was warranted and brought about the change. Furthermore, specific changes from the Affordable Care Act paved the way for social workers to play a critical role in healthcare delivery.

Social workers are essential in supporting and helping vulnerable populations. Vulnerable populations in healthcare are those who endure comorbid physical and mental health conditions

and are potentially aggravated by insufficient healthcare (Waisel, 2013). Social workers strive to solve problems and offer skills that can be applied in everyday life. Social workers are vital in supporting psychosocial needs. The ability to offer mental health services in all healthcare settings as a result of the Affordable Care Act is a milestone for the field of social work. Social workers will be a focal point in this research as advocates for their patients and providers of mental health services. This is a step in the right direction for integrated models of care (National Association Social Workers [NASW], 2022). Several healthcare agencies support an integrated model of care including National Committee for Quality Assurance (NCQA, 2021), Substance Abuse and Mental Health Servies (SAMSA, n.d.), the American Psychiatric Association (APA, 2019), the American Psychological Association (APA, 2017), and the Council on Social Work Education (CSWE, 2022). CSWE is a member of Interprofessional Education Collaborative (IPEC, 2022) and supports an integrated model of care in healthcare settings, which is relevant for social work education. These agencies are critical in supporting the delivery of mental health services.

Interprofessional Education Collaborative (IPEC, 2022) represents 21 national health professional associations that connect to influence curriculum development across education systems. The goal of the IPEC is to ensure healthcare professionals are proficient in competencies for whole-person care, population health, and collaborative practice. Interprofessional Education (IPE, 2022) involves students from multidiscipline learning and working together to help improve health outcomes. Together, this approach shapes the healthcare model to be one of teamwork and strength similar to the integrated model of care. The World Health Organization (2010) has recognized the value of IPE and the impact it has on global health. A framework for action on Interprofessional Education and Collaboration was created

and highlighted the current state of interprofessional collaboration, tools to support teamwork, and identified action items that policymakers can apply to local health systems. This framework was relevant for the 2022 Educational Policy and Accreditations standards which were released by the Council on Social Work Education. The concept of competency-based education relies on a shared understanding of the nature of competence in professional practice. Competence in social work refers to being able to combine and apply social work knowledge, values, skills, cognitive and affective processes to practice situations in a culturally sensitive, purposeful, intentional, and professional manner to promote human and community health. A holistic view of competence is recognized by the EPAS; that is, demonstrated competence is based on knowledge, values, skills, cognitive and affective processes, including critical thinking, affective reactions, and the exercise of judgment as they relate to unique practice situations. It is essential for social workers educators to adopt this approach in order to ensure that their students are prepared to practice safely, competently, and ethically with all clients, constituents, and members of the public. In addition, social work education provides practitioners with the necessary skills to develop socially responsible policy, address the policy implications of their work, and implement strategies to address inequalities and inequities. In a curriculum that begins with outcomes, expressed as expected competencies, program developers develop substantive content, pedagogical approaches, and educational activities that provide students with opportunities to demonstrate these skills. The standards set the expectations for all social work programs across the United States.

The Social Work Code of Ethics (NASW, 2021) focuses on six key values and social justice is on the forefront of this research. Social workers advocate on behalf of vulnerable populations and strive for equality. The U.S. Bureau of Labor Statistics (2020) states a majority

of social workers provide care in an office setting, not ambulatory or specialty care clinics. There is a need for this multidisciplinary approach for patients with comorbid physical and mental health conditions within specialty care settings. Specialty care clinics are defined as a "facility, often associated with a hospital or medical school, that is devoted to the diagnosis and care of outpatients. A medical establishment run by several specialists working in cooperation and sharing the same facilities" (American Heritage, 2011). However, social workers are not always present in these clinics for these patients. When exploring the healthcare system and models of integrated care, vulnerable groups, such as those with comorbid conditions, need to have a voice.

This study explored the perceptions of effectiveness of a specific treatment model for patients managing long-haul COVID-19 A Social worker's role in exploring treatment needs of long-haul COVID-19 patients through a social justice theory was examined. By understanding perceived effectiveness of  alternative treatment options, patients can obtain the support needed to manage both their physical and mental health conditions when social workers are not immediately available.

**Shortage of Social Workers**

Over the past decade the aim to work in the field of mental health has declined leaving a shortage of professionals ranging from psychiatrists to therapists (Butryn et al., 2017). Mental health professions include psychiatrists, psychologists, social workers, counselors, marriage and family therapists, advanced practice nurses specializing in mental health care and substance use. The U.S. Bureau of Labor Statistics (BLS) identified 577,000 mental health professionals were practicing in the United States in 2017. American's Health Ranking (2021) identified 284 mental health providers per 100,000 population. A few reasons for this decline vary from poor job satisfaction, burnout, low pay for excessive hours, additional stress that comes along with

working in community settings, and higher paying jobs for the same amount of school (Butryn et al., 2017). In 2018, 111,000,000 people lived in areas with a shortage of mental health professionals (Weiner, 2018) and 96,000,000 Americans had to wait more than one week for mental health services (Wood et al., 2018). In March 2021 that number increased to 122,000,000 or 37% of the population (USA Facts, 2021). In rural areas, the deficit is even more significant and rural communities cannot meet the demand for services as might urban communities in terms of recruitment and retention due to wages (Ransford, 2018). With the shortage of mental health professionals, this leaves a lack of resources to meet the demand, concluding that there is an overarching need to explore alternative treatment interventions to meet a patient's mental health conditions (Fish, 2021; Grover, 2020; Kumar, 2020; Wainberg, 2017).

**Need for Mental Health Care**

According to the literature, mental health professionals understand the longer a person experiences mental health conditions and is left untreated, the higher risk they become, leading to additional complications such as physical health conditions, chronic mental health conditions, and possibly suicide. One example would be the effects of untreated psychosis and how early intervention has the most significant outcomes (Albert et al., 2017). Patients who experience mild mental health symptoms can become high risk of attempted suicide or hospitalization if left untreated (Bijl et al., 2003). Depression is one of the most common disorders in the United States (NIMH, 2019) and as previously stated, prevalence rates of depression have increased since the onset of COVID-19. In 2019, 47,511 Americans died by suicide and 1.38 million had attempted suicide (American Foundation for Suicide Prevention, 2021). Early intervention is key to treating mental health conditions. For this research, the focus was on social workers in the role of mental health professionals and advocates, offering an alternative treatment approach to address long-

haul COVID-19 symptoms among patients with mental health conditions. Social workers need to work collectively with physical health professionals and explore ways to mitigate the shortage of social workers by offering alternative treatment solutions in their absence (Grover, 2020; Hossain 2020). One such alternative treatment option could be a digital application that targets mental health conditions.

**Exploring Treatment Options**

There are a variety of treatment options for patients managing mental health conditions that vary based on severity of symptoms and past experiences with other treatment approaches. In 2019, medication was the predominant form of treatment at 15.8% and counseling from a mental health professional was 9.5% (CDC, 2019). Despite being the two main methods utilized, at times they are not always effective. Compliance, inaccurate mental health diagnosis, unknown biological markers, resistance to the medication (Garcia-Gutierrez, 2020; Semahegn, 2018) are a few factors that contribute to medication being ineffective. A few circumstances that impact counseling are stigma, cultural differences, conflict between patient and therapist, differentiating expectations between patient and therapist, and lack of progress (Bharadwaj, 2017; Gopalkrishnan, 2018; Roberts, 2018). Long-haul COVID-19 is a complex disease that lacks evidence of effective treatment interventions and as previously described, this population will be managing physical and mental health conditions related to the disease. Identified barriers related to access, shortage of mental health social workers, ineffective treatment methods, necessitate the need to explore alternative treatment options to help aid in a patient's recovery.

Modernized treatment interventions now include digital technology. Digital technology can take on many meanings such as wearables, telemedicine, digital applications, and so forth (Moon et al., 2022). Wearables are fixed as part of clothing or an accessory to monitor activity

and can be connected to mobile application software programs (Lukowicz & Troser, 2004). Telemedicine focuses on remote delivery of healthcare services and health information exchange often as a synchronous (in real-time) video appointment with a healthcare professional. (Bashur et al., 2000). Telemedicine was critical during the onset of the pandemic as the pandemic restrictions limited exposure to patients and professionals (Arafat et al., 2021). Telemedicine is helpful for treating mental health conditions however, it requires a social worker to be present and with the shortage, this may not be the best treatment option available.

Digital applications are software programs that run on devices such as smartphones, laptops, or computers (US Food & Drug Administration [FDA], 2019). Specifically, digital applications (apps) for mobile devices (smartphone) have grown over the years and in 2021, there were 10,000-20,000 self-help applications (Clay, 2021). Ninety-two percent of the U.S. population has a cell phone, including smartphones, which are needed for many of the digital applications (Hasselberg, 2020). Numerous digital applications offer an array of tools to address a variety of mental health diagnoses, and many include a social worker. However, due to the shortage of social workers, these specific applications are struggling to hire staff to meet the demand. Simultaneously, digital applications have been introduced as an alternative treatment option to tackle the mental health crisis and the shortage of social workers (Fish & Mittal, 2021). Further validating that it is imperative to explore digital applications that do not require the involvement of a social work in order to assess perceived effectiveness in meeting patient outcomes.

**Statement of Purpose**

This exploratory study was designed to illustrate how patients diagnosed with long-haul COVID-19 respond to a digital application to support their mental health conditions.

Furthermore, answering the question: What are the perceived experiences of patients using a digital application while seeking care for long-haul COVID-19 conditions?

Outcomes of the study provide social workers insight to an alternative treatment option that may be provided to patients when social workers are not available. The patients' perception of the digital application was vital in understanding how it is viewed, used, and sensed to impact one's overall mental health conditions. This is essential in social work practice to ensure a patient's needs are being met when social workers are unavailable.

**Theoretical Framework**

Rawls' theory of Social Justice emerged in the 19th century and focused on relationships between groups within society (Ekmekci & Arda, 2016). The intended purpose of the theory was to create a system to ensure the fair distribution of primary social goods. Primary social goods refer to things which people need all throughout their lives to live as functioning members of society. According to Ekmekci (2016) two principles within the theory are equal liberty and social inequalities. Equal liberties focus on several items such as self-respect, rights to personal integrity, and right of property. Social inequalities encompass income, welfare, and resources. Moreover, all people should have equal access to basic elements such as healthcare, and life opportunities, regardless of their circumstances (Jost & Kay, 2010). Philosophers and theorists have attempted to define social justice in greater detail, with varied approaches, and across all levels of intervention or analysis. Social justice fits easily into the macrosystem level of practice through community organizing, social welfare policies, and advocacy (Figueira-McDonough, 1993). The microsystem level is challenging since the focus at this level is on individual, family, and group work (Wakefield, 1988). An overarching and unifying theme is that theories of social justice embody notions of freedom and human rights (Morris, 2002).

The National Association of Social Workers (2021) aligns its definition with this overarching view of social justice, positioning in its Code of Ethics that social workers challenge social injustice. This understanding of social justice shapes the conceptualization of societal benefits and responsibilities; it also determines social work's professional mission. An implication of human rights-based definition of social justice is that social workers are responsible for advocacy on behalf of vulnerable groups who regularly encounter barriers. Groups typically identified as vulnerable by social workers include those characterized by shared age, ethnicity, and gender. Some vulnerable groups that are overlooked include compromised individuals having complex, chronic physical and mental health conditions. At times, these groups seem to be overshadowed by society but require just as much support as any other group. Patients managing chronic conditions such as those with long-haul COVID-19 would be considered a vulnerable population and necessitate social workers to advocate on their behalf as any other vulnerable group. Furthermore, promoting alternative treatment options to meet their needs when healthcare professionals are not available. The social work Code of Ethics defines (NASW, 2021) standards that model the behavior of the profession and social justice plays a key role in these standards, emphasizing human rights and improving the lives of vulnerable groups.

 Social workers seek social change on behalf of vulnerable groups to ensure equality of access for everyone (NASW, 2021). Resources for this research are the multidisciplinary professionals who are needed for this vulnerable population. The role of a social worker within specialty care clinics would be to examine whether vulnerable populations within specialty settings have equal access to services.

Human rights are a pillar of social work practice (NASW, 2021) and if resources and equal healthcare opportunities are lacking, this affects one's human rights. Constructs of social

justice and its central position in social work practice makes it clear that attention to this example

of access to healthcare is relevant and timely. Integrated models of care often interface with

vulnerable populations, especially groups with comorbid physical and mental health conditions.

Patients who require integrated models of care may struggle with accessing resources to meet

both their physical and mental health needs. It is the responsibility of social workers to ensure

that patients have access to the right treatment options when healthcare professionals are

unavailable, thereby applying social justice on their behalf.

**Chapter 2: Literature Review**

A review of the following databases Ebscohost, Google Scholar, Science Direct databases, and Social Science reviews resulted in articles that included keywords COVID-19, comorbid conditions, social work, mental health, and treatment options. Variables associated with this research were applied which resulted in 121 articles. Keywords were models of care, long-haul COVID-19, social workers, integrated models of care, digital applications, comorbid conditions, treatment for long-haul COVID-19, and alternative mental health treatment. Studies relevant to the research are predominantly from the past 10 years and include a variety of qualitative, quantitative, mixed method designs, and systematic reviews. However, there is little research encompassing all the variables associated with this study due to the newness of the disease, the lack of use of digital applications for complex conditions, and recent shortage of social workers. To gain a better understanding if a digital application offers patients perceived effectiveness in care when social workers are not available it was essential to discover what was available, what has worked in the past, where were the gaps in care, and what will meet future needs. As a result, the effectiveness of an integrated model of care, models of care for patients with COVID-19, specialty care clinics, the effect of social workers within healthcare setting, the adherence, and effectiveness of digital applications was explored.

**Effectiveness of an Integrated Model of Care**

Outcomes of research studies were examined to determine how integrated models of care were supported by healthcare professionals and reduced patients' mental health symptoms. Allen (2009) utilized a systematic review to examine 10-years of random control trials to identify when integrated models of care were effective and indicated successful outcomes for healthcare professionals. First, healthcare professionals exhibited compliance to treatment protocols by

decreasing variation in practice. Second, there was an increase in physician agreement about treatment options due to the collaboration. Third, healthcare professionals demonstrated adequate results in the decision-making process. Fourth, their behavior changed to be more favorable due to teamwork. In a different study Allen (2009) examined healthcare professionals and addressed how they define their roles, responsibilities, and activities within the model to ensure role alignment. Atwal and Caldwell (2002) studied interprofessional collaboration in discharge planning, which resulted in identifying how organizations caused delays in the process, not the healthcare professionals themselves. There is a tendency for organizations not to collaborate, which leads to the creation of silos, breakdown of communication, and an increase in processing time. Collaboration between healthcare professionals minimizes these barriers and facilitates a faster and easier discharge for the patient. Overall integrated models of care have been advantageous for healthcare professionals. Social workers and other healthcare professionals, working with integrated models of care must collaborate with one another for patients to succeed.

Integrated models of care have demonstrated positive effects on decreasing mental health symptoms. Studies by Chwastiak (2017), Goldstein (2017), Lemmens (2015), and Karapareddy (2019) indicate a decrease in depressive symptoms when an integrated approach was utilized. Coordinating care across professionals, setting shared goals, involving patients in the treatment planning process, and improving communication were key factors contributing to a positive outcome.

Lemmens (2015) conducted a systematic review of ten studies that explored integrated models of care for patients with psychological comorbidity. Outcomes showed beneficial effects and one common theme identified was depressive symptoms decreased by 50% across several

studies. This improvement was met by communication occurring between psychiatrist, neurologists, care management, and on-going communication with the patients. Karapareddy (2019) outlines that integrated models of care support hopeful outcomes and improvement in mental health disorders by eliminating unnecessary services and shared goals across team members.

Patients managing comorbid conditions have also had successful outcomes with integrated models of care. Chwastiak (2017) provides evidence that an integrated model of care is effective for patients managing poorly controlled diabetes and depression. Both conditions were managed by a care team and outcomes show improvement. A "stepped care" approach in which patients with less acute needs were seen by a nurse or care managers, whereas patients with more acute needs were seen by specialists. At the time of referral, the patient's needs were identified and coordination across physical and mental health needs was initiated on the same day. Goldstein (2017) suggests that an integrated model would support patients with cardiovascular disease and depression by treating both simultaneously. Results were positive and met by all team members sharing progress notes, adjusting the patient's care plan, and engaging patient's in their care.

Ouwens (2015) suggests that chronically ill patients with a variety of heterogeneous physical and mental health conditions, demonstrated desirable effects on the quality of care by having each participant contribute to the overall treatment plan, patient and providers. Goldstein (2017) highlights that providers benefit from an integrated model through improved communication, case coordination, and health education. The patients benefit from convenience, decrease in stigma, higher quality care, and quicker appointments.

.

Integrated models of care have been favorable for healthcare professionals, and patients with chronic physical and mental health conditions. Equivalently, patients presenting with long-haul COVID-19 have similar physical and mental health conditions as those defined in this literature review, suggesting that an integrated approach to care may be an appropriate treatment method. Similarly, integrated models of care have been positive for patient outcomes.

**Models of Care for COVID-19**

Research related to the treatment of patients who are managing long-haul COVID-19 comorbidity is limited. A small number of studies focus on treatment of physical health conditions but few address mental health treatment (Guzik, 2020; Merrill, 2020; Yong, 2021). Guzik (2020) focused on the implications of the cardiovascular system and possible treatment options whereas Merrill (2020) focused on thrombotic syndrome and deep vein thrombosis of the legs however, mental health was not mentioned in either study. Yong (2021) focused on dyspnea, indicating shortness of breath in patients managing long-haul COVID-19 and suggests rehabilitation as a treatment option. Yong (2021) mentions anxiety and depression  associated with the disease but offers no treatment recommendations. Despite a lack of scientific evidence supporting treatment options specific to mental health treatment of those with long-haul COVID-19, it is relevant to review proposed models of care for patients managing COVID-19.Vehar (2022) suggests a comprehensive, multidisciplinary approach within a specialty care clinic as the foundation to treat patients with COVID-19

Models of care for COVID-19 was the focal point of a systematic review (Decary et al., 2021) that expanded across a variety of healthcare models throughout United Kingdom and Canada. The systematic review results suggested care models should include coordination of care across multidiscipline, and training for screening and support of medical needs, and access

18

to medical specialty clinics for testing and diagnosis. Several other studies centered on care models for patients with long-haul COVID-19 and identified that an integrated model outside of a primary care setting is significant to meet the complications of the long-term conditions such as chest pain, memory loss, organ system issues, and heart conditions (Bringham 2021; Parkin, 2021; Santhosh, 2021). Gemelli (2020) affirmed the need for large observational research to understand consequences of the disease and experiences of the patients. In addition, he highlighted the need for a multidiscipline approach to identify specific clinical needs and create comprehensive care plans for individuals managing physical and mental health conditions (Gemelli, 2020).

Other studies have attempted to explore the mental health conditions related to COVID-19 however, affective treatment options remains unclear. Lopez-Leon (2021) and Rogers (2020 indicated that neuropsychiatric symptoms can appear at the onset of the disease to months post-diagnosis. Edinoff (2022), Guck (2021), Nalbandian (2021), Vink (2020) each focused on mental health conditions related to COVID-19 and provided treatment suggestions, but none have conducted studies with patients to validate if the suggestions demonstrated positive outcomes.

Guck (2021) studied psychological complications because of hospitalization due to COVID-19. Post-Traumatic Stress Disorder (PTSD), hypervigilance, re-experiencing phenomena, and avoidant behavior were the most prevalent diagnoses in his patient population. Treatment recommendations were based on past studies and not a result of direct studies on patients managing long-haul COVID-19 due to the novelty of the disease. Treatment recommendations varied from coping skills education, use of cogitative behavioral therapy, and telemedicine (Guck et al., 2021). A comprehensive review by Nalbandian (2021) of literature on post-acute COVID-19 diagnosis and neuropsychiatric symptom suggested that migraine-like

headache, PTSD, depression, anxiety, and obsessive-compulsive disorder were prevalent in patients with COVID-19. Treatment recommendations were to provide standard therapy for those managing headaches and to provide screening to identify severity of PTSD, depression, anxiety, and obsessive-compulsive disorder. Edinoff (2022) study highlighted the same psychiatric symptoms as Guck and treatment recommendations were to prescribe pro-inflammatory cytokines, high-dose steroids, or a multidrug regimen. Vink (2020) studied the correlation of Cognitive Behavioral Therapy (CBT) with patients managing post COVID-19 Fatigue Syndrome applying lessons from a different study that focused on Q-Fever Fatigue Syndrome, which is a state of prolonged fatigue. The theory was that by applying results from a Q-Fever Fatigue Syndrome study, patients with COVID-19 Fatigue Syndrome may demonstrate positive outcomes. However, the outcomes from the Q-Fever Fatigue study did not reveal that CBT improved physical performance and the hypothesis was null (Vink & Vink-Niese, 2020) therefore, no treatment recommendations were provided.

De Hert (2011), Knapen (2014), Ohrnberger (2017), Scheewe (2013) have suggested that managing one's physical health can impact mental health and managing both concurrently demonstrates better outcomes. De Hert (2011) focused on physical health conditions in patients managing severe mental health conditions. He provided recommendations from a system perspective, which included educating the healthcare community on how to engage with patients and reducing stigma and discrimination. Additionally, he provided recommendations at the individual provider level including the importance of taking responsibility for the physical health of patients with mental health conditions and communicating changes to a primary care provider.

Knapen (2014) and Ohrnberger (2017) highlight improvement in patients mental health when treating physical and mental health conditions together. Knapen (2014) studied

motivational strategies in patients with major depression. A variety of physical therapies were utilized and patients' depression symptoms as well as their physical health and body image improved. Exercises also became a coping mechanism for the patients. In a meta-analysis conducted by Ohrnberger (2017), the impact of physical health on mental health was examined. Evidence showed a correlation between the two and elements such as lifestyle choices, social interactions resulted in positive outcomes. A study conducted by Scheewe (2013) found that exercise improved the cardiovascular health of patients with schizophrenia and decreased their depression.

**Specialty Care Clinics**

Specialty care clinics may be model locations for patients managing long-haul COVID-19 conditions. Decary (2021) conducted a rapid systematic review on best-available evidence on care models for patients managing long-haul COVID-19. Eight out of 12 models suggested a specialized care clinic that includes integrated care, whole-person focus, and evidence-based care to meet the needs of this population. Parkin (2021) studied a three-tiered model of care for patients managing long-haul COVID-19. Tier one, which is the most intense tier, includes patients with acute needs and managing symptoms longer than three months. This tier reflects a specialty care clinic model with an integrated care approach where patients engage with a variety of physical and mental health specialists. Patients may step down to a less intensive level of care as they progress in their recovery. Assessments are taken upon intake to establish baseline, at eight-weeks and six-months. Tier two focuses on community-based teams and tier three includes primary care providers.

Heightman (2021) conducted a 12-month analysis of patient symptoms related to long-haul COVID-19 and healthcare needs within a specialty care clinic. Findings demonstrated a

variety of long-term effects including mental health concerns. The study also identified the need to incorporate psychological support in these clinic to address the shortage of mental health professionals to meet the patient's needs. Leon-Lopez (2021) conducted a systematic review and meta-analysis of long-term COVID-19 effects. Although the symptoms are similar to those found in other studies, the overall findings indicate that treating this population requires a multidisciplinary approach that includes rehabilitation, clinical management, a variety of specialties, and a holistic approach. This type of approach sets the stage for a specialty care clinic.

**Effects of Social Workers within Healthcare Setting**

In healthcare, social workers provide services to patients across the lifespan by addressing a broad range of bio-psychosocial issues that impact a person's well-being (NASW, 2022). Moreover, social workers in healthcare settings contribute their expertise in several areas such as whole-person care, social justice, self-determination, and mental health (Straussner, 2022). According to Fraser (2018), the work of social workers within integrated care models can result in cost savings by patients receiving care in one location and eliminating unnecessary services.

Social workers have a positive effect on patient outcomes. Fraser (2018)  highlights improved mental health outcomes for patients are a result of social workers focusing on a multidisciplinary approach of sharing information and instilling warm hand-offs to other healthcare professionals. Social workers in primary care settings offer access to mental health services, improve outcomes of patients with mental health issues, and increase skills and comfort of primary care providers in addressing mental health challenges (Kates et al., 2002). A study by Stekette (2017) confirmed that social workers are beneficial to all age groups when interacting

with patients. A case study suggests that social workers who provide patients with links to community resources upon discharge from a hospital, can help improve their health status and quality of life by reducing their utilization of healthcare services (Barber, 2015).

Social workers are significant and a valued role in the provision of care by providing psychosocial assessments and interventions, offering counseling, conducting case management functions, navigating the health care system, linking patients with community resources and other parts of the healthcare system, and education and training providers about psychosocial aspects related to health and sickness (Ashcroft et al., 2018).

As evident throughout the introduction and literature review, patients with physical and mental health conditions that are associated with long-haul COVID-19 would be best served in a specialty care clinic that utilizes an integrated model of care. Social workers play a key role in integrated models of care however, due to the shortage of social workers, it is necessary to explore and advocate for alternative treatment options.

**Digital Technology**

Mobile devices are increasingly accessible, leading to an increase in digital technology. In 2021, 85% of American adults own a smartphone (Pew Research Center, 2023). One component of digital technology is digital applications. Digital application is defined as a computer program designed to carry out or facilitate a task on a computer device such as a smartphone or tablet (IGI Global, 2023). Digital applications relevant to this study include mobile applications that offer health and wellness activities as well as exercise programs on smartphones or tablets. In 2021, the average person spent 4.8 hours per day using digital applications (data.ai research, 2022).

Paglialonga (2018) assessed digital health applications to improve health in numerous ways such as providing access, support behavior change, and enhance self-care. However, this study did not include actual patient use but instead the identification, characterization, and assessment of digital applications. Based on analysis of scientific literature, Kondylakis (2020) examined 12 studies evaluating digital application for prevention, management, and treatment of COVID-19. It was found that digital applications could increase patients interaction, provide home monitoring, track symptoms, and reduce the burden of hospitals. Eleven of the applications were related to physical health, while only one application tracked the mental health of college students which was shown to be effective. Eisenstadt (2021) conducted a systematic review of 52 publications and meta-analysis of 39 publications that supported digital applications in managing mental health, enhance well-being, and nurture emotional regulation. This review excluded any physical health elements and focused exclusively on stand-alone digital mental health applications for mild mental health conditions. Results indicated there is a lack of empirical studies that investigate effectiveness of digital applications for emotional regulation.

The use of digital applications has been investigated in a variety of studies; however, few studies have examined the outcome of patients using the digital applications, particularly for patients with comorbid conditions.

### *Adherence of Digital Applications*

Adherence related to digital applications includes engagement with the application, uptake or use of the application, or utilization of the application's program as designed (Donkin et al., 2011). An analysis of 40 studies on user engagement of  digital applications for mental health was conducted by Ng (2019). Outcomes were positive for usability, user satisfaction and

acceptability although the study did not examine actual patient outcomes related to the digital application and usability.

Henson (2019) examined five studies related to digital mental health applications and therapeutic alliance. According to the results of the studies, none of the studies quantified digital therapeutic alliances, but instead examined mental health conditions, the duration of the use of technology, and methods of assessing the digital alliances. Patient outcomes were not explored yet each study reviewed by Henson (2019) suggested that smartphones as an adjunct to therapy can lead to engagement and adherence. Patoz (2021) conducted a systematic review of 13 studies that focused on adherence of digital applications for patients' managing bipolar disorder. In the review, seven studies examined activity rates, three retention rates, and three compliance characteristics. The results were high and ranged from 58-91.6 percent in terms of activity use, however patient outcomes were not included or compared to activity use. Fleming (2018) reviewed 10 studies related to digital applications for depression, mood, and anxiety. Across all studies, 21% to 88% of users engaged in at least one technique whereas 7-42% engaged in moderate use after four weeks. Again, patient outcomes were not examined in this review, only engagement.

A study conducted by Schlosser (2017) examined patients who were treated for depression symptoms using a mobile application that applied social networking, goal setting, and a mental health coach to deliver text-based evidence-based therapy. Participants were recruited via ads or Craigslist. Over a 12-week period, patients logged in on average of five days per week resulting in 50% reduction in depressive symptoms.

There were specific parameters for each study included in this review, and the outcomes indicated that patients were logging on and using digital applications, but deep insight related to

patient outcomes was not presented. Furthermore, studies that demonstrate adherence in relation to patient outcomes would be more valuable than simply tracking usage.

### *Effectiveness of Digital Applications*

Digital applications have been effective in treating mental health conditions and may be one option for long-haul COVID-19 patients as they manage their comorbid conditions. Digital applications have been evaluated for patients with depression, anxiety, psychological distress, overall mental well-being, emotional regulation, and comorbid hypertension and/or diabetes (Church, 2020; Graham, 2020; Khademian, 2020; Menezes, 2019). Results were encouraging and there was a reduction in depression and anxiety symptoms, and an increase in overall mental well-being and emotional regulation.

According to Church (2020), a cross-sectional analysis examined the effectiveness of a digital application to manage anxiety and stress among primary care patients. The digital application provided for self-rated psychological distress as an adjunct to professional mental health care. Pre and post sessions were measured, and outcomes showed a decrease by 29% in anxiety symptoms and 31% for stress symptoms.

Graham (2020) conducted a randomized control trial with patients in primary care that were managing depression and anxiety. Participants in the experiment group engaged with a coach-supported platform comprised of a suite of digital applications that was delivered over eight weeks. The control group received treatment as usual for eight weeks and then offered a mobile platform. In the experiment group, participants experienced a 50% decrease in depression and anxiety symptoms which was higher result than the control group. Adherence was also reported to be high with the median of 93-98 sessions over the course of eight weeks. Menezes (2019) conducted a study with patients in primary care managing depression and hypertension or

diabetes. A digital application was provided for six weeks that offered low-intensity psychoeducation. Outcomes highlighted that 58% of the participants reduced depressive symptoms after the six weeks. Khademian (2020) evaluated fifteen studies on the use of digital applications and the effect on depression, stress, and anxiety symptoms. Outcomes showed that digital applications that included behavior change strategies resulted in a decrease in symptoms. Results are promising as noted however, Khademian (2020) suggests further research is needed to reach conclusive evidence.

Digital applications have been used to support mental health needs and when the application program offers cognitive-behavioral therapy techniques, the results are equal or better than in-person care (Hasselberg, 2020). Early discovery outcomes show that digital applications can support those with unmet mental health conditions especially with the ongoing shortage of social workers (Moon et al., 2022; Raney et al., 2017).

**Chapter Summary**

Integrated models of care have been recognized as a necessary model for patients managing long-haul COVID-19 (Guzik, 2020; Merrill, 2020; Yong, 2021). It is recommended that patients with long-haul COVID-19 be treated in specialty care clinics that provide integrated models of care (Heightman, 2021; Leon-Lopez, 2021; Parkin, 2020). Social workers play a substantial role within integrated models of care (Fraser, 2018; Stekette, 2017; Ashcroft, 2018). However, the shortage of social workers has impacted many aspects of healthcare including lack of access to high-quality mental health services, fragmented service delivery models, and research capacity (Wainberg 2017; Weiner 2018; Wood 2018). With the shortage of social workers today, it is necessary to identify other effective treatment options to support this vulnerable population, especially in the absence of social workers.

Digital applications have demonstrated effectiveness on decreasing mental health symptoms (Church, 2020; Graham, 2020; Menezes, 2019). Various studies focus on adherence of digital applications which is high (Ng, 2019; Patoz, 2021; Fleming, 2018) however, studies do not include patient outcomes associated with adherence which is a gap in the literature. Several studies have particular physical health disease or specific mental health condition, but few combine both physical and mental health conditions similar to long-haul COVID-19 and mental health (Goldstein, 2017; Chwastiak, 2017). It is important to note that all of the studies discovered in this review occurred in primary care settings, which are not suitable for patients with severe comorbid conditions such as those managing long-haul COVID-19. Patients who receive treatment in specialty clinics have multiple issues and require a variety of specialists to meet their needs. By providing patients with an alternative treatment option such as a digital application, additional appointments may be avoided. With research focusing on alternative mental health interventions due to the shortage of social workers, patients will have access to the supports they need while seeking care in a specialty clinic.

This qualitative study addressed the research question of: *what are the perceived experiences of patients using a digital application while seeking care for long-haul COVID-19 conditions?* The hypothesis was that a digital application would support a patient's mental health conditions while seeking care for long-haul COVD-19 when social workers are not immediately available.

**Chapter 3: Methodology**

This research study was a secondary study inclusive of patients who participated in an observational, longitudinal study at a large clinic in the northeastern part of the country. The study was titled "Post-COVID impairment phenotyping and outcomes," short title "Long haul COVID." The aim relevant to this research study focused on the mental health conditions of patients managing long-haul COVID-19. Patients were evaluated by a psychiatrist upon enrollment if they presented with mental health symptoms. When the patients' symptoms fell into a mild to moderate threshold, they were offered a digital application to help support their symptoms. If the patients' symptoms met a severe threshold, they were seen by the psychiatrist for therapeutic sessions. The digital application was a resource for patients with long haul COVID-19. An analysis of the current study included both qualitative and demographic data.

The digital application provided offered a self-guided program that included over 80 cognitive behavioral therapy techniques and a behavioral change coach. Coaching interactions were left to the patients' discretion. Anxiety, depression, and sleep were three clinical pathways within the digital application. Coaches could remove or add a technique to meet the  patient's needs as they progress through a program based on the patient's responses. Coaches are paraprofessionals who were taught communication skills, motivational interviewing, and texting etiquette during the on-boarding process. During the on-boarding process, coaches role-play the skills they learn during a month-long training course. The messages sent and received from patients are regularly audited. Coaches are not therapists, nor do they provide therapy but are supervised by a licensed mental health provider and have weekly supervision. Screenshots from the digital application are shared below.

**Figure 3.1**

*Screenshot of Digital Application*
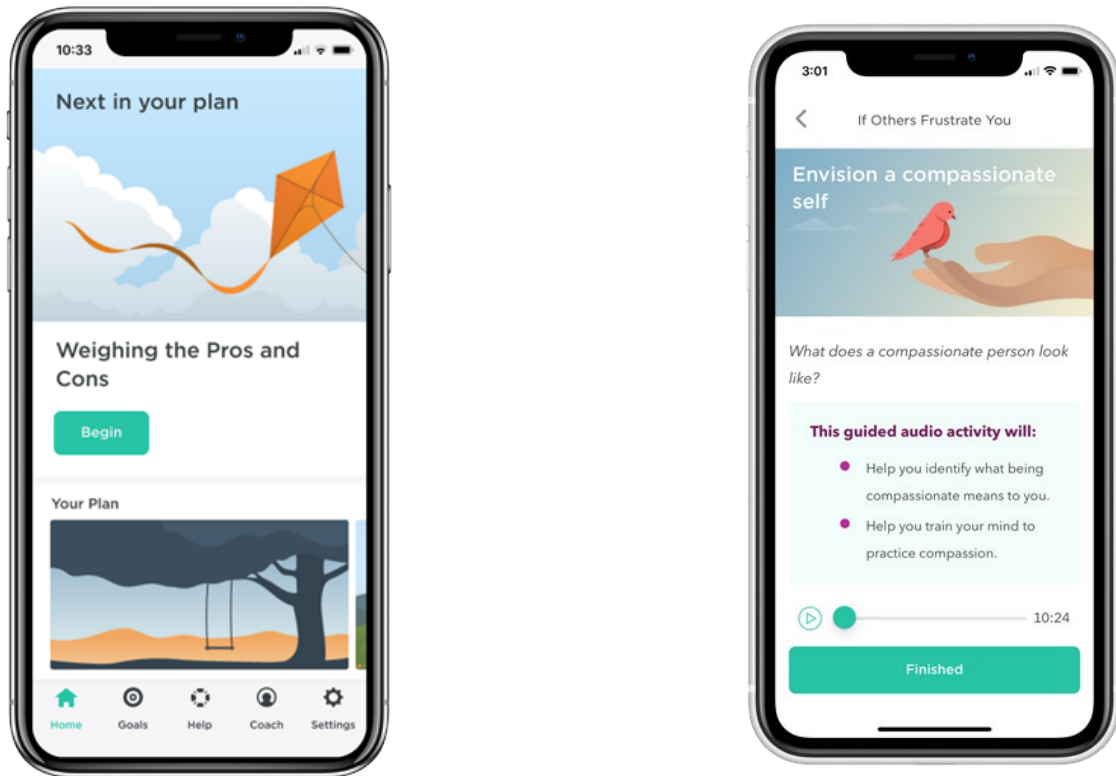


The design for the study was a qualitative, phenomenological approach to data collection. The research aim was to explore the perceived experiences of patients utilizing a digital application to support their mental health conditions related to long-haul COVID-19. Existing research has focused on designing models of care and the impact of care on physical health conditions, but few explored patient perception of using a digital application to support their mental health.

**Study Design**

Qualitative research was selected over quantitative research with the objective to understand the patient's unique perspective and insight through their own words, which provided for flexibility to share their own experiences. According to Padgett (2017) the essence of

qualitative research is sociology, philosophy, and psychology with the goal to gain a deeper understanding of the individual. Creswell and Poth (2018) define a phenomenological approach as discovering similarities in a shared experience of a particular phenomenon. Neubauer et al. (2019) states that phenomenology focuses on the study of an individual's lived experiences within the world. Participants in this study were managing physical and mental health conditions related to long haul COVID-19. Creswell and Poth (2018) further explain that individuals in phenomenological research share the "what" and "how" of their experiences, which suggested qualitative research was the accurate means to gather the data for this specific study.

In the design phase of a phenomenological study, Creswell and Poth (2018) identify several steps. First is to identify the phenomenon and second is to develop a detailed description of the phenomenon to be studied. For this study, the phenomenon was to explore the use of and perceptions related to the use of a digital application to manage patient's mental health conditions as a result of long haul COVID-19. By gathering shared experiences, the researcher developed a deeper understanding of the phenomenon, which will help shape practice and policy. Data collection will be explained further in this chapter however, it should be mentioned that individual qualitative interviews through semi-structured open-ended questions was the data collection approach to obtain the information. The remainder of this chapter describes the setting of the study and sample size of the targeted population, the data collection method, the analysis method, trustworthiness, and reflexivity statement.

The University of Pittsburgh Institutional Review Board (IRB) approved the request for permission to interview the patients and connect the two studies. A second IRB application was submitted and approved through Millersville University to conduct the research as a doctoral

student. The researcher completed the trainings through the Collaborative Institutional Training Initiative (CITI Program) for research with human subjects and ethics trainings.

**Sample**

The participants for this study were enrolled in a research study at a large clinic in the northeastern part of the country. The clinic was a specialty care clinic where patients sought care for their physical and mental health conditions because of long-haul COVID-19. A digital application was provided to support mild to moderate mental health conditions if participants chose to use it. The participants for this study were those who engaged with the digital application to support their mental health condition.

Purposive sampling was the method utilized for this study. According to Padgett (2017), purposive sampling includes identifying study participants who can provide information related to the phenomenon being studied. Creswell and Poth (2018) identify criterion sampling as a specific type of purposive sampling in which the participants meet specific criteria to be included in the sample. Participants met the inclusion criteria to participate in the study as outlined in the research protocol: must be 18 years of age or older, diagnosed with long-haul COVID-19, present mild to moderate mental health condition, received care at the clinic, accessed the digital application, and utilized three or more techniques within the digital application. Criteria was verified by a research assistant at the clinic and created a password protected excel spreadsheet with participant information that was shared with this researcher.

According to Padgett (2017), a sample size of 6-10 participants for a phenomenological study is acceptable, whereas Duke (1984) suggests 3-10 participants. In qualitative research, saturation refers to the moment at which no new themes or codes are discovered or when the information provided becomes repetitive (Boddy, 2016). To achieve the sample size

recommendation for both Padgett and Duke, the objective for the study was to interview 10-20 participants. A total of 10 participants engaged in the study.

**Data Collection**

Upon receiving consent to participate in this research study from the participants, individual interviews were scheduled. The interviews were set to be audio recorded through Zoom. The researcher attempted to provide the participants with the Zoom link during the call, but several participants requested that the link be emailed to them instead, capturing their email address during the call. A few participants did not understand the technology associated with Zoom; Therefore, the researcher offered an alternative recording option, which involved recording the interviews and storing them on the researcher's computer and in a password protected file. The interviews ranged from 15-39 minutes with the mean interview time of 25 minutes. Participants were given the researcher's phone number at the time of scheduling for any concerns or questions that may have come up. Participants were informed the only risk associated with the research was the potential for a breach of confidentiality. They could decide to stop their involvement in the study at any time and participation did not impact their involvement within the specialty clinic. Participants were given a study ID number for data collection to protect them, confidentially.

Data were collected through individual qualitative interviews using semi-structured open-ended questions (see, Appendix C). The questions focused on three topics: COVID-19, mental health, and experience with the digital application. The data were gathered at one point in time and no follow-up interviews occurred. Seidman (2006) suggests two or more interviews per participant however one interview per participant was conducted due to the variability of utilizing a digital application  Moreover, participants may use the application for a period of time

and then pause use, which could lead to forgetting details about the digital application or the effect it had on them. Interviews that were conducted via Zoom, were audio recorded, and saved to an online cloud storage location at Millersville University. Interviews that were conducted via the researcher's computer were audio recorded and saved to a password protected file. Zoom provided encryption of data recordings to the cloud as a security feature. The researcher transcribed the recordings that were saved on the researcher's computer in a password protected file and the audio recordings were destroyed. Video recordings were not captured during the interviews to maintain confidentiality of the participant. The researcher conducted the interviews in a private space behind a locked door to ensure privacy of the participants. At the end of the interviews, the researcher ended the recording session for both parties. The excel spreadsheet with participant information was stored in a password protected file. The researcher was the only individual to retain the names of the participants. Any hand-written notes were transcribed onto a password protected file, locked in the researcher's file cabinet in the research office, and the hand-written notes were destroyed. All transcribed audio recordings, notes, and interview transcriptions will be destroyed after three years in accordance with federal Institutional Review Board (IRB) regulations.

**Data Analysis**

The data obtained from the individual qualitative interviews were analyzed in accordance with Moustakas' (1994) method of phenomenological analysis. First, the researcher reviewed each transcript from Zoom for complete word-for-word accuracy. The researcher transcribed the other recordings that were saved to the computer, onto a word document. Second, the researcher listened to each recording, along with the transcription to ensure exactness. Third, the researcher applied horizontalization (Moustakas, 1994), highlighting substantial statements

from each participant, treating each statement as having equal value, removed any content unrelated to the research questions, and developed a list of statements. Fourth, the researcher grouped the statements into themes, which removed repetition. Fifth, the researcher created a description of what the participants experienced with the phenomenon, including verbatim examples, also known as textual description (Moustaka, 1994). Sixth, the researcher utilized a structural description of how the experience happened, including the setting and context of where the phenomenon took place (Moustaka, 1994). Lastly, the researcher composed a description of the phenomenon and included textural and structural descriptions that provided for what and how the participants experienced the phenomenon, which is the final summary of the analysis.

**Trustworthiness and Rigor**

Guba and Lincoln (1985) developed four criteria to determine rigor or trustworthiness of a qualitative study: credibility, transferability, dependability, and confirmability. One method of defining credibility as described by Guba and Lincoln (1985) is peer debriefing and support. This method provides for non-involved researchers to react to initial research procedures and findings. For this particular study other researchers were consulted on the research question, methodology, and individual qualitative interview questions. However, peer debriefing was not utilized for review of the findings as this may contaminate the results as stated by Padgett (2017). Member checking is another method of credibility. Member checking allows for stakeholders who are providing the data, to also offer feedback (Gruba & Lincoln, 1985). Participants as the stakeholders, validated their responses to the individual qualitative interview answers by the researcher repeating back what was shared during the interview. This method allowed for clarification of any misinterpretations. Transferability is defined as the degree to which the results can be transferred to another context or settings (Guba & Lincoln, 1985). In principle, if

the findings are positive, the digital application may be utilized in other treatment settings for patients with different mental health conditions. Dependability and conformability were established by tracking daily tasks and justification for any modifications relevant to the research. Furthermore, validating trustworthiness of the study, data, and outcomes (Guba & Lincoln, 1985).

Two modifications of the initial study application were made as a result of the researcher's desire to add demographic data and a few participants were unable to use zoom technology. Therefore, audio recordings were conducted by using a computer-based audio program instead of zoom. This collaboration with the IRB highlights that dependability was the strongest of the four areas of trustworthiness. Credibility could have been enhanced by having another research review the results to verify the data outcomes.

**Researcher's Reflexivity Statement**

The researcher recognizes that certain preconceptions may exist regarding the use of digital applications due to working in the field of technology and managing telemedicine for a large healthcare organization. This researcher has a slightly negative perception of COVID-19 due to a family member passing away from what is believed to have been the vaccination. However, the participants in the study were survivors of the disease and were seeking treatment in a clinical setting where they were working with healthcare professionals. These factors helped remove any false preconceived notions because the element of the vaccination was not a part of the study.

# Chapter 4: Research Findings

This chapter presents the research findings. Several themes emerged from the interviews and will be discussed and organized according to the three main research areas:

1. Experience with COVID-19.

2. Experience with mental health.

3. Experience with the digital application.

The purpose of this research study was to explore patients' perceptions of use of an alternative treatment option to manage mental health conditions in the absence of social workers. There is little research on this topic for this population. The study explored a patient's perceived experiences of using a digital application to support their mental health needs while seeking care for long-haul COVID-19 in a specialty care clinic using an integrated model of care. Semi-structured individual qualitative interviews were conducted with 10 participants who received treatment in a specialty care clinic in the northeastern part of the country. Through data analysis, common themes emerged from the participants' descriptions of their lived experiences. Review of the questions and common themes will be presented throughout this chapter by summarizing the findings and sharing participants own words to support the findings. Themes were physical and mental health symptoms, and effect of COVID-19.

## Participant Demographics

Ten interviews were conducted during late Summer and early Fall of 2022. Each interview was conducted by means of audio-recordings through zoom or computer-based recordings. To protect the participants confidentiality, the researcher assigned a study ID number to each. The length of the interviews ranged from 15 to 39 minutes with the median interview

time of 25 minutes. The participants were all female (*n* = 10) and ages ranged from 34 years to 75 years with the mean age of 57 years.

## Analysis of COVID-19 Research Questions

All ten participants were open to sharing their experiences related to long-haul COVID-19. Participants were asked when they were first diagnosed with COVID-19, symptoms they experienced throughout the time, and how the disease affected them. Table 4.1 provides information on how long participants had been managing their symptoms since the onset and how many symptoms they experienced during that period. Participants with long-haul COVID-19 experienced symptoms during a period of 10-24 months, with an average of 17 months at the time of the interview. The number of repetitive symptoms ranged from 5-15, with an average of 8 symptoms. There were a few outlying symptoms that were reported but determined to be separate from the disease based on participant comments. Some participants experienced more symptoms compared to others and offered they had experienced other physical and mental health issues prior to the onset of the disease.

**Table 4.1**

*Length of Experiencing Symptoms and Number of Long-haul COVID-19 Symptoms*

| | Length of Experiencing Symptoms (in months) *n* = 10 | Number of Symptoms *n* = 10 |
|---|---|---|
| Minimum | 10 | 5 |
| Maximum | 24 | 15 |
| Mean | 17 | 8 |
| SD | 5.7 | 2.59 |

**Physical and Mental Health Symptoms**

There were 15 common symptoms reported across all interviews with fatigue (80%), brain-fog (60%), and fever (50%) being the top reported physical health symptoms. Anxiety

(100%), depression (40%), and Post-Traumatic Stress Disorder (PTSD) (20%) being the top

mental health conditions reported as presented in figure 4.1. The participants reported 10

secondary symptoms that developed later in the course of the disease. Long-term physical health

complications were preload- failure, dysautonomia, Postural Orthostatic Tachycardia Syndrome

(POTS), and postprandial hypotension.

**Figure 4.1**.

*Top Physical and Mental Health Symptoms Frequently Reported*
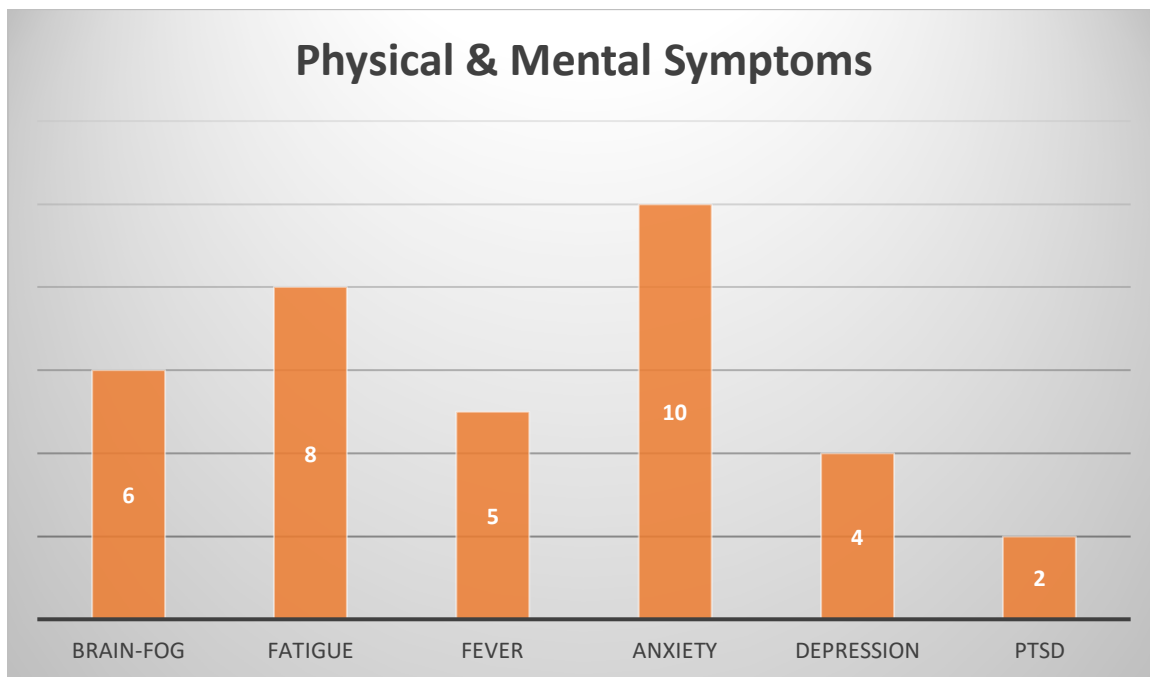


*Fatigue*

Eight (80%) of the participants focused on how the fatigue affected them, "I would sleep

maybe six or eight hours a day, be up for a few hours and exhausted, and lay down for a short

nap that usually ended up being that long." Another stated, "generally I had fatigue at one point

that I couldn't get out of bed and that lasted for about two months." The fatigue impacted each

person who experienced it and how they continued with their daily routine. Many would have to

nap in-between doing any type of activity.

### Brain-fog

Six (60%) of the participants discussed how the brain-fog impacted their thinking and behavior. One participant stated, "I couldn't think how to put together a sentence." Another talked how she had been at her job for nine years and struggled with daily tasks that she has done for years, " there were days I'd sit here crying because I don't know what I am doing. I could not get my brain to figure out how to go from point A to point B."  Another participant talked about how she would, "sit for hours and seem to zone out and not even know it." A participant shared how she experienced balance issues and was unable to concentrate because of the brain fog. Overall, the information shared related to the brain-fog impacted each person in one or more aspects of their normal daily life and routine.

### Fever

Among the participants, five (50%) reported that fever would last for long periods of time before resolving without explanation.

### Anxiety

Ten (100%) of the participants shared that they experienced anxiety. The severity of the anxiety varied based on physical health complications, past mental health conditions, and the participant's support system.

### Depression

Four (40%) of the participants experienced depression. Depending on the individual's physical health complications, their past mental health conditions, and their support system, the level of depression varied.

### PTSD

Two (20%) of the participants experienced symptoms of PTSD as a result of the disease.

**Effect of COVID**

Figure 4.2 demonstrates the effect the disease had on the participants. Seven (70%) of the participants commented on the lack of support they felt from others and six (60%) discussed how it has changed their life in a negative way.

*Lack of Support*

Seven (70%) of the participants who felt unsupported is broken down as follows; five participants (50%) stated that their primary care physician did not believe in their symptoms and suggested it was all a mental health issue. A few of them expressed gratitude once they started receiving care at the clinic. One participant shared, "I was so happy that someone understood what I was talking about and believed me." A participant stated that hospital personnel suggested they be discharged and go home because there was nothing else they could do for them since all of their tests were normal. A quote from a participant emphasized, "doctors don't get it right and so it's still in your head there's nothing wrong with you, you need to see a psychologist." Another stated, "there is no explanations for it, and you don't understand what's going on and it is very frustrating and is literally defeating."

Overall, participants expressed doubts  and sometimes felt unsupported by those they sought professional healthcare answers from. In light of social justice theory and equal liberty, it is vital for social workers to advocate on behalf of this vulnerable population to ensure their needs are heard and met.

Two participants (20%) commented on how their employer did not support them when they needed to take time off due to their symptoms or for appointments related to the disease, leaving them with similar feelings as experienced with healthcare providers.

### *Life Changing*

Another common theme among these questions was life-long consequences associated with the disease, which were reported by six (60%) participants**.** The lingering symptoms forced one participant to retire early, and another lost her nursing license. One participant had been focused on her weight and lost 50 pounds over the past year but could no longer exercise due to weakness in her muscles. As a result of depression and chronic pain, one participant was unable to leave her house. A participants' driver's license was revoked because of long-term post-postprandial hypotension. One comment summarizes this theme, "this became a third full-time job, managing my healthcare for this disease, after work, family, and then COVID, it's a life altering disease."

**Figure 4.2.**

*Effect of COVID*
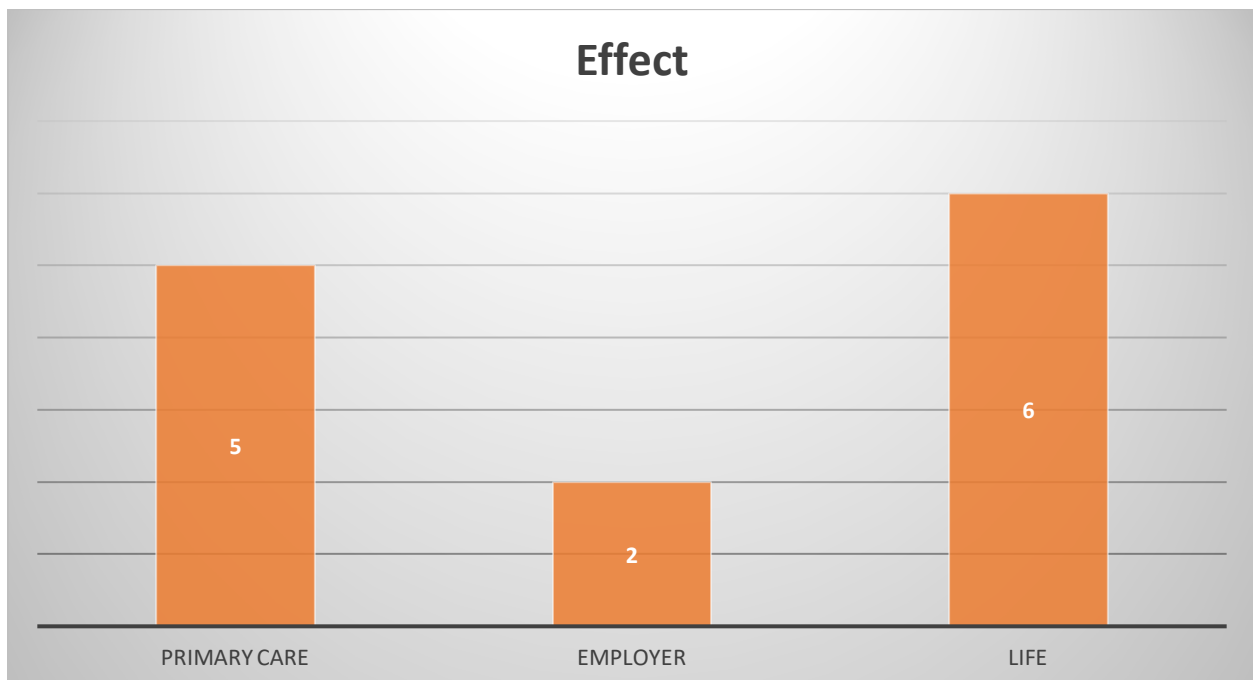
Figure 4.3 illustrates key words derived from the responses to the questions regarding participants' experiences with long-haul COVID-19. The words shown in larger font highlight frequent responses discussed in this section and provide connections with literature from earlier research similar to what Nordvig and Noble (2021) and Young (2021) discovered surrounding lingering symptoms associated with the disease.

**Figure 4.3.**

*Word Cloud for COVID-19 Symptoms.*

**Analysis of Mental Health Research Questions**

This series of research questions explored the participants experience with mental health conditions. The participants were asked if they had been diagnosed with a mental health condition prior to or following their visit to the long-haul COVID-19 clinic. The participants were asked how they would categorize their symptoms as mild, moderate, or severe. Additionally, participants were asked which types of treatments they have accessed in the past, currently, and the impact of the treatment on their mental health conditions. The results of these questions revealed several themes, including prior mental health conditions, prior mental health treatment interventions, and the impact of COVID-19 on mental health.

**Prior Mental Health Conditions**

Eight (80%) participants stated they had mental health conditions prior to COVID-19. It was reported that four (40%) participants experienced anxiety and depression at the same time, three (30%) participants had anxiety, and one (10%) participant had depression shown in figure 4.4. Each participant shared episodic information related to their mental health condition. The severity of prior mental health conditions varied by participant and their situation. Furthermore, each participant commented on how their mental health conditions had been stable to the onset of COVID-19.

**Figure 4.4**.

*Prior Mental Health Conditions Reported*
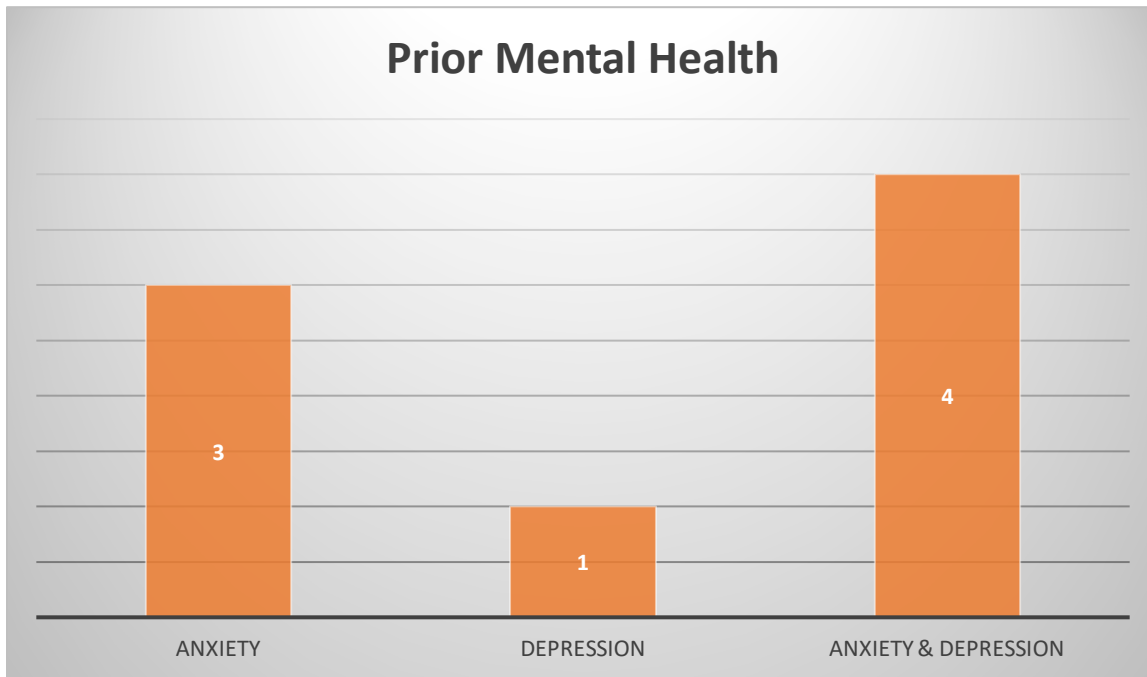


**Prior Mental Health Treatment Interventions**

Figure 4.5 highlights prior mental health treatment interventions utilized. Among the participants, five (50%) previously used medication in conjunction with therapy, one (10%) only attended therapy, one (10%) only used medication, and one (10%) had no treatment. Each participant stated their treatment interventions had been successful and their mental health conditions were stable upon the onset of COVID-19.

**Figure 4.5**

*Prior Mental Health Treatment Interventions Reported*
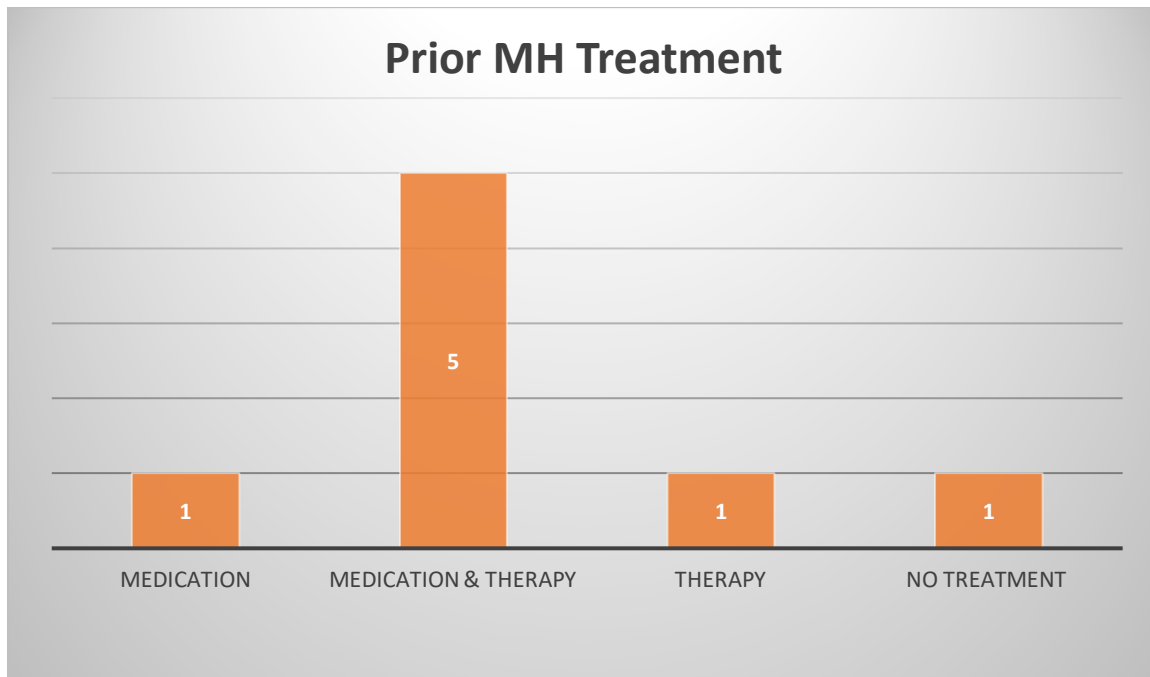


## Impact of COVID-19 on Mental Health

Each of the eight (80%) participants who had previously experienced mental health

conditions, discussed how the disease has exacerbated their symptoms. A lack of understanding

of what was occurring inside them, coupled with a lack of support from the healthcare

community, appears to contribute to their anxiety, which ultimately led to their depression. One

participant verbalized their feelings in the moment, " I am very, very depressed. I am so weak

and exhausted. I am in a state of constant pain, and depression, and anxiety." Another

participant commented how they have had anxiety before but, "not like this, this is severe."

Similar comments were repeated throughout the interviews, "this is a more severe degree of

depression than I have had before." Since the onset of COVID-19, one participant was diagnosed

with Attention Deficit Hyperactivity Disorder (ADHD) and another with Post-Traumatic Stress

Disorder (PTSD). Two (20%) participants stated they have not experienced panic attacks until

this disease. One quote sums up the overall feeling from the participants, "The depression that you go through sets in later on. The anxiety that you go through is early on and very intense and its far worse because there is so much that adds to it because you are expected to rebound without really knowing what's going on."

The two (20%) participants that had not experienced mental health conditions in the past articulated their symptoms and the end result was a mental health diagnosis. One stated how she, "would start shaking and trembling, mixed intense emotions, racing thoughts and not knowing what was going on, it was very alarming." The other participant stated that she had onset depression and anxiety and feels, "it's simply that you are no longer the person that you thought you once were and that is a very hard thing to deal with."

***Common words***

A list of key words resulting from the responses to the questions regarding participants' experience with mental health can be found in Figure 4.6. The words in larger font indicate primary responses discussed in this section and provide connection with earlier research  similar to findings from Lopez-Leon (2021), Rogers (2020), and Vindegarrd and Benros (2020). Each had discovered that current mental health conditions worsened, or new ones appeared post onset of the disease.

**Figure 4.6.**

*Word Cloud from Mental Health Questions*



**Analysis of Digital Application Research Questions**

This series of research questions focused on the patient's perceived experience using a digital application to support their mental health conditions. With the shortage of social workers and the inability to use telemedicine since the modality requires a social worker, a digital application was the intervention utilized to support patients' mental health conditions.

Participants were asked if they had expectations prior to using the digital application and if they believe the application supported their mental health needs. Additionally, participants were asked what other mental health services they accessed and what barriers prevented them from progressing. Lastly, participants were asked what they would share with others experiencing similar issues, what was most helpful, and what could have been done differently. Common themes were perceived effectiveness of the digital application, techniques utilized,

coaching experience, barriers to utilization, participant recommendations, and feedback for the clinic.

Only three (30%) participants had expectations prior to using the digital application, seven (70%) did not. One participant hoped it would help with her, "short fuse," another thought, "it would help with my anxiety," and another stated, "this is the first time someone was reaching out to help me." Participants seemed to take whatever the clinic offered as support due to the anxiety surrounding the unknown and lack of support from others.

Participants engaged in a variety of cognitive behavioral therapy techniques within the digital application. Techniques focus on a variety of activities such as hypnosis, meditation, and goal setting. The number of techniques utilized ranged from four to 48, with an average of 14 techniques, see table 4.2.

**Table 4.2**

*Techniques*

|  | Techniques Utilized $n=10$ |
|---|---|
| Minimum | 4 |
| Maximum | 48 |
| Mean | 14 |

**Perceived Effectiveness of the Digital Application**

Figure 4.7 highlights the perceived effectiveness of the digital application. Seven (70%) participants found the digital application to be effective  in managing their mental health symptoms. Their comments indicated that the application kept them "accountable in their journey,"  "provided support," and "appreciated the reminders due to the memory loss." In regard to usability, participants found the digital application, "easy to use," "provided clear directions," "available when needed," and offered a "positive experience." The following comments from participants reinforced the findings: "I enjoyed it, it was very easy to use, it did

teach me a bit too," "it was nice to have something there that guides you along the way, rather than doing it myself." This outcome gives emphasis that the digital application supported the patients. By offering this intervention, patients experienced social equality by having resources to meet their needs in the absence of social workers.

Three (30%) participants did not find the digital application to be effective. A few reasons provided were "the techniques were not relevant to my needs." Another stated, "it's not the same as seeing someone in-person" another commented " it felt kiddish." A few suggestions were to create different clinical journeys for those in different places in their recovery and add more visuals through the application. A few of these participants had been in therapy in recent years and still practiced the skills learned during prior sessions, which impacted their perception of the digital application pathways.

**Figure 4.7**

*Effectiveness of the Digital Application*

*Techniques*

Among the digital application techniques hypnosis (40%), meditation (30%) and sleep (20%) were the techniques that received the most positive feedback as outlined in figure 4.8. One participant stated that "the hypnosis technique was hard to process but liked that it helped my brain." Another participant commented that, "I liked the hypnosis part and that I didn't have to leave the house or take off work to do it." In regard to the sleep technique, one participant stated "it helps me fall right to sleep. I like how it guides you, and it's in my pocket 24/7."

Some participants reported that the digital application actually made them feel anxious or more tense because their concentration was impaired due to the memory loss and cognitive impacts from the disease. This is one area where social workers may instill additional support for this subgroup that experienced barriers related to the disease.

**Figure 4.8**

*Techniques Participants Preferred*
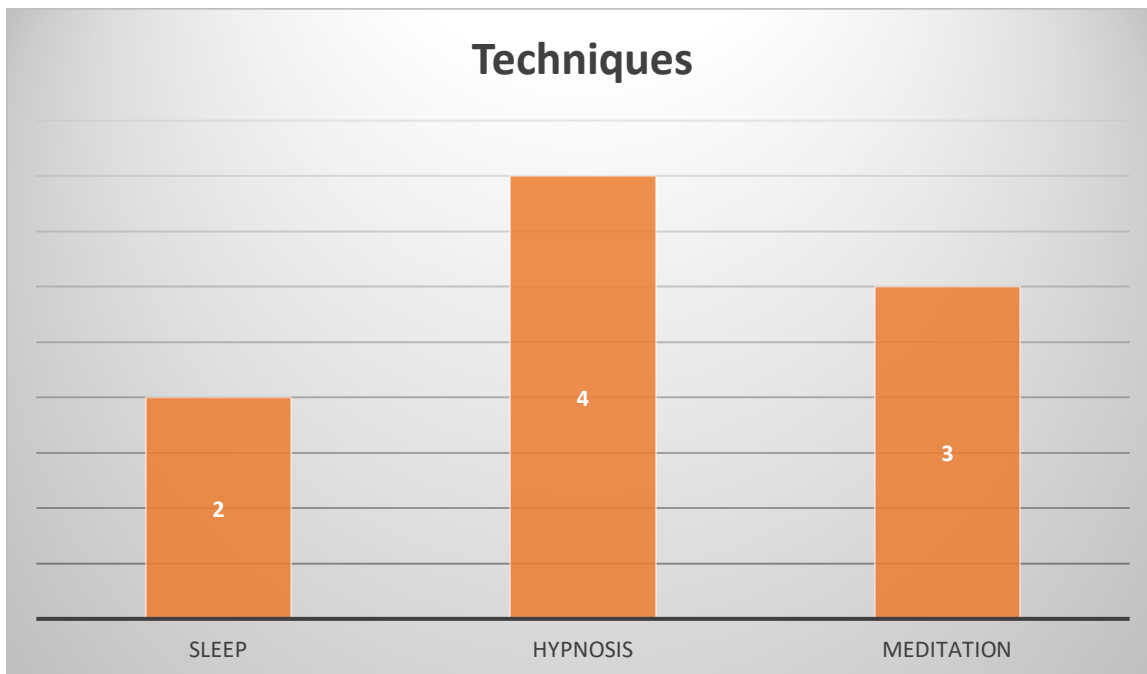
*Coaching Experience*

The participants had mixed feedback related to the in-app behavior change coach. Seven (70%) of the participants engaged with the mental health coach through messaging. Messages ranged from 0 to 68, with the average being 12.4 as shown in table 4.3.

**Table 4.3**

*Coach Messaging*

| | Messages<br>*n* = 10 |
|---|---|
| Minimum | 0 |
| Maximum | 68 |
| Mean | 12.4 |
| SD | 20.6 |

Three (30%) participants preferred having the coach for support, four (40%) participants did not have feelings either way, and three (30%) did not engage with the coach as shown in

F**igure 4.9.**

*Participant Preference of  In-App Coach*

**Coaching**

| PREFERRED | NEUTRAL | UNPREFERRED |
| 3 | 4 | 3 |
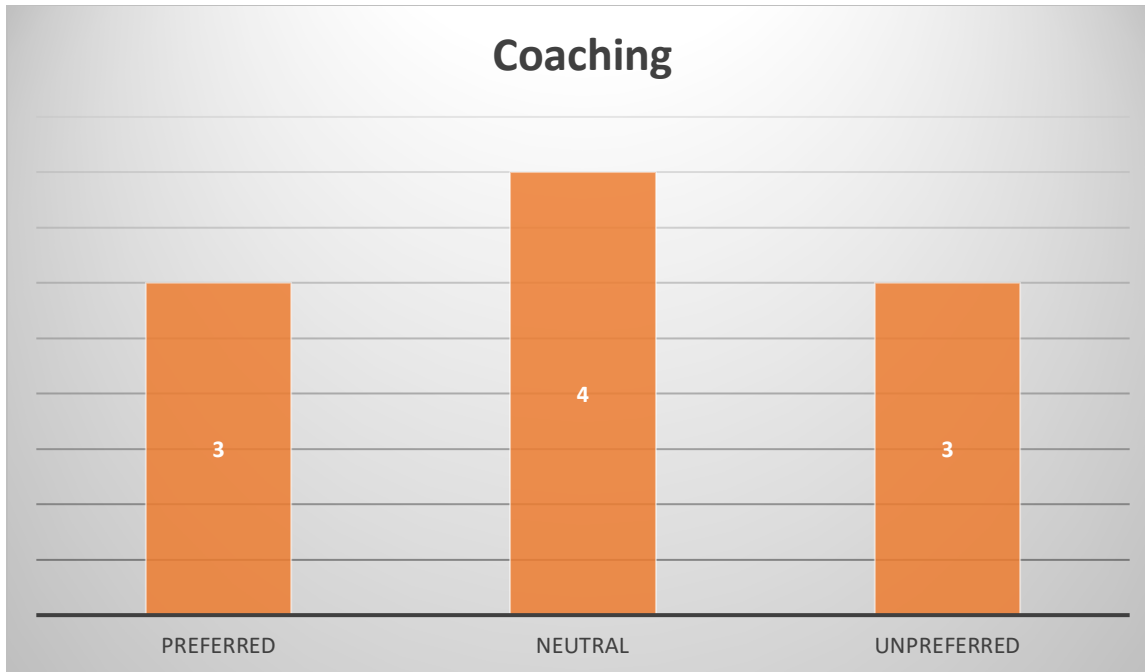
*Positive Feedback.* In regard to positive feedback related to the coaches many felt supported in one way or another, "the coach was my rock, my support." Another commented, "I enjoyed chatting with the coach" and, "I liked the conversations, it helped when I was stressed." One participant expressed the disconnect but understood the reason for the change, "I liked my coach, but she fell off because I didn't use the application as much as I wanted."

*Negative Feedback.* A number of participants expressed different opinions regarding the coaches. One participant stated, "I was overwhelmed because she asked me to do more each time I finished a technique." The participant expressed frustration and preferred verbal praise instead. Another commented, "I felt like the responses from my coach were generic and didn't really apply to what I just completed." Lastly, one commented, "I wanted my coach to just be supportive and not always offer things for me to do." It was suggested that the coaches be more accepting of the disease and offer more support, "no one understands the disease or believes the patients so just offer support instead."

**Barriers to Utilization**

Two (20%) of the participants experienced barriers related to the digital application, which was inconvenient for participants as they had to sign in with an access code each time. If they lost the access code this would increase their stress and frustration. Other barriers that impacted the participants continual use of the digital application was related to the disease, which included fatigue, brain-fog, memory-loss, depression, and ADHD.

**Participant Recommendations**

Seven (70%) participants stated they would recommend the digital application to support mental health conditions. Three (30%) would not recommend the application. Among those who would recommend the digital application offered suggestions, "schedule time to use it," "be faithful and use it," "be patient with yourself," and "use it often." They found the application to be supportive and helped them manage their mental health symptoms and the additional suggestions will help maintain engagement.

Of the three (30%) participants who would not recommend the digital application, they prefer to use other digital applications. One for meditation and mindfulness, one used Headspace, and the other played games to help with concentration. Each participant shared reasons why they use other digital applications. Aside from the one who used an application to play games, one stated that the visuals were better, and the other had been using the application for quite some time.

*Clinic*. Feedback related to the clinic was shared by numerous participants. Four (40%) specifically stated that they had a positive experience with the clinic and appreciated the professionals' knowledge of the disease and were grateful for the group of specialists. Supporting quotes are, "the clinic was my salvation," " super glad that I found it, and just the

whole program. I can't say enough good things about it, it's been a good experience." "I couldn't have asked for any better care, it's been great." A participant who did not want additional mediation for their mental health condition stated, "great staff and she heard me." Several other participants appreciated the support and resources offered, "patients need to take advantage of the resources they offer." One quote summarizes the impact an integrated approach had on them:

> I have made great gains thanks to them and the brain fog and stuff. They've done that, and I did a lot of different types of therapies for those things. The mental health, I think and feel, is better because I was getting the support I needed for all of the physical aspects of it, so the mental aspects became better too.

Seeking care in an integrated model of care, outside of a primary care office, offered them encouragement, support, and validated what they were experiencing both physically and mentally. Many participants stated how they have felt improvements since seeking care at the clinic.

Several participants proposed that patients be referred to a mental health social worker in their area in case they require one in the future. Participants also recommended that support groups be established for this specialty population, particularly since they do not have much support available to them based on their experience. Despite appreciating the idea of specialty clinics and whole-person care, one participant stated that she felt somewhat disconnected, and that patients were in and out in a short period of time. Lastly, there was a suggestion to increase contact with patients who may be in a more chronic state and experiencing intense anxiety and depression.

*Common Words*

As illustrated in Figure 4.10, key words were identified based on responses to questions linked to the use of the digital application. Words with larger font are the more prominent words discussed in this section and echo similar findings discovered by Ng (2019), Henson (2019), and Schlosser (2017) related to patient engagement, usability, and the effect of engagement with a digital application.

**Figure 4.10**

*Word Cloud from Digital Applications Questions.*
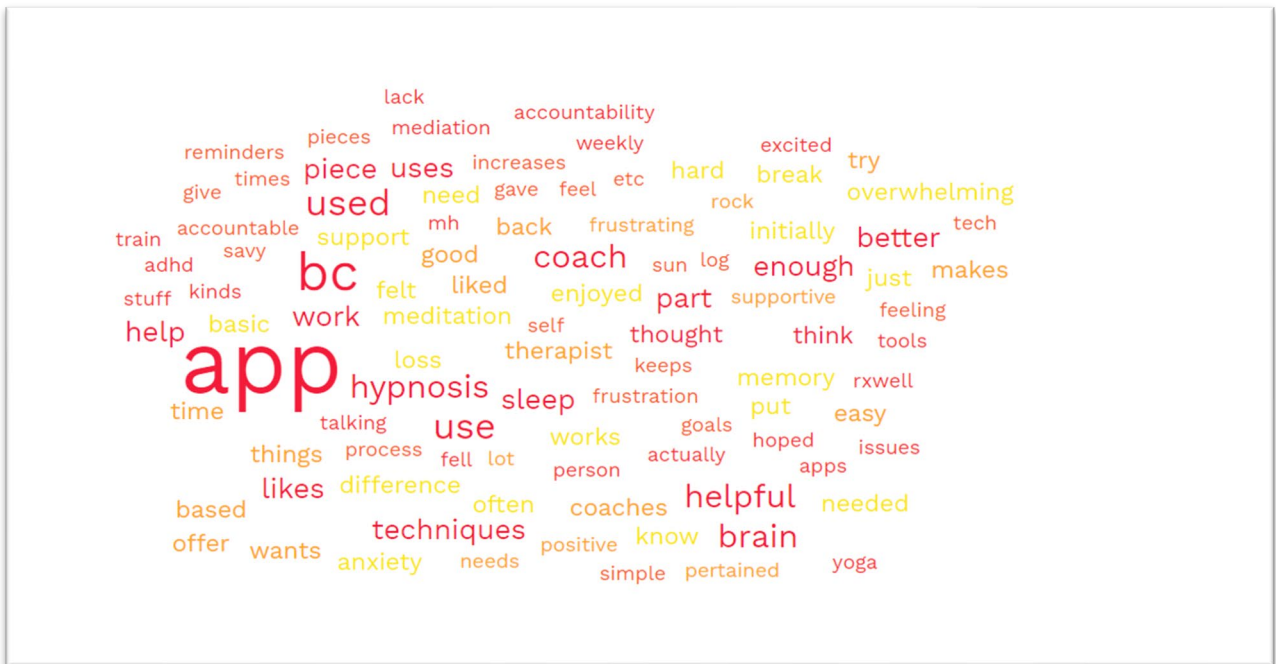


**Chapter Summary**

This chapter presented the results of the study along with participant demographics and supporting comments. Ten participants were interviewed about their perceived experiences of using a digital application to support their mental health conditions. The data contained responses from the participants that aligned with answers in the three main focus areas for this study. Themes and suggestions were included in the findings. It is noteworthy that 10 (100%) of

the participants experienced anxiety from the disease, eight (80%) experienced fatigue, six (60%) experienced brain-fog, and five (50%) experienced unexplained fever. Six (60%) of participants had experienced life changing events because of the disease and seven (70%) felt unsupported by their employer or primary care physicians Among the participants, eight (80%) had a history of mental health condition, and seven (70%) had received treatment for these conditions, which were stable at the onset of the disease. Six (60%) of the participants had received therapy from a social worker in the past.

Seven (70%) perceived the digital application to be effective and seven (70%) would recommend the digital application to others that are experiencing similar symptoms. Lastly, seven (70%) of the participants engaged with the coach, however no conclusion can be drawn if the coach had an impact. Three (30%) preferred the coach while four (40%) were neutral.

The following chapter will provide a discussion of the findings from this study, provide recommendations for social worker practice, address strengths and limitations, and potential future research from this work.

**Chapter 5: Discussion, Implications, Conclusion and Recommendations**

This qualitative research study provided an important perspective from patients who utilized a digital application to support their mental health conditions as an alternative intervention when social workers were absent. The focus of this research explored the perceived experiences a digital application had on patients managing comorbid physical and mental health conditions related to long-haul COVID-19 while seeking care in a specialty clinic. This chapter will connect the findings of the previous chapter to the literature and theory, discuss the strengths and limitations, explore implication for social work practice, and conditions for future research.

Studies conducted by Kathol (2010) and Struckman (2018) found that 80% of patients with complex physical health conditions also suffer from mental health conditions, further supporting the comorbidity with this population. According to Chwastiak (2017) and Goldstein (2017), integrated models of care have been found to be the most effective for patients managing physical and mental health conditions at the same time. Fatigue (80%) and anxiety (100%) were the two main symptoms reported in this study, similar to what Nordvig and Noble (2021) uncovered when conducting studies related to symptoms in patients with COVID-19. It is evident from the findings that this population should be treated within an integrated model, and social workers should advocate on the patient's behalf that their physical and mental health needs be treated simultaneously even in the absence of social workers.

Studies have confirmed that prior mental health conditions had resurfaced or that new diagnoses had been identified as a result of the disease (Vindegaard & Benros, 2020). The results of this study indicated that eight (80%) of the participants had prior mental health conditions and that the COVID-19 resulted in recurrence of those mental health symptoms. Additional studies

by Lopez-Leon (2021) and Rogers (2020) confirmed that patients experienced neuropsychiatric symptoms at the onset or months later from the disease.

Six (60%) of those with prior mental health conditions had previously received therapy from a social worker. The same data were discovered in studies by Stekette (2017), Barber (2015), and Ashcroft (2018) related to the positive effects of social workers in treatment of mental health. Based on outcomes from this study and prior research, it is suggested that social workers play a key role in the delivery of mental health services. However, with the shortage of social workers it is necessary for social workers to educate and advocate for alternative treatment options to be available to meet patients' mental health needs.

Study findings demonstrated how long-haul COVID-19 caused life-changing physical and mental conditions that last for months to years. Six (60%) of the participants reported how the disease had affected their life such as loss of nursing license and loss of driver's license. There were seven (70%) participants who stated that they felt unsupported at times by either their healthcare professional or employer, which contributed to their anxiety. It is important for social workers to educate providers about the importance of validating patients' symptoms that support their needs. Moreover, this aligned with outcomes from this study but also with social justice theory concept of social liberty, which eliminates inequalities, provides for freedom of expression, and the right to equal healthcare.

Results of the study reveal that seven (70%) of the participants stated the digital application was effective in supporting their mental health conditions. This mirrors studies by Church (2020), Graham (2020), and Menezes (2019) where patients had an increase in mental health well-being after utilizing a digital application. Similarly, Khademian's (2020) research verified the positive impact digital applications have on patients with anxiety and depression.

The participants shared that their mental health had improved than when they started using the digital application. Participants shared that overall use of the digital application provided for a positive experience and seven (70%) of the participants would recommend the digital application to others that are experiencing similar symptoms. Hasselberg (2020) shared the same sentiment from prior studies. As well as being easy to use and convenient, participants were able to access the application whenever they wished. Henson (2019) determined that digital applications are a supportive option to therapy and lead to engagement and adherence. The application also served to hold participants accountable for engagement. Social workers can introduce providers to the technological aspects of digital applications and how they may be a supplement to therapy when social workers are absent. Moreover, supporting providers, patients, and social justice theory notion of equal access to healthcare are essential. By educating providers, social workers are removing barriers to resources and ensure patients' needs are being met.

The participants were provided the opportunity to reflect upon their use of the digital application and stated that by scheduling time, it ensured they used the digital application often. In their comments, participants urged others to remain faithful to the application and be patient with themselves. The brain-fog and fatigue can be frustration and being patient with themselves helped them to move forward in their journey.

A few barriers to success with the digital application were related to the disease such as fatigue, brain-fog, anxiety, depression, and ADHD. The existence of such barriers was not discovered in earlier research. It is important to consider such obstacles as part of the planning process for future populations who have cognitive impairments. It may be beneficial to conduct a more detailed assessment of mental health symptoms, past diagnoses, past treatments, patient

preference, and severity scales during the intake process to provide a variety of resources and support a patient's journey.

**Strengths and Limitations of the Study**

There are strengths and limitations to consider when reviewing the results of this study. All participants were previously enrolled in a study related to long-haul COVID-19. They were receptive to alternative treatment options for any of their physical and mental health conditions due to the unfamiliarity of the disease. This did allow for the opportunity to reach the sample size for a phenomenological study as defined by Padgett (2017) and Duke (1984). Participants in the study were all female and volunteered to participate in the study as they were engaged with the digital application. However, the study did not provide perspectives from those who did not engage with the digital application or from other genders. Participants who fell into the mild to moderate category of having a mental health condition were offered the digital application and participation was voluntary. Though no other mental health services were offered leading them to engage with the application as the only treatment option. The small sample size limits the generalizability yet given the new approach to treating this disease, the study is contributing to the body of literature.

Qualitative research relies on the researcher's subjective observation and interpretation of the findings however, to prevent bias and assumptions guiding the interpretation of the data a phenomenological analysis approach was applied. As a result of the interviews with participants, the researcher has been able to validate and expand their knowledge regarding the use of digital applications. The researcher has gained a greater understanding of the effectiveness and non-effective use of a digital application expressed during the interviews. Outcomes from this research support the phenomenon that a digital application is perceived to support a patient's

mental health condition. The literature points out that social workers are an essential component of an integrated model of care. However, there is a shortage of social workers to meet the rising demand for mental health services. By offering a digital application, a patient's needs can be met in social workers' absence.

**Implications for Social Work Practice and Future Research**

This research adds new leadership and educational implications for social work research and practice. The findings from this study provide valuable insight for social workers and patients with comorbid chronic condition.

A goal of this research was for social workers to understand how patients managing comorbid conditions places them into a vulnerable category. The NASW Code of Ethics sets forth principles where social workers are to support and advocate for their patients (NASW, 2022). This vulnerable, yet sometimes overlooked population, necessitate social workers to apply social justice theory and advocate for this population (NASW, 2022). It is important for social workers to support their patients by educating providers within these models that alternative treatment options, such as digital applications, can assist in managing mental health conditions. By educating providers and offering alternative options when social workers are absent, digital applications can fill a gap in service delivery for patients experiencing comorbid physical and mental health conditions. Specilaty care clinics provide intense levels of care that make this even more essential. Additionally, when social workers are present they can treat patients with higher acuity mental health conditions since a digital application may support mild to moderate mental health conditions.

Social workers may design educational materials about the functions of a digital application for patients. A step-by-step workflow may support those that are hesitant to use the

digital application or support those that may be managing brain-fog associated with the disease. For patients managing brain-fog or cognitive impairments from the disease, a connection between the behavior change coaches and patient may involve the coach sending reminders more frequently or offer small incremental techniques that do not require long engagement periods.

Social workers can advocate for policy change to ensure virtual accessible care by focusing on broadband issues and digital divide education, this is critical when examining social determinants of health.

Social work educators can create a course that focuses on the technological capabilities of digital applications. This course would align with the Council on Social Work Education, Educational Policy and Accreditation Standards  (2022) by connecting competency-based education to Interprofessional Education (IPE). Specifically, students will learn about an intervention delivered in a healthcare setting and work with other healthcare professionals using simulations to practice the role of  social worker, how to provide education to patients, how to use the digital application, how to engage with a coach, ways to gain knowledge surrounding escalation pathways, and when and how to intervene. Healthcare students such as primary care providers, physician assistants, and nurse practitioners would benefit from learning about innovative, digital technology as an alternative treatment intervention that can be a supplemental option with the shortage of social workers.

### *Future Social Work Research Consideration.*

This exploratory study offers a step towards modifying integrated models of care. Future research would benefit vulnerable groups, clinicians, and enhance the model in specialty clinics.

1. **Mixed-Method Studies on Specific Mental Health Conditions.** Assessment of mental health symptom changes impacted by a digital application would allow for greater specificity of homogeneity and heterogeneity use for patients with comorbidity in specialty clinics. Including social determinants of health factors such as race, geographic location, socio-economic status, and education to determine if any of these factors contribute to different outcomes.

2. **Qualitative Studies on Whole-Person Perspective.** Qualitative research on patients accessing digital applications, and the effect on their physical health and mental health conditions simultaneously, could demonstrate psychological impact of physical health symptoms.

3. **COVID-19 Research.** Studies to determine if there is any correlation between patients managing the disease, engagement within the application, messages with the behavior change coach, and assessment scores. Identify potential length of recovery, increase or decrease in mental health conditions and escalation pathways where social workers may be needed to support high acuity conditions.

4. **Studies on Social Workers.** Research that focuses on social workers perception of digital application use for patients with mild to moderate mental health conditions as an alternative to in-person care.

**Conclusion**

This exploratory research study provided insight from participants on how they perceived a digital application to support their mental health conditions in the absence of social workers. Literature is limited related to digital applications and even more limited on how digital applications could impact patients with long-haul COVID-19. Social work practice implications

include putting the patients' needs first and supporting alternative treatment options and educating providers on the benefits for patients and social workers by offering such tools. Social workers can also advocate for policy changes to include digital applications on the treatment continuum and privacy laws associated with technology. Lastly, social work educators can include alternative treatment options within the education system.

Future research could focus on quantitative research to monitor physical and mental health changes simultaneously for those managing comorbidity conditions. Qualitative research could focus on whole-person care and determine if physical health symptom improvement could impact mental health symptom improvement simultaneously. On-going research related to long haul COVID-19 is needed due to the unfamiliarity of the disease. Understanding social workers' perceptions of digital applications will help provide insight to offering additional treatment options in the future. The findings from this research study add to the limited knowledge on the topic areas and hopes to inspire others to do more to expand upon this phenomenon.

# References

Albert, N., Melau, M., Jensen, H., Hastrup, L. H., Hjorthoj, C., & Nordentoft, M. (2017). The
effect of duration of untreated psychosis and treatment delay on the outcomes of
prolonged early intervention in psychotic disorders. *NPJ* schizophrenia *3*(1), 1-8.
https://doi.org/10.1038/s41537-017-0034-4

Allen, D, Gillen, E, & Rixson, L. (2009). Systematic review of the effectiveness of integrated
care pathways: What works, for whom, in which circumstances? *International Journal of
Evidence-Based Healthcare, 7*(2), 61-74. https://doi.org/10.1111/j.1744-
1609.2009.00127.x

Allen, D., Gillen, E., & Rixson, L. (2009). The effectiveness of integrated care pathways for
adults and children in health care settings: A systematic review. *JBI Library of Systematic
Reviews*, *7*(3), 80–129. https://doi.org/10.11124/01938924-200907030-00001

Arafat, M. Y., Zaman, S., & Hawlader, M. (2021). Telemedicine improves mental health in
COVID-19 pandemic. *Journal of Global Health*, *11*, 03004.
https://doi.org/10.7189/jogh.11.03004

American Foundation for Suicide Prevention. (2020). *Suicide statistics*, U.S.
https://afsp.org/suicide-statistics/

America's Health Ranking. (2021). Mental health providers in United States.
https://www.americashealthrankings.org/explore/annual/measure/MHP/state/U.S

American Heritage. (n.d.). Specialty clinic. In *American Heritage.com Dictionary of the English
Language, Fifth Edition*. (2011). https://www.thefreedictionary.com/Specialist+clinic

American Psychological Association. (2017). Collaborative care and integrated care: What's the

    difference? https://www.apaservices.org/practice/update/2017/10-26/collaborative-

    integrated-care?_ga=2.205699859.1895298734.1645031119-841351331.1644773762

American Psychiatrist Association. (2019). *Learn about the collaborative care model.*

    https://www.psychiatry.org/psychiatrists/practice/professional-interests/integrated-

    care/learn

Ashcroft, R., McMillan, C., Ambrose-Miller, W., McKee, R., & Brown, J. B. (2018). The

    emerging role of social work in primary health care: a survey of social workers in Ontario

    family health Teams. *Health & Social Work*, *43*(2), 109-117.

    https://doi.org/10.1093/hsw/hly003

Atwal, A., & Caldwell, K. (2002). Do multidisciplinary integrated care pathways improve

    interprofessional collaboration? *Scandinavian Journal of Caring Sciences*, *16*(4), 360-

    367. DOI: 10.1046/j.1471-6712.2002.00101.x

Barber, R. D., Coulourides Kogan, A., Riffenburgh, A., & Enguidanos, S. (2015). A role for

    social workers in improving care setting transitions: A case study. *Social work in Health*

    *Care*, *54*(3), 177-192. https://doi.org/10.1080/00981389.2015.1005273

Bashshur, R., Reardon, T.G., Shannon, G.W. (2000). Telemedicine: A new health care delivery

    system. *Annual Review of Public Health, 21,*613-637.

    https://doi.org/10.1146/annurev.publhealth.21.1.613

Bernell, S., & Howard, S. W. (2016). Use your words carefully: What is a chronic

    disease? *Frontiers in Public Health*, *4*, 159. https://doi.org/10.3389/fpubh.2016.00159

Bharadwaj, P., Pai, M. M., & Suziedelyte, A. (2017). Mental health stigma. *Economics*

    *Letters*, *159*, 57-60. https://doi.org/10.1016/j.econlet.2017.06.028

Bijl, R., de Graaf, R., Hiripi, E., Kessler, R. C., Kohn, R., Offord, D. R.,Ustun, T., Vicente, B.,

    Vollebergh, W., Walters, E., & Wittchen, H. U. (2003). The prevalence of treated and

    untreated mental disorders in five countries. *Health affairs*, *22*(3), 122-133.

    DOI:10.1377/hlthaff.22.3.122

Boddy, C. L. (2016). Sample size for qualitative research. *Qualitative Market Research Journal,*

    19(4), 426-432. https://doi.org/10.1108/QMR-06-2016-0053

Bonavita, V., & De Simone, R. (2008). Towards a definition of comorbidity in the light of

    clinical complexity. *Neurological Sciences*, *29*(1), 99-102. DOI: 10.1007/s10072-008-

    0898-1

Bowling, A., & Bond, M. (2001). A national evaluation of specialists' clinics in primary care

    settings. *The British journal of general practice: The journal of the Royal College of*

    *General Practitioners*, *51*(465), 264–269. https://pubmed.ncbi.nlm.nih.gov/11458477/

Brigham, E., O'Toole, J., Kim, S. Y., Friedman, M., Daly, L., Kaplin, A., Swarthout, M.,

    Hasselfeld, B., Lantz-Garnish, M., Vannorsdall, T., Agranovich, A., Raju, S., & Parker,

    A. (2021). The Johns Hopkins Post-Acute COVID-19 Team (PACT): A

    multidisciplinary, collaborative, ambulatory framework supporting COVID-19

    survivors. *The American Journal of Medicine*, *134*(4), 462-

    467.https://doi.org/10.1016/j.amjmed.2020.12.009

Butryn, T., Bryant, L., Marchionni, C., Sholevar, F. (2017). The shortage of psychiatrists and

    other mental health providers: Causes, current state, and potential solutions. *International*

    *Journal of Academic Medicine, 3*(1), 5-9. https://www.ijam-

    web.org/text.asp?2017/3/1/5/209851

Centers for Disease Control. (2019). *Coronavirus Disease 2019 (COVID-19)*.

https://www.cdc.gov/dotw/covid-19/index.html#:~:text=COVID-

19%20is%20a%20respiratory,infected%20may%20not%20have%20symptoms

Centers for Disease Control. (2020). *Mental health, data for the US.*

https://www.cdc.gov/nchs/fastats/mental-health.htm

Centers for Disease Control. (2020). *Mental health treatment among adults: United States, 2019.*

https://www.cdc.gov/nchs/products/databriefs/db380.htm

Centers for Medicare and Medicaid Services. (2010). *The affordable care act: Helping providers*

*help patients.*https://www.cms.gov/medicare/medicare-fee-for-service-

payment/aco/downloads/aco-menu-of-options.pdf

Chen, C., Haupert, S. R., Zimmermann, L., Shi, X., Fritsche, L. G., & Mukherjee, B. (2021).

Global prevalence of post-acute sequelae of COVID-19 (PASC) or Long COVID: A

meta-analysis and systematic review. *MedRxiv*.

https://doi.org/10.1101/2021.11.15.21266377

Chua, K. P., Conti, R. M., & Becker, N. V. (2021). Assessment of out-of-pocket spending for

COVID-19 hospitalizations in the US in 2020. *JAMA network open*, *4*(10).

doi:10.1001/jamanetworkopen.2021.29894

Church, D., Stapleton, P., & Sabot, D. (2020). App-based delivery of clinical Emotional

Freedom Techniques: Cross-sectional study of app user self-ratings. *JMIR mHealth and*

*uHealth*, *8*(10), e18545. DOI: 10.2196/18545

Chwastiak, L. A., Jackson, S. L., Russo, J., DeKeyser, P., Kiefer, M., Belyeu, B., Mertens, K.,

    Chew, L., & Lin, E. (2017). A collaborative care team to integrate behavioral health care

    and treatment of poorly controlled type 2 diabetes in an urban safety net primary care

    clinic. *General hospital psychiatry*, *44*, 10-15.

    https://doi.org/10.1016/j.genhosppsych.2016.10.005

 Clay, R. (2021). Mental health apps are gaining traction. *American Psychological Association*

    *52* (1). 55.  https://www.apa.org/monitor/2021/01/trends-mental-health-

    apps#:~:text=Mental%20health%2Drelated%20self%2Dhelp,unbiased%20information%2

    0about%20such%20apps

Council on Social Work Education. (2022). Policy agenda, healthcare.

    https://www.cswe.org/Advocacy-Policy/Policy-Agenda#Healthcare

Council on Social Work Education. (2022). 2022 Educational policy and accreditation standards.

    https://www.cswe.org/accreditation/standards/2022-epas/

Creswell, J., Poth, C. (2018). Qualitative inquiry and research design, fourth edition. Sage

    publications.

Czeisler, M., Lane, R., Petrosky, E., Wiley, J., Christensen, A., Njai, R., Weaver, M., Robbins,

    R., Facer-Childs, E., Barger, L., Czeisler, C., Howard, M., Rajaratnam, S. (2020). Mental

    health, substance use, and suicidal ideation during the COVID-19 pandemic-United

    States, June 24-30, 2020. *Morbidity and mortality weekly report (MMWR), Center for*

    *Disease Control,* 69(32); 1049-1057.

    https://www.cdc.gov/mmwr/volumes/69/wr/mm6932a1.htm

Data.ai Research. (2022). Retrieved June 15, 2022, from

    https://www.data.ai/en/insights/market-data/state-of-mob,ile-2022/

Daré, L.O., Bruand, PE., Gérard, D. Marin, B., Lameyre, V., Boumediene, F., Preux, P.M.

    (2019). Co-morbidities of mental disorders and chronic physical diseases in developing

    and emerging countries: a meta-analysis. *BMC Public Health* 19**,** 304.

    https://doi.org/10.1186/s12889-019-6623-6

Décary, S., Dugas, M., Stefan, T., Langlois, L., Skidmore, B., Bhéreur, A., LaBlanc, A.,

    Hastings, S., Manns, B., & Saxinger, L. (2021). Care models for long COVID: A rapid

    systematic review. *MedRxiv*. https://doi.org/10.1101/2021.11.17.21266404

De Hert, M., Cohen, D., Bobes, J., Cetkovich-Bakmas, M., Leucht, S., Ndetei, D. M.,

    Newcomer, J.W., Uwakwe, R., Asai, I., Moller, H-J., Gautam, S., Detraux, J., & Correll,

    C. U. (2011). Physical illness in patients with severe mental disorders. Barriers to care,

    monitoring and treatment guidelines, plus recommendations at the system and individual

    level. *World Psychiatry*, *10*(2), 138. https://pubmed.ncbi.nlm.nih.gov/21633691/

Donkin, L., Christensen, H., Naismith, S. L., Neal, B., Hickie, I. B., & Glozier, N. (2011). A

    systematic review of the impact of adherence on the effectiveness of e-therapies. *Journal*

    *of medical Internet research*, *13*(3), e1772. DOI: 10.2196/jmir.1772

Dukes, S. (1984). Phenomenological methodology in the human sciences. *Journal of Religion*

    *and Health,* 23(3), 197–203. https://doi.org/10.1007/BF00990785

Edinoff, A. N., Chappidi, M., Alpaugh, E. S., Turbeville, B. C., Falgoust, E. P., Cornett, E. M.,

    Murnane, K.S., Kaye, A.M., & Kaye, A. D. (2022). Neurological and Psychiatric

    Symptoms of COVID-19: A narrative review. *Psychiatry International*, *3*(2), 158-168.

    https://pubmed.ncbi.nlm.nih.gov/21633691/

Eisenstadt, M., Liverpool, S., Infanti, E., Ciuvat, R. M., & Carlsson, C. (2021). Mobile Apps that

promote emotion regulation, positive mental health, and well-being in the general

population: Systematic review and meta-analysis. *JMIR mental health*, *8*(11), e31170.

https://pubmed.ncbi.nlm.nih.gov/34747713/

Ekmekci, P. E., & Arda, B. (2015). Enhancing John Rawls's theory of justice to cover health and

social determinants of health. *Acta bioethica*, *21*(2), 227. DOI: 10.4067/S1726-

569X2015000200009

Fleming, T., Bavin, L., Lucassen, M., Stasiak, K., Hopkins, S., & Merry, S. (2018). Beyond the

trial: systematic review of real-world uptake and engagement with digital self-help

interventions for depression, low mood, or anxiety. *Journal of Medical Internet*

*Research*, *20*(6), e9275. Doi: 10.2196/jmir.9275

Fish, J. N., & Mittal, M. (2021). Mental health providers during COVID-19: essential to the US

public health workforce and in need of support. *Public Health Reports*, *136*(1), 14-17.

https://doi.org/10.1177/0033354920965266

Fond, G., Nemani, K., Etchecopar-Etchart, D., Loundou, A., Goff, D. C., Lee, S. W., Lancon,

C., Auquier, P., Baumstarch, K., Llorca, P-M., Yon, D. K., & Boyer, L. (2021).

Association between mental health disorders and mortality among patients with COVID-

19 in 7 countries: a systematic review and meta-analysis. *JAMA Psychiatry*, *78*(11),

1208-1217. DOI:10.1001/jamapsychiatry.2021.2274

Fraser, M. W., Lombardi, B. M., Wu, S., de Saxe Zerden, L., Richman, E. L., & Fraher, E. P.

(2018). Integrated primary care and social work: A systematic review. *Journal of the*

*Society for Social Work and Research*, *9*(2), 175-215. https://doi.org/10.1086/697567

García-Gutiérrez, M. S., Navarrete, F., Sala, F., Gasparyan, A., Austrich-Olivares, A., &

 Manzanares, J. (2020). Biomarkers in psychiatry: concept, definition, types and relevance

 to the clinical reality. *Frontiers in psychiatry*, *11*, 432.

 https://doi.org/10.3389/fpsyt.2020.00432

Gemelli, (2020). Post-COVID-19 global health strategies: the need for an interdisciplinary

 approach. *Aging Clinical and Experimental Research*, 32, 1613–1620.

 https://doi.org/10.1007/s40520-020-01616-x

Gigueira-McDonough, J. (1993). Policy practice: The neglected side of social work

 intervention. *Social Work*, *38*(2), 179–188. http://www.jstor.org/stable/23716995

Graham, A. K., Greene, C. J., Kwasny, M. J., Kaiser, S. M., Lieponis, P., Powell, T., & Mohr, D.

 C. (2020). Coached mobile app platform for the treatment of depression and anxiety

 among primary care patients: a randomized clinical trial. *JAMA psychiatry*, *77*(9), 906-

 914. https://pubmed.ncbi.nlm.nih.gov/32432695/

Goldstein, C. M., Gathright, E. C., & Garcia, S. (2017). Relationship between depression and

 medication adherence in cardiovascular disease: the perfect challenge for the integrated

 care team. *Patient Preference Adherence*, *11*, 547. https://doi.org/10.2147/PPA.S127277

Gopalkrishnan, N. (2018). Cultural diversity and mental health: Considerations for policy and

 practice. *Frontiers in Public Health*, *6*, 179. https://doi.org/10.3389/fpubh.2018.00179

Gordon, J. (2021). One year in: COVID-19 and mental health. *National Institute of Mental*

 *Health*. https://www.nimh.nih.gov/about/director/messages/2021/one-year-in-covid-19-

 and-mental-health

Guba, E.G., & Lincoln, Y.S. (1989). *Fourth generation evaluation*. Newbury Park, CA: Sage.

Grover, S., Dua, D., Sahoo, S., Mehra, A., Nehra, R., & Chakrabarti, S. (2020). Why all COVID-
19 hospitals should have mental health professionals: The importance of mental health in
a worldwide crisis! *Asian Journal of Psychiatry*, *51*, 102147.
https://doi.org/10.1016/j.ajp.2020.102147

Guck, A. J., Buck, K., & Lehockey, K. (2021). Psychological complications of COVID-19
following hospitalization and ICU discharge: Recommendations for
treatment. *Professional Psychology: Research and Practice*, *52*(4), 318.
https://doi.org/10.1037/pro0000402

Hammack, P. L. (2018). *The Oxford handbook of social psychology and social justice*. Oxford
University Press.

Hasselberg, M. J. (2020). The digital revolution in behavioral health. *Journal of the American
Psychiatric Nurses Association*, *26*(1), 102-111.
https://doi.org/10.1177/1078390319879750

Heightman, M., Prashar, J., Hillman, T., Marks, M., Livingston, R., Ridsdale, H., Roy, K., Bell,
R., Zandi, M., McNamara, P., Chauhan, A., Denneny, E., Astin, R., Purcell, H., Attree,
E., Hishmeh, L., Prescott, G., Evans, R., Mehta, P., Brennan, E., Brown, J., Porter, J.,
Logan, S.,Wall, E., Dehbi, H., Cone,& S. Banerjee, A. (2021). Post-COVID assessment
in a specialist clinical service: a 12-month, single-center analysis of symptoms and
healthcare needs in 1325 individuals. M*edRxiv*.
https://doi.org/10.1101/2021.05.25.21257730

Henson, P., Wisniewski, H., Hollis, C., Keshavan, M., & Torous, J. (2019). Digital mental
health apps and the therapeutic alliance: initial review. *BJPsych open*, *5*(1).
DOI: 10.1192/bjo.2018.86

Hilty, D. M., Chan, S., Torous, J., Luo, J., & Boland, R. J. (2019). A telehealth framework for

    mobile health, smartphones, and apps: competencies, training, and faculty

    development. *Journal of Technology in Behavioral Science*, *4*(2), 106-123.

    https://link.springer.com/article/10.1007/s41347-019-00091-0

Hossain, M. M., Tasnim, S., Sultana, A., Faizah, F., Mazumder, H., Zou, L., McKyer, E.,

    Ahmed, H., & Ma, P. (2020). Epidemiology of mental health problems in COVID-19: a

    review. *F1000 Research 9* (636). DOI: 10.12688/f1000research.24457.1

IGI Global. (2023). What is a digital application?

    https://www.igiglobal.com/dictionary/strategic-analysis-of-the-rise-and-fall-of-uber-in-

    theprivateurbantransportbusiness/96559#:~:text=A%20digital%20application%20(also%

    20called,not%20all%20programs%20are%20applications.

Interprofessional Education Collaborative. (202). *About Us.*

    https://www.ipecollaborative.org/about-us

Interprofessional Education Collaborative. (2022). *Membership.*

    https://www.cswe.org/Advocacy-Policy/Policy-Agenda#Healthcare

Jost, J. T., & Kay, A. C. (2010). Social justice: History, theory, and research. In S. T. Fiske, D.

    T. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (pp. 1122–1165). John

    Wiley & Sons, Inc. https://doi.org/10.1002/9780470561119.socpsy002030

Karapareddy, V. (2019). A review of integrated care for concurrent disorders: cost effectiveness

    and clinical outcomes. *Journal of Dual Diagnosis*, *15*(1), 56-66.

    https://doi.org/10.1080/15504263.2018.1518553

Kates, N., Crustolo, A. M., Farrar, S., & Nikolaou, L. (2002). Counsellors in primary care:

    Benefits and lessons learned. *The Canadian Journal of Psychiatry*, *47*(9), 857-862.

    https://doi.org/10.1177/070674370204700907

Kathol, R., Butler, M., McAlpine, D., Kane, R. (2010). Barriers to physical and mental condition

    integrated service delivery. *Psychosomatic Medicine, 72*(6), 511-518. DOI:

    *DOI:* 10.1097/PSY.0b013e3181e2c4a0Khademian, F., Aslani, A., & Bastani, P. (2021).

    The effects of mobile apps on stress, anxiety, and depression: overview of systematic

    reviews. *International Journal of Technology Assessment in Health Care*, *37*(1).

    DOI: 10.1017/S0266462320002093

Kohn R, Saxena S, Levav I, Saraceno B. (2004). The treatment gap in mental health care.

    *Bulletin of the World Health Organization*, *82*(11), 858-866.

Kondylakis, H., Katehakis, D., Kouroubali, A., Logothetidis, F., Triantafyllidis, A., Kalamaras,

    I., Votis, K., Tzovaras, D. (2020). COVID-19 Mobile Apps: A systematic review of the

    literature. *Journal of Medical Internet Research. 22*(12), 1-12.

    https://www.jmir.org/2020/12/e23170

Knapen, J., Vancampfort, D., Moriën, Y., & Marchal, Y. (2015). Exercise therapy improves both

    mental and physical health in patients with major depression. *Disability and*

    *Rehabilitation*, *37*(16), 1490-1495. DOI: 10.3109/09638288.2014.972579

 Kumar A., K. Rajasekharan Nayar (2021). COVID 19 and its mental health consequences,

    *Journal of Mental Health, 30*(1), 1-2. DOI: 10.1080/09638237.2020.1757052

Kuramoto, F. (2017). *The Affordable Care Act and integrated behavioral health care: Meeting*

    *the health and behavioral health needs of a diverse society*. Routledge.

Kuramoto, F., & Yuen, F. (2014). The Affordable Care Act: A comprehensive and integrated

approach to health care. *Journal of Social work in Disability & Rehabilitation, 13:*1-2.

DOI: 10.1080/1536710x.2013.870519

Lemmens, L. C., Molema, C. C., Versnel, N., Baan, C. A., & de Bruin, S. R. (2015). Integrated

care programs for patients with psychological comorbidity: A systematic review and

meta-analysis. *Journal of Psychosomatic Research*, *79*(6), 580-594.

https://doi.org/10.1016/j.jpsychores.2015.07.013

Lopez-Leon, S., Wegman-Ostrosky, T., Perelman, C., Sepulveda, R., Rebolledo, P. A., Cuapio,

A., & Villapol, S. (2021). More than 50 long-term effects of COVID-19: A systematic

review and meta-analysis. *Scientific Reports*, *11*(1), 1-12.

https://www.nature.com/articles/s41598-021-95565-8

Lukowicz, P., Kirstein, T., & Tröster, G. (2004). Wearable systems for health care

applications. *Methods of information in Medicine*, *43*(03), 232-238.

https://pubmed.ncbi.nlm.nih.gov/15227552/

 Medicine Net. (2016)Definition of Chronic Disease.

https://www.medicinenet.com/chronic_disease/definition.htm

Menezes, P., Quayle, J., Garcia Claro, H., da Silva, S, Brandt, L.R., Diez-Canseco, F., Miranda,

J.J., Price, L.N., Mohr, D.C., Araya. R. (2019). Use of a mobile phone app to treat

depression comorbid with hypertension or diabetes: A pilot study in Brazil and Peru

*JMIR Mental Health, 6(4*), e11698 DOI: 10.2196/11698

Mental Health America. (2022). The state of mental health in America, 2022 key findings.

https://www.mhanational.org/issues/state-mental-health-
america#:~:text=In%202019%2C%20just%20prior%20to,to%20nearly%2050%20millio
n%20Americans.

Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects.
*Journal of Economic Development, Environment and People 7(1),* 23-48.
*https://www.ceeol.com/search/article-detail?id=640546*

Moon, K., Sobolev, M., & Kane, J. M. (2022). Digital and mobile health technology in
collaborative behavioral health care: Scoping review. *JMIR Mental Health*, *9*(2), e30810.
DOI: 10.2196/30810

Morris, P. M. (2002). The capabilities perspective: A framework for Social Justice. *Families in
Society*, *83*(4), 365–373. https://doi.org/10.1606/1044-3894.16

Moustakas, C. (1994). *Phenomenological research methods*. Sage

Nalbandian, A., Sehgal, K., Gupta, A., Madhavan, M. V., McGroder, C., Stevens, J. S., Cook,
J.R., Nordvig, A.S., Shalev, D., Sehrawat, T.S., Ahluwalia, N., ikdelo, B., Dietz, D., Der-
Nigoghossian, A., Liyanage-Don, N., Rosner, G.F., Bernstein, E.J., Mohan, S., Beckley,
A.A., Seres, D.S., Choueiri, T.K., Uriel, N., Ausiello, J.C., Accilit, D., Freedber, D.E.,
Baldwin, M., Schwartz, A., Brodie, D., Kim, C.K., Elkind, M.S.V., Connoers, J.M.,
Bilezikian, J.B., Landry, D.W., & Wan, E. Y. (2021). Post-acute COVID-19
syndrome. *Nature Medicine*, *27*(4), 601-615. DOIhttps://doi.org/10.1038/s41591-021-
01283-z

National Association of Social Workers. (2016). I*ssue: Ensure that social workers are frontline*

    *health providers to effect affordable care act integration.*

    https://www.socialworkers.org/LinkClick.aspx?fileticket=IXiH2rvJ-wM%3d&portalid=0

National Association of Social Workers. (2021). *Code of ethics.*

    https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English

National Association Social Workers. (2022) *Health.*

    https://www.socialworkers.org/Practice/Health

National Committee for Quality Assurance. (2021). *Patient-centered specialty practice*

    *recognition (PCSP).* https://www.ncqa.org/programs/health-care-providers-

    practices/patient-centered-specialty-practice-recognition-pcsp/

National Institute of Mental Health. (2023). *Definitions.*

    https://www.nimh.nih.gov/health/statistics/mental-illness

National Institute of Mental Health. (2020). *Mental Illness.*

    https://www.nimh.nih.gov/health/statistics/mental-illness.shtml

National Institute of Mental Health (2017). *Bipolar Disorder.*

    https://www.nimh.nih.gov/health/statistics/bipolar-disorder

Neubauer, B. E., Witkop, C. T., & Varpio, L. (2019). How phenomenology can help us learn

    from the experiences of others. *Perspectives on Medical Education*, *8*(2), 90-97.

    https://doi.org/10.1007/s40037-019-0509-2

Ng, M. M., Firth, J., Minen, M., & Torous, J. (2019). User engagement in mental health apps: a

    review of measurement, reporting, and validity. *Psychiatric Services*, *70*(7), 538-544.

    https://doi.org/10.1176/appi.ps.201800519

Nordvig, A., Noble, J. (2021). Post-COVID brain fog: A patient registry and cross-disciplinary approach to characterization, treatment, and etiology. *American Academy of Neurology, 96(15)*. https://n.neurology.org/content/96/15_Supplement/4288.abstract

Ohrnberger, J., Fichera, E., Sutton, M. (2017). The relationship between physical and mental health: A mediation analysis. *Science Direct 195*, 42-49. https://doi.org/10.1016/j.socscimed.2017.11.008

Ouwens, M., Wollersheim, H. U. B., Hermens, R., Hulscher, M., & Grol, R. (2005). Integrated care programs for chronically ill patients: a review of systematic reviews. *International Journal for Quality in Health Care*, *17*(2), 141-146. https://doi.org/10.1093/intqhc/mzi016

Padgett, D. (2017). *Qualitative methods in social work research* (3rd ed.)*.* Sage.

Paglialonga, A., Lugo, A., & Santoro, E. (2018). An overview on the emerging area of identification, characterization, and assessment of health apps. *Journal of biomedical informatics*, *83*, 97-102. https://doi.org/10.1016/j.jbi.2018.05.017

Parkin, A., Davison, J., Tarrant, R., Ross, D., Halpin, S., Simms, A., Salman, R., & Sivan, M. (2021). A multidisciplinary NHS COVID-19 service to manage post-COVID-19 syndrome in the community. *Journal of Primary Care & Community Health*, *12*, 21501327211010994. DOI: 10.1177/21501327211010994

Patoz, MC., Hidalgo-Mazzei, D., Pereira, B., Blanc, O., de Chazeron, I., Murru, A., Verdlini, N., Pacchiarotti, I., Vieta, E., Llorca, P-M., & Samalin, L. (2021). Patients' adherence to smartphone apps in the management of bipolar disorder: a systematic review. International Journal of  Bipolar Disorders, 9(19). https://doi.org/10.1186/s40345-021-00224-6

Pew Research Center. (2023). Mobile fact sheet. https://www.pewresearch.org/internet/fact-
 sheet/mobile/

Quinn, A., Ji, P., & Nackerud, L. (2019). Predictors of secondary traumatic stress among social
 workers: Supervision, income, and caseload size. *Journal of Social Work*, *19*(4), 504-528.
 DOI:10.1177/1468017318762450

Raney, L., Bergman, D., Torous, J., & Hasselberg, M. (2017). Digitally driven integrated
 primary care and behavioral health: How technology can expand access to effective
 treatment. *Current Psychiatry Reports*, *19*(11), 1-8. DOI: 10.1007/s11920-017-0838-y

Ransford, Marc. (2018). *Rural American suffering severe shortage of mental health
 professionals.* Medical Xpress. https://medicalxpress.com/news/2018-08-rural-america-
 severe-shortage-mental.html

Raveendran, A. V., Jayadevan, R., & Sashidharan, S. (2021). Long COVID: An
 overview. Diabetes & metabolic syndrome. *Science Direct, 15*(3), 869–875.
 https://doi.org/10.1016/j.dsx.2021.04.007

Roberts, T., Esponda, M., G., Krupchanka, D., Shidhaye, R., Patel, V., & Rathod, S. (2018).
 Factors associated with health service utilization for common mental disorders: a
 systematic review. *BMC psychiatry*, *18*(1), 1-19. https://doi.org/10.1186/s12888-018-
 1837-1

Rock Health. (2017). *2016 Year End Funding Report: A reality check for digital health.*
 https://rockhealth.com/reports/2016-year-end-funding-report-a-reality-check-for-digital-
 health/.

Rogers, J. P., Chesney, E., Oliver, D., Pollak, T. A., McGuire, P., Fusar-Poli, P., Zandi, M.,

    Lewis, G., & David, A. S. (2020). Psychiatric and neuropsychiatric presentations

    associated with severe coronavirus infections: a systematic review and meta-analysis with

    comparison to the COVID-19 pandemic. *The Lancet Psychiatry*, *7*(7), 611-627.

    https://doi.org/10.1016/S2215-0366(20)30203-0

Santhosh, L., Block, B., Kim, S. Y., Raju, S., Shah, R. J., Thakur, N., Bringham, E., & Parker, A.

    M. (2021). Rapid design and implementation of post-COVID-19 clinics. *Chest*, *160*(2),

    671-677. https://doi.org/10.1016/j.chest.2021.03.044

Scheewe, T. W., Backx, F. J. G., Takken, T., Jörg, F., Van Strater, A. C. P., Kroes, A. Kahn,

    R.S., & Cahn, W. (2013). Exercise therapy improves mental and physical health in

    schizophrenia: a randomized controlled trial. *Acta Psychiatric Scandinavica*, *127*(6), 464-

    473. DOI: 10.1111/acps.12029

Schlosser, D. A., Campellone, T. R., Truong, B., Anguera, J. A., Vergani, S., Vinogradov, S., &

    Arean, P. (2017). The feasibility, acceptability, and outcomes of PRIME-D: A novel

    mobile intervention treatment for depression. *Depression and Anxiety*, *34*(6), 546-554

    .https://doi.org/10.1002/da.22624

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education*

    *and the social sciences*. Teachers college press.

Semahegn, A., Torpey, K., Manu, A., Assefa, N., Tesfaye, G., & Ankomah, A. (2018).

    Psychotropic medication non-adherence and associated factors among adult patients with

    major psychiatric disorders: a protocol for a systematic review. *Systematic reviews*, *7*(1),

    1-5. https://doi.org/10.1186/s13643-018-0676-y

Sheaff, R. (1998). What is 'primary' about primary health care? *Health Care Analysis*, *6*(4), 330-340. DOIhttps://doi.org/10.1007/BF02678372

Singh, S. J., Barradell, A. C., Greening, N. J., Bolton, C., Jenkins, G., Preston, L., & Hurst, J. R. (2020). British Thoracic Society survey of rehabilitation to support recovery of the post-COVID-19 population. *BMJ Open*, *10*(12). doi:10.1136/bmjopen-2020-040213

Sławecki, B. (2018). *Qualitative methodologies in organization studies* (pp. 7-26). Palgrave Macmillan.

Sporinova, B., Manns, B., Tonelli, M, Hemmelgarn, B., MacMaster, F., Mitchell, N., Au, F., Ma, Z., Weaver, R., Qinn, A. (2019). Association of mental health disorders with health care utilization and costs among adults with chronic disease. *JAMA Network Open 2*(8). doi:10.1001/jamanetworkopen.2019.9910

Straussner, L. (2022). Health Care Review: Integrated Health Care — What Do Social Workers Contribute? *Social Work Today, 18*(2) P. 32. https://www.socialworktoday.com/archive/MA18p32.shtml

Struckmann, V., Leijten, F. R., van Ginneken, E., Kraus, M., Reiss, M., Spranger, A., Boland, M., Czypionka, T., Busse, R. & Rutten-van Mölken, M. (2018). Relevant models and elements of integrated care for multi-morbidity: Results of a scoping review. *Health Policy*, *122*(1), 23-35. DOI: 10.1016/j.healthpol.2017.08.008

Substance Abuse and Mental Health Services Administration. (2020). *2020 National Survey of Drug Use and Health (NSDUH) Releases.* https://www.samhsa.gov/data/release/2020-national-survey-drug-use-and-health-nsduh-releases

Substance Abuse and Mental Health Services Administration. (2021). *2021 National Survey of*

    *Drug Use and Health (NSDUH) Releases.*

    https://www.samhsa.gov/data/sites/default/files/reports/rpt39443/2021NSDUHFFRRev01

    0323.pdf

Substance Abuse and Mental Health Services Administration. (n.d.). *Integrated models for*

    *behavioral health and primary care*. https://www.samhsa.gov/resource/ebp/integrated-

    models-behavioral-health-primary-care

Torous, J., Wisniewski, H., Liu, G., & Keshavan, M. (2018). Mental health mobile phone app

    usage, concerns, and benefits among psychiatric outpatients: comparative survey

    study. *JMIR Mental Health*, *5*(4), e11715.doi: 10.2196/11715

United Health Foundation (2022). *Annual report mental health providers.*

    https://www.americashealthrankings.org/explore/annual/measure/MHP

U.S. Bureau of Labor Statistics. (2020). *Occupational outlook handbook-social workers.*

    https://www.bls.gov/ooh/community-and-social-service/social-workers.htm

U.S. Bureau of Labor Statistics. (2017). *Occupational employment and wage statistics.*

    https://www.bls.gov/oes/current/oes2017oes.htm

USA Facts. (2021).*Over one-third of Americans live in areas lacking mental health*

    *professionals*. https://usafacts.org/articles/over-one-third-of-americans-live-in-areas-

    lacking-mental-health-professionals/

U.S. Food and Drug Administration. (2019). *Device Software Functions Including Mobile Medical Applications.* https://www.fda.gov/medical-devices/digital-health-center-excellence/device-software-functions-including-mobile-medical-applications#:~:text=Mobile%20medical%20apps%20are%20medical,into%20a%20regulated%20medical%20device.

Vehar, S., Boushra, M., Ntiamoah, P., & Biehl, M. (2021). Post-acute sequelae of SARS-CoV-2 infection: Caring for the 'long-haulers'. *Cleve Clin J Med*, *88*(5), 267-272. DOI: 10.3949/ccjm.88a.21010

Vindegaard, N., & Benros, M. E. (2020). COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain, Behavior, and Immunity*, *89*, 531-542. https://doi.org/10.1016/j.bbi.2020.05.048

Vink, M., & Vink-Niese, A. (2020). Could cognitive behavioral therapy be an effective treatment for long COVID and post COVID-19 fatigue syndrome? Lessons from the Qure study for Q-fever fatigue syndrome. *Healthcare 8*(4), 552. *Multidisciplinary Digital Publishing Institute.* DOI: 10.3390/healthcare8040552

Wainberg, M. L., Scorza, P., Shultz, J. M., Helpman, L., Mootz, J. J., Johnson, K. A., Neria, Y., Bradford, J. E., Oquendo, M. A., & Arbuckle, M. R. (2017). Challenges and opportunities in global mental health: A research-to-practice perspective. *Current Psychiatry Reports, 19(5),* 28. https://doi.org/10.1007/s11920-017-0780-z

Waisel, D. B. (2013). Vulnerable populations in healthcare. *Current Opinion in Anesthesiology, 26(2)*, 186-192. DOI: 10.1097/ACO.0b013e32835e8c17

Wakefield, J. C. (1988). Psychotherapy, distributive justice, and social work: Part 1: Distributive

justice as a conceptual framework for social work. *Social Service Review, 62,* 187–210.

https://www.journals.uchicago.edu/doi/abs/10.1086/644542

Weiner, S. (2018). Addressing the escalation psychiatrist shortage. *AAMC.*

https://www.aamc.org/news-insights/addressing-escalating-psychiatrist-

shortage#:~:text=The%20Shortage%20by%20the%20Numbers&text=The%20number%2

0of%20psychiatrists%20in,of%20Health%20and%20Human%20Services

Wilder-Smith, A. (2021). COVID-19 in comparison with other emerging viral diseases: risk of

geographic spread via travel. *Tropical Disease Travel Medicine and Vaccines,* 7(1), 1-11.

https://tdtmvjournal.biomedcentral.com/articles/10.1186/s40794-020-00129-9

Wood, P., Burwell, J., & Rawlett, K. (2018). *New Study Reveals Lack of Access as Root Cause*

*for Mental Health Crisis in America*. National Council for Behavioral Health.

https://www.thenationalcouncil.org/press-releases/new-study-reveals-lack-of-access-as-

root-cause-for-mental-health-crisis-in-america/

World Health Organization.(2021). *A clinical case definition of post COVID-19 condition by a*

*Delphi consensus.* https://www.who.int/publications/i/item/WHO-2019-nCoV-

Post_COVID-19_condition-Clinical_case_definition-2021.1

World Health Organization. (2010). *Framework for action on interprofessional education and*

*collaborative practice.*

https://apps.who.int/iris/bitstream/handle/10665/70185/WHO_HRH_HPN_10.3_eng.pdf;

jsessionid=9452CD2684D0F9D211CF3E1DA6A84A5A?sequence=1

World Health Organization. (2016). *Framework on integrated, people-centered health services.*

https://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_39-en.pdf?ua=1&ua=1

World Health Organization. (2022,). *WHO Coronavirus (COVID-19) Dashboard, Overview*.

    Retrieved April 3, 2022, from  https://covid19.who.int/

World Health Organization. (2021). *WHO Primary health care*. https://www.who.int/news-

    room/fact-sheets/detail/primary-health-care

Yong, S. J. (2021). Long COVID or post-COVID19 syndrome: putative pathophysiology, risk

    factors, and treatments. *Infectious Diseases*, *53*(10), 737-754.

    DOI: 10.1080/23744235.2021.1924397

## Appendix A

## Recruitment Script

Hello, my name is Michelle Palmieri.

I work with Dr. Alison Morris and am conducting a research study as a student at Millersville University of Pennsylvania. I am contacting you because you signed the Long Covid Research Registry which stated that you would be willing to hear about Long-COVID research studies for which you might be eligible.

This study involves a one-time 15–20-minute interview about your experience using the digital application, RxWell. The purpose of this research will be to gain a better understanding of your experience and the benefits of using a digital application while seeking care in a specialty clinic for covid-19.

- The risk associated with this research is the potential for a breach of confidentiality. Although every reasonable effort has been taken, confidentiality during Internet communication activities cannot be guaranteed and it is possible that additional information beyond that collected for research purposes may be captured and used by others not associated with this study.

- Your participation is voluntary, and you can stop the discussion at any time. If you agree to participate, you would be known by a study ID versus anything having your name or any identifying information. If you choose not to participate, or if you do not complete the study, this will have no effect on your relationship with UPMC Pulmonary Clinic or Dr. Alison Morris.

Would you be willing to speak with me about your experience?

Yes: If so, I can review the consent form with you to obtain verbal consent. Once you have done so, we can set up a day/time that is convenient for you.

No: I appreciate your time. Thank you for your consideration.

If you have any questions related to this, you can contact:
Alison Morris, MD, MS
NW628 UPMC Montefiore
3459 Fifth Avenue
Pittsburgh, PA 15213
412-624-7784

**Consent to Act as a Participant in a Research Study**

**STUDY TITLE:** COVID-19 and Mental Health: Exploring the impact of a digital application

**PRINCIPAL INVESTIGATOR:** Alison Morris, MD, MS
NW628 UPMC Montefiore
3459 Fifth Avenue
Pittsburgh, PA 15213
412-624-7784

**RESEARCHER:** Michelle S. Palmieri, Doctoral student Millersville University of Pennsylvania.

**SOURCE OF SUPPORT**: N/A

**Invitation to Participate in a Research Study**
You are being asked to take part in a research study because you have utilized the digital application RxWell, while seeking care in the Pulmonary Clinical at UPMC.

Research studies include only people who choose to take part. This form provides information to help you decide if you would like to participate in this research study. You should take your time to make your decision. Members of the research study team can answer any questions that you have about the study.

**Who is conducting this research study?**
This research study is being done by Michelle S. Palmieri, a doctoral student at Millersville University of Pennsylvania.

**What is the purpose of this research study?**
The purpose of this research is to gain a better understanding of your experience and the benefits of using a digital application while seeking care in a specialty clinic for COVID-19.

**How many people will participate in this research study?**
We hope to enroll 10-20 participants.

**How long will my participation in this study last?**
Your participation in this study will involve one interview.

**What will I be asked to do if I participate in this study?**
- You will be asked to consent to this study.

- By agreeing to participate in this research study you are giving the research team permission to contact you and ask questions about your perception of how the digital application supported your mental health needs.

- You will be asked to participate in a one-time 15–20-minute phone interview. The questions will be related to your COVID-19 conditions, mental health needs, and perception of the digital application. Your responses will be entered into a secure website and the researcher will ask you to answer the questions over an audio only format.

- If you agree to participate, your phone interview will be recorded (audio) so that the researcher can listen to your interview responses after the interview. Only the researcher will have access to these recordings. Your personal information, such as your name, will be kept confidential and removed from audio recordings and any other records created from the phone interview.

**Will I be compensated (receive a payment) for participating in this research study?**
- There is no compensation for participating in this study.

**What are the possible risks, side effects, and discomforts of this research study?**
*Infrequent (Rare) Risks***:**
- The risks associated with this study include the potential for a breach of confidentially. To reduce the risk of that happening, we will protect the confidentiality of the information you provide by giving you a unique study ID that will be kept separate from any identifying information.

- You will be asked questions about private, personal matters and information related to your health. You may feel uncomfortable answering these questions or discussing your health with the research team. You may also feel tired from having discussions with the research interviewer. There are no known psychological or physical risks associated with the interview that will be used for this study.

- *It is possible that your confidential information may be collected and used by individuals who do not have permission to do so. The research* takes precautions to prevent this from happening, but there is still a risk that your confidentiality may be breached.

*Unknown Risks:*
In addition to the risks listed above, there may be other risks that are unknown at this time. We will monitor your safety during your participation in this research study.

**What are the possible benefits from taking part in this study?**
There is no guaranteed direct benefit to you from taking part in this research study. The information gathered may help support others in the clinic in the future.

**What treatments or procedures are available to me if I decide not to take part in this research study?**
If you choose not to participate in this study, you will still receive your regular care for your COVID-19 needs at the pulmonary clinic.
You are not obligated to participate in any research study.

**Will my insurance provider or I be charged for the costs of any procedures performed as part of this research study?**
There is no cost to you for participating in this study. Neither you, nor your insurance provider, will be charged for the costs performed for this research study. You and your insurance company will continue to pay for your regular health care in the usual manner (care you would receive even if you were not participating in this research study).

*CONFIDENTIALITY AND RELEASE OF YOUR PERSONAL HEALTH INFORMATION RECORDS*

**Who is requesting my personal health information and why is this information needed?**
The researcher is requesting your authorization (permission) to interview you.

**What will be disclosed?**
Summarized analysis of your reported thoughts, feelings, perceptions will be shared in the findings. However, no identifiable information will be shared.

**Will research data be placed in my medical records?**
Research data will not be placed in your medical record.

**For how long will the investigators be permitted to use and disclose identifiable information related to my participation in this research study?**
The investigators may continue to use and disclose, for the purposes described above, identifiable information (which may include your identifiable medical information) related to your participation in this research study for a minimum of 7 years after final publication and completion of this research study or for as long (indefinite) as it may take to complete this research study.

**Who will have access to identifiable information related to my participation in this research study?**
In addition to the individuals listed on the first page of this consent form and their research staff, the following individuals will or <u>might</u> have access to identifiable information for the purposes of conducting and monitoring this research study:

- Authorized representatives, business associates, or affiliates of the University of Pittsburgh Research Conduct and Compliance Office; the University of Pittsburgh Human Research Protection Office; the Office of Human Research Protections (OHRP) of the Department of Health and Human Services (DHHS).

- We may share identifiable information with your health care team if there is an immediate risk to your health. Your health care team will use this information to make decisions about your treatment.

- Under certain circumstances we may be required to release your identifiable information in response to an order by a court of law.

**What steps will be taken to protect my information provided for this research study?**
Any information about yourself obtained from this research study will be kept confidential (private) to the greatest extent possible. Data collected during the study will be stored in a way that does not identify you by name. You will be identified by a unique Study ID and the information linking these subject codes with your identity will be kept separate from your research study records. Data stored on computers or web-based tools will be kept behind firewalls, encrypted, and password protected.

If your research data is shared with other researchers who are interested in this specific research study, your identity will not be revealed to those researchers. You will not be identified in any publication or presentation of the research results unless you sign a separate consent form giving your permission for us to do so.

**Will the information I provide be used for anything other than the current study?**
Our research study team may use information you provide for this research study, to conduct research projects in the future that are different from what is described in this document. Your information will continue to be kept confidential.

We may also share information collected for this research study in the future with other researchers who are not involved with this research study. However, we will not share any information that would directly identify you. All data provided to these individuals will be anonymous, and these researchers will be required to sign an agreement that states they will not attempt to determine your identity.

**May I withdraw, at a future date, my consent for my participation in this research study?**
- You have the right, at any time, to withdraw from participating in this study. You may also withdraw your permission to allow the research team to use and disclose health information collected as part of this research study.

- You may withdraw your consent for your participation in this research study by providing a written and dated notice of this decision to the principal investigator of this research study.

- The research team will continue to use any information already collected up to when you withdraw from the study.

- It is your decision to participate in this research study. If you chose not to participate in this research study or chose to withdraw at any point from this research study, your decision will not affect your current or future relationship with the University of Pittsburgh, or any other health care providers or insurance companies.

**If I agree to take part in this research study, can I be removed from the study without my consent?**

The researchers may withdraw you from participation if necessary for other reasons. For example, you may be withdrawn because of changes in your health. If you are withdrawn from the research study, the research study team's decision will not affect your current or future relationship with the University of Pittsburgh, or any other health care providers or insurance companies.

**Who else can answer my questions about my participation in this research study?**
If you have any questions about your rights as a research study subject (participant) or wish to talk to someone other than the research team, you can call the University of Pittsburgh Human Subjects Protection Advocate toll free at 1-866-212-2668.

**For additional information about this research study**:
Call the Research Study, or write to:

> Alison Morris, MD, MS
> NW628 UPMC Montefiore
> 3459 Fifth Avenue
> Pittsburgh, PA 15213
> 412-624-7784

**VOLUNTARY CONSENT:**

All of the above information has been explained to me and all of my current questions have been answered. By signing this form, I agree to participate in this research study and to allow the use my answers related to my care for the purposes described above, I consent to participate in the COVID-19 and mental health study. I understand that I am encouraged to ask questions, voice concerns or complaints about any aspect of this research study during this study, and that such future questions, concerns, or complaints will be answered by a qualified individual of the research team or by calling the Principal Investigator of this study, Dr. Alison Morris, MD (412)624-7784. I understand that I will be provided with a copy of my signed consent form for my records.


Participant's Name (Print): _____
                               (First, middle initial, last name)


_____      _____
Participant's Signature                                     Date:


**INVESTIGATOR CERTIFICATION**

*I have explained the nature and purpose of this research study to the above-named individual(s), and I have discussed the potential benefits and possible risks of study participation. Any questions the individual(s) have about this study have been answered, and we will always be*

*available to address future questions, concerns or complaints as they arise. I further certify that no research component of this protocol was started until after this consent form was signed.*

_____        _____
Printed Name of Person Obtaining Consent        Role in Research Study


_____        _____
Signature of Person Obtaining Consent        Date [add time if copy will be in
medical record]

**Appendix C**

**Qualitative Research Questions**

Hello, my name is Michelle, and I am a student at Millersville University and conducting research with patients who seek care in the pulmonary clinic at UPMC. Thank you for agreeing to participate this interview. Your participation is voluntary, and you can stop this discussion at any time. If so, your information will be removed from the final analysis.

The purpose of this research will be to gain a better understanding of your experience and the benefits of using a digital application while seeking care in a specialty clinic for covid-19.

Now I will provide you with some information about the phone interview that I will be conducting with you today. The interview should take 15-20 minutes of your time and will be audio-recorded so we can recall exactly what was discussed during out phone call. Once the interview is completed, it will be transcribed, or typed out, word for word. Please note that any personally identifiable information (i.e., locations, names) will be removed from the transcript.

Do you have any questions before we begin?

Do you agree to allow the researcher to record this interview?

1. COVID-19 questions: *Maybe just ask: "tell me about your experience with COVID-19" and ask others if they do not arise during initial question.*
    a. When were you first diagnosed with COVID-19?
    b. What types of symptoms did you experience when you were first diagnosed?
    c. How had this affected you initially?

2. Mental health questions:
    a. Have you been told that you have a mental health diagnosis, such as anxiety or depression (*before coming to the clinic of after*)?
    b. When were you first diagnosed? (*If not answered above*)
    c. What symptoms do you have (*have them list them*)? Would you say your symptoms are mild, moderate, or severe?
    d. Do you attribute your mental health diagnoses to having COVID? (*If not answered above*)
    e. How has having [insert mental health condition] affected you when coming to the clinic?
    f. What type of treatment have you received, such as therapy or medications, for your mental health diagnosis prior to coming to the clinic?
    g. Do you see a mental health therapist for this diagnosis today? (*If not offered in questions above*) If so, how often, what modality, where? Do you feel this has helped you today?

3. Digital tool treatment intervention questions: *maybe just ask: "Tell me about your experience with RxWell" and ask others if the info does not arise naturally.*
    a. What expectations did you have about RxWell before you started?

b. How do you feel RxWell supported your mental health diagnosis while seeking care in the clinic?
c. What other mental health services contributed to improvement with your mental health diagnosis since coming to the clinic?
d. Were there any barriers that prohibited progress with your mental health diagnosis?
e. What would you share with others, that are experiencing similar issues, regarding RxWell?
f. What elements of RxWell were most helpful? *(Coaching, techniques, etc.)*
g. Is there anything else the clinic could do/have done to help with your mental health issues, besides offering RxWell?

Those are all the questions that I have for you today. Would you like to add anything else?

Thank you for taking the time to participate in this interview. Have a great day!