

Impact of Telehealth on patient outcomes during COVID-19. A case study at Fakeeh University Hospital Dubai.

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ABSTRACT

Topic: Impact of Telehealth on patient outcomes during COVID-19. A case study at Fakeeh University Hospital Dubai

Aim: The main purpose of this research is to analyze the impact of telehealth services during COVID-19 on patient outcomes, particularly during the time frame of the pandemic December 2020 - February 2022 at Fakeeh University Hospital.

Research Objectives: The study consists of three objectives. (1) To determine and compare patient-physician satisfaction levels from teleconsultation before and during the pandemic. (2) To analyze the impact of teleconsultations without physical examination on physician-patient communication during COVID-19 (3) To investigate the influence of telehealth on the number of admissions to hospitals during COVID-19.

Methodology: A retrospective Mixed method approach was used to answer the research questions using data obtained from an online survey and face-to-face interviews with physicians and patients who used telehealth services. Thematic analysis was used for qualitative analysis and Chi-square tests, systematic measures, and risk estimates were used for quantitative analysis. SPSS Version 26 was used for statistical analysis, and a p-value of 0.05 was set statistically significant

Results & Discussion: The sample size of 100 showed a high knowledge about telehealth as related to their satisfaction with telehealth services. Chi-square statistics (p-Value 0.000) showed a significant positive impact on the patient-physician satisfaction level, while there is a significant relationship between the impacts of teleconsultations without physical examination on physician-patient communication (p-Value 0.000) and the strong influence of telehealth on the decreased number of admissions to the hospital during COVID-19 (p-value 0.000)

Conclusion: This study assembled substantial information to analyze the impact of telehealth on patient outcomes during a COVID-19 pandemic and the findings of this study have highlighted the positive impact of using telehealth services on patient outcomes during the COVID-19, however, further studies are required to see the impact of post- COVID-19 telehealth services.

Keywords: Telemedicine, Mental Health, Employee Motivation

Chapter 1: INTRODUCTION

Coronaviruses that belong to the Coronaviridae family may cause infection in animals or humans. Diseases caused by the most current coronavirus have been identified as coronavirus-19 (COVID-19). The outbreak began in Wuhan, China, and has since spread around the globe. In the early stages of COVID-19, fever, dry cough, trouble breathing, and boredom are all common symptoms. People over the age of 65, as well as those with pre-existing medical conditions including hypertension, heart disease, or diabetes, are at greater risk of developing the illness in its most severe form. The World Health Organization has declared this worldwide occurrence a pandemic (WHO). Slowing the spread of a virus is facilitated by a "social gap" or social distancing that occurs when there is less interaction between people (UN News, 2022).

Restrictions on travel and quarantines have been imposed across the globe to curb the spread of the disease. Because of this, individuals who are not COVID-19-infected should be given daily care in a hospital environment that does not expose them to other patients at risk of infection (e.g., the elderly and those with underlying disorders). Clinical psychiatrists, for example, refuse to visit the COVID-19 patient's ward because of severe infection control measures. Health care professionals face various problems in the face of natural disasters and epidemics. Patients with COVID-19, as well as those who require healthcare, will benefit from new and creative approaches to solving their problems.

Smartphones and webcams, which allow patients and healthcare providers to communicate through video, are already commonplace in most households because of the fast growth and shrinkage of portable technology. Quarantined doctors may use these services to remotely care for their patients. Some of the issues faced by the workforce may be addressed by using a tele-physician to cover various locations.

In this regard, technological advancements have opened up new possibilities. COVID-19 will need a comprehensive approach, but it is one of the best approaches to maximize service delivery while limiting the risk of direct person-to-person exposure using current technology. In times of epidemic circumstances (such as the COVID-19 pandemic), the use of telemedicine has the potential to assist epidemiological research, disease control, and clinical case management. Information technology has shown rapid growth in the last decade. This revolutionary change has greatly influenced our lives and almost all fields of work particularly the field of medical health. Innovations in technology have given birth to Telehealth also termed E-health/Telemedicine. Telehealth, in broader terms, is defined as the “Exchange of medical-related information and services by sitting at a distance” (Maheu. M, 2002). It is the use of digital communication to support long-distance healthcare (Rahaman, 2021). Its services include dealing with patient consultation, remote surgical processes, scheduling appointments, patient counseling over the phone calls, monitoring of patients suffering from chronic diseases, provision of medical advice, and dispensing of medication. The telehealth system performs efficiently through effective communication among hospital physicians, allied health workers, nursing staff, and patients. Telehealth is a vast field mainly categorized into 6 key areas which include teleconsultation, M-Health, Telemonitoring, Tele pharmacy, Tele diagnosis, and Tele-robotics. Telehealth services have brought a great revolution in the health industry all over the world by modifying the whole healthcare system at a low cost (Stowe.S & Harding.S, 2010).

The population of Arab countries contributes to almost 6% of the global population. The Healthcare systems of Arab countries can deliver efficient patient care and the fastest delivery of medical services. Fakeeh Care is a pioneer healthcare service provider in Jeddah, KSA. Their healthcare journey started in 1978 by name of Dr. Soliman Fakeeh Hospital, founded by Dr. Soliman himself. It has expanded its business in Mecca, Madinah, and Dubai now. Fakeeh. Care has opened up its branch back in 2020 in Dubai by name of Fakeeh University Hospital with headquarters located in Silicon Oasis. Currently, it can deal with 70,000 patients per Annum and a total of 340 employees. On average, there are 40000 admissions and around 20,000 surgical admissions. The hospital is highly equipped with healthcare facilities designed with the latest technology. The hospital is providing 60 intensive care units, 350 beds for inpatients, and capacity of 55 clinics, 24/7 service offered by the hospital pharmacy, and state-of-the-art diagnostic laboratories. Fakeeh University Hospital is already known as a Smart hospital popular for fully automated management systems of medication. Currently, there are 20 different departments fully operational and providing medical services at Fakeeh University Hospital. During COVID-19, the whole healthcare industry has realized the value of telehealth for better cure and patient treatment. Fakeeh University Hospital has taken the lead to introduce a digital healthcare system. The hospital has recently introduced the service of telehealth where Patients are served with treatment, counseling, and delivery of proper medication by sitting at far distance places (Fuh. care, 2022).

1. Purpose | Aim

The main purpose of this research is to analyze the impact of services provided through telehealth during COVID-19 and to investigate the impact on patient outcomes, particularly during the time frame of pandemic 2021-2022. The research will be conducted on patients treated by Fakeeh University Hospital with the help of Telehealth service during COVID-19.

2. Objective

- To determine and compare patient-physician satisfaction levels from teleconsultation before and during the pandemic (relative consultation, overall patient experience) in Fakeeh University Hospital.

- To analyze the impact of teleconsultations without physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital.

- To investigate the influence of telehealth on the number of admissions to hospitals during COVID-19.

3. Research Question

- What is the patient-physician satisfaction level from teleconsultation before and during the pandemic (relative consultation, overall patient experience) in Fakeeh University Hospital?

- What is the impact of teleconsultations without physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital?

- What is the influence of telehealth on the number of admissions to the hospital during COVID-19?

Chapter 2: LITERATURE REVIEW

3. Background

In December 2019, an outburst of pneumonia was reported in the city of Wuhan, China. The origin of the outbreak was unknown, but it was considered to be associated with the seafood wholesale market of Huanan, China. Infected patients had severe clinical symptoms of coughing, fever, shortness of breath, and mild symptoms of diarrhea, fatigue, and myalgia. Genome analysis of causative agent proved it to be a unique type of coronavirus. The rapid spread of this virus caused thousands of deaths in China within 2 months and was rapidly spreading to all parts of the world. Till April 2020 COVID-19 infected cases were recorded in 200 countries all over the world. Looking at the serious situation, the World health organization declared it a pandemic in March 2020 (Ciotte & Ciccozzi, 2020). Till now, the world has paid a huge amount of loss in terms of human lives, social economies, the medical system, and unemployment. All infectious diseases have specific symptoms, specifications, and preventive measures. The outbreak of infectious diseases always depends on its transmission rate; it is usually spread through the infected person directly or indirectly. To prevent the rapid spread of COVID-19, it was mandatory to take preventive measures of maintaining social distancing, cutting all the transmission channels of the virus, isolation of infected patients, and cancellation of all public activities. In China, it was noticed that the isolation of patients infected with Coronavirus and blocking traffic resulted in disease control (Qian.M & Jiang.J, 2022). World Health Organization recommended maintaining the social distance to avoid transmission of the virus which was spreading by air droplets containing the virus produced by coughing, forced speaking, and sneezing. During this period, when healthcare centers were already occupied with COVID-infected

patients and dealing with this pandemic situation. It was hard to maintain social distance and deal with other patients in the hospital.

During this pandemic, the United Arab Emirates government has taken very strict measures to overcome the pandemic COVID-19. All the precautionary measures advised by WHO were considered. UAE National Emergency Crisis and disasters management authority (NECDMA) established the command control center on emergency bases for managing the COVID-19. They coordinated remotely within different healthcare facilities to transfer patients. The government built many field hospitals and hired extra health care staff to take care of infected patients. NECDMA shared on daily bases the newly reported case, total active cases, recoveries, and deaths. Based on these numbers UAE government has taken multiple measures to overcome the transmission of infection such as partial curfews, cut-off flights from countries classified in the red zone, strict social distancing, mandatory masks, and a vaccination program.

Hospitals are one of the places with a high number of infected patients, considering into account, that all the healthcare regulatory authorities in the United Arab Emirates, suspended elective surgeries in hospitals. For any patient admitted to a hospital or emergency surgery, COVID-19 screening test is declared mandatory. To reduce the flow of patients in hospitals, the Dubai health authority introduced Telehealth services in the emirate, where patients could get all their healthcare needs remotely without leaving their homes. The physician remotely conducts consultation through web calls and suggests treatment. Through the services of Telepharmacy, pharmacies were allowed to deliver medication to the doorsteps of patients, and counseling was done by pharmacists remotely about the use of medications and their precautions. To regulate these services, the Dubai health authority shared in form of a circular a complete guide called Standards for telehealth services for all healthcare entities operating in the emirates about the minimum requirements and to get the license before initiation of this service (Health regulation sector, 2021). This document shared thirteen standards on telehealth services focusing on facility registration and requirements, management responsibilities, doctors, nurses, and allied healthcare responsibilities, the management of health records, taking consent of patients, telediagnosis, telemonitoring, tele pharmacy, tele robotics-assisted services, and mobile health services. One of the standards to regulate this service was the key performance indicator and sharing quarterly to Dubai health authority. This indicator requires to reflect the domain of access and quality.

2. Patient-physician satisfaction level from teleconsultation

a. General

The introduction of telehealth, during COVID-19, opened up new horizons to deal with pandemic situations. It has triggered the prompt shift from the traditional healthcare system towards the telehealth system as this patient-centric system helps the patients to be proficiently and systematically screened by sitting at a distance. This system helps to protect physicians and patients from direct exposure to each other. Another competitive edge of the telehealth system was the availability of a platform for medical professionals and patients to interact with each other at any time of the day over the cellphone or web app. According to the research, the Telehealth system had helped to bring improvement in patient on-time treatment and detailed counseling of patients suffering from chronic diseases. Patients with chronic diseases are already prone to get easily infected by sudden outbreaks of viruses as they do not have strong

immunity to fight against the infected virus. It is of high importance for them to maintain social distance and avoid all means of virus transmission. But, at the same time, they need proper care and treatment for existing chronic diseases.

b. Patients

Research conducted on patients suffering from eating disorders and diabetes during COVID-19 suggested that patients treated by using telehealth systems received a high quality of treatment and therapeutic alliance. It also helped to reduce the risk of COVID among these patients (Raykos, B.C, et al 2021).

Telehealth system has been introduced in developed countries a long time ago, but it has achieved more popularity during COVID-19 all over the world. A survey conducted in United State from January-March 2020 showed that the trend to use telehealth services was high from January to March 2020 as compared to the same period of 2019. Patients suffering from diseases other than COVID-19 started preferring to seek medical aid through telehealth to avoid frequent hospital visits. The participants involved in the study said they want to maintain social distancing to avoid COVID transmission. The cross-sectional analytical method to check the use of telemedicine during COVID-19 showed a huge shift towards the use of telehealth by patients instead of the traditional healthcare system. The study showed that 69% of patients visiting telehealth were between the age of 18 and 49 years. There was a less percentage of children's visits to telehealth Koonin, L.M. (2020).

Telemedicine has had a positive influence on patients with heart failure, according to Khader et al. (2014). Using quantitative methods, this research sought to examine the impact of telecardiology on the diagnosis and treatment of cardiac illnesses, to enhance patient well-being while also reducing the amount of time and money spent on the procedure. In Jordan, two tele-clinics were used for this study. Every patient referred to the tele-clinics for suspected cardiac issues was included in the research. During the first week of the study and then every eight weeks after that, researchers spoke with the patients and rated their quality of life to gather additional data. Study participants were 47 percent women and 53 percent men. The patients ranged in age from 18 to 93, with an average age of 49. 71.1% of the patients were given a complete diagnosis as a result of the study. In comparison, during the telecardiology sessions, 77.35 of the patients received a treatment plan. Three-fourths of the patients were able to avoid travel and obtain therapy close to home. In terms of travel time, 96.1 percent of the patients found that telecardiology clinics saved them time; 98.1 percent found that it saved them time in the waiting room, and all of the patients found that it was less expensive.

Patient's quality of life improved as a result of telecardiology visits, according to this research. The results of this research showed that telecardiology in Jordan would make it easier for people in rural regions to get medical treatment. Patients in Jordan might benefit from this. This research shows that telemedicine has had many good benefits in providing healthcare services in distant places where healthcare practitioners are not present, as this study shows. From this research, we can simply deduce how beneficial and convenient telemedicine has been for patients as well as how cost-effective it is. With the advent of telecardiology, hospital admissions and referrals have dropped dramatically. Using telehealth to monitor patients with cardiac issues improves the patient's quality of life by 30 percent over six to twelve months, according to research. Most systematic studies show that telemedicine enhances the quality of life for cardiac patients.

Research published in 2015 by Al Azab and Khader aims to evaluate the effect of telemedicine-based services on renal disease diagnosis and management. The Queen Rania Hospital and the Mafrqa Government Hospital were used in this investigation. A study was conducted to see how telehealth services affect individuals with renal illness and how the process works. There were 64 patients in the study's sample (30 females and 34 males). The patients were all above the age of 54. Patients in this research ranged in age from 16 to 90. The patients were interviewed, and their quality of life was assessed after the research was completed to get meaningful data for this study. Two months following the previous visit, the researchers sent out semi-structured questionnaires to see whether there had been any change in their quality of life.

Tele clinics have been shown to lower medical costs and wait times for a large number of patients, according to this study. Between 71 and 100 percent of patients were satisfied with the medical treatment they received at the institutions. Using tele-nephrology, the average quality of life score of the patients was 97, which indicates that it was successful. Patients who used tele clinics reported shorter wait times and reduced expenses in 96.9% and 98.45% of cases, respectively, of their visits. The mean satisfaction score jumped from 33 to 45 in only 16 weeks of utilizing this healthcare system. Using telemedicine in the treatment of renal illness was shown to be quite beneficial. It also proposes several potential actions for enhancing medical telemedicine.

c. Physicians

A study was conducted in Florida in a tertiary care hospital to understand the perception and attitude toward telehealth services during the period of COVID-19 pandemic. In this study, a survey containing around 40 questions was shared with all physicians within Mayo Clinic Florida. The survey was opened for one month in the 3rd quarter of 2020. Around 530 received the survey however only around twenty percent of physicians participated. The results concluded that the majority of the physicians were satisfied with the implementation of telehealth during COVID-19 however more studies require to conduct about the continuity of telehealth after the pandemic (T. D. Malouff et al. 2021).

Doraiswamy S. et al. conducted a scoping review of the use of telehealth during COVID-19 and concluded that a lot of literature is being published on the use of telehealth services during the first two-quarters of pandemic COVID-19 and mainly the literature is from developed countries where telehealth services have been used effectively by physicians and patients. However, in underdeveloped and lower developed countries, such services are not well studied. Before establishing such services, it requires to study of the feasibility and review of the infrastructure and its implication on the healthcare system including all the stakeholders, such as healthcare facilities, healthcare providers, and patients (Doraiswamy S. et al. 2020). For this study, the authors reviewed more than five hundred articles from more than three hundred different journals. Around fifty percent of the literature reviewed in this article, were focusing on multiple specialties and core parts of clinical care while more than twenty percent of articles focused on different specialties of internal medicine.

An article focusing on the “influence of telehealth on achieving better health across the communities” was published in the 17th volume of preventing chronic disease by the centers for disease control and prevention (CDC) on July 16, 2020 (McElroy, J.A et al. 2020). Telemedicine has been introduced a long

way back, especially in rural areas like Missouri, but the level of care and insurance reimbursement was still the biggest hurdle to the success of telehealth. With the emergence of COVID-19 in the coastal areas of the United States, and patients being afraid to get exposed to viruses during their visits to clinics or hospitals, the Missouri states had to quickly adopt the telehealth services. A command center was established in the Missouri university health care, which serves the 25 counties of this rural area. In the 1st quarter of 2020, many clinics were closed to pull out the nursing care to the hospitals reporting for hundreds of patients with respiratory illness. Shortage of staff leads to the requirement of telehealth services. With the adoption of telehealth services by the management and health care providers, the data shows, that in-person visits reduce from 100 % in February 2020 to only 13% in April. 0% telehealth visit recording in February 2020 which reached 87% in April 2020, during the COVID-19 pandemic in Missouri university healthcare. The success of this telehealth project was remarkable with the assistance of collaborative virtual network learning and the dedication of nursing and other medical staff.

3.Impact of teleconsultations without physical examination on physician-patient communication:

As of now, there are many studies published and it is quite evident that telehealth services had a positive impact on patient satisfaction and have reduced the gap between physicians and patients without any difficulty in communication. However, such studies are limited to mainly developed areas and underdeveloped countries have yet to do a lot of feasibility work in this regard. Another spectrum to be studied is how far this service goes beyond the pandemic COVID-19 crisis as most of the studies were conducted during the pandemic 19.

The concept of telehealth in UAE was not well established before pandemic 19 as there are numbers of health care providers across the country and access to such facilities are very easy. However, during COVID-19, due to the movement restriction, telehealth services adoption becomes the norm in the society. With the emergence of COVID-19 connected health care was the need of the hours. Patients were overall satisfied with the quality of telehealth services in a study conducted to understand the perception of telehealth services on patient satisfaction in the emirates of Dubai, United Arab Emirates, however, patients suggested few areas of improvement (Al-Sharif, G.A., et al, 2021). This study was conducted on the residents of Dubai and randomly 100 patients were selected out of which ninety-four completed the survey. More than 80% of the participants were satisfied with the service of telehealth. Participants were interviewed based on the factors which made them satisfied, factors that did not make them satisfied, and the areas for improvement.

Patients were overall satisfied with their experience of telehealth consultation with an outpatient cardiologist, in research conducted to evaluate the patient satisfaction with telehealth of ambulatory cardiology telehealth consultation (Cho, D et al, 2021). This study was conducted over almost 6 months and during this period almost fourteen thousand patients used the telehealth service for cardiology consultation. Data was collected by sharing the questionnaires with the participants. Patients were distributed into two groups. One group was categorized as having higher satisfaction while the other group was categorized as having lower satisfaction. Only 7 thousand were selected for this study due to their unique disease management and inclusion criteria of the study, however, only around 1100 participants

completed the survey. The younger and female gender were among the highest who were satisfied with the telehealth services. The study showed overall satisfaction with this service during the COVID-19 pandemic. There was no communication gap noticed and patients experienced timely service for their healthcare needs. The patients with comorbidities other than cardiology were not considered for this study which requires further study to understand the impact of other comorbidities.

During the COVID-19 pandemic, a study was conducted in Saudi Arabia to evaluate the trend and response of doctors towards telemedicine in the country. There was an increase in the use of telemedicine during the pandemic, which ultimately required reviewing the effectiveness of this service and how physicians cope with this technology. The questionnaire shared with the participants covered the part to understand the mindset of physicians about telemedicine and what were the obstacles involved. Around 400 participants shared their responses out of which nearly 60% of participants used the telemedicine service other than phone calls, mainly what's app, the application provided by health authority such as SEHA app, zoom calls, Teams meeting, and email. The use of whats app was among the highest source followed by zoom calls. These are the application that is easily accessible to all the residents of the region with high-speed internet and technology devices at affordable prices. This study concluded that the majority of the physicians considered that use of telemedicine is beneficial and can manage chronic diseases remotely thus resulting in a reduced number of outpatient visits to the clinics i.e., up to 90% without any communication issues. Only the area of concern is the availability of technology and its limitations while conducting the dependable diagnostic procedure was another limitation. With such rapid emergence of telemedicine, the safety of confidential data storage could be another concern. Moreover, the study concluded social factors to accepting this technology could be another barrier in the said region of study. Majority of the physicians believe the success of telemedicine depends on the type of specialty. It is evident that telemedicine is cheaper than onsite visits and saves time however as the service is new to the region there is little reluctance to accept the way of disease management. (Kaliyadan F, 2020).

An article published on bain.com, where a study conducted found out that telehealth use in the United States increased 100-fold during the pandemic although this option was available to patients through their insurance provider before the pandemic. Secondly, the study found that physicians adopted the telehealth model successfully and will continue to treat their patients through this service even after the pandemic is over. Bain's 2020 US Front Line of Healthcare Survey publishes that telehealth will take an essential part of patient care and will replace all the consultations which were previously taken over phone calls. All hospital administrators and investors are willing to invest in telehealth services considering the high level of acceptance of this service by health care providers and patients. Almost 90% of the user of telehealth during the pandemic 19 were new and they never had used this service before. 90% of the physicians showed interest to continue this service for their routine consultation or follow-up patients even after pandemic 19, which was 50% at the time of the report publish while up to 85% of physicians agreed to continue this service for physician-to-physician consultation such as referral cases compared to only ten percent in 2020. Acceptance of telehealth for urgent care also increased to 78% compared to 23%. New patients' appointments through telehealth services will be increasing from less than 20% to approximately 75% (Bain's report 2020).

“Nanda M and Sharma R” also conducted a study where they review more than 1000 studies from PubMed and only twenty-five studies were selected considering the reliability, inclusion, and exclusion criteria to understand the patient’s anticipation and understanding of the use of telemedicine service during the pandemic of COVID-19. The result of this study was based on a survey of around fifty thousand patients from approximately 150 healthcare facilities and these surveys were conducted in more than twelve countries. Considering the different specialties and aspects of disease management doctors and patients both were highly satisfied and showed great affinity to continue the telehealth consultation even once the COVID-19 pandemic is over. Participants expressed one of the advantages of this service is, that it saves the time of waiting, ease of access to healthcare even without leaving your home or workplace, and remote evaluation of healthcare needs. Like many other studies, challenges with regards to the technology implications and physical examination for diagnostic purposes were one of the concerns with this service. Overall, the success of telehealth services is quite evident however it requires closer feasibility check and regulatory guidelines, continuity, and sustainability (Nanda M and Sharma R. 2021).

4. Influence of telehealth on the number of admissions

Peine, A. et al, conducted a study on telemedicine in Germany during pandemic 19 by a national survey to analyze the acceptance of telemedicine in public and among healthcare providers and its implications healthcare system. They studied the impact of telemedicine on the management of emergency and acute care cases and found out that with the implementation of telemedicine, the rate of mortality drastically reduced from 13% to less than 9.5% with more advantage of less cost for the overall treatment. With the implementation of telemedicine, the distance and barrier between specialized physicians and patients were reduced regardless of the shortage of medical professionals across the world. The impact of telehealth in the management of intensive care with complications of COVID-19 reduced the duration of stay in hospital and only in the United States were more than fifty thousand lives saved and costs cut down by more than 5 billion US dollars per year (Peine, A. et al. 2020).

The impact of telemedicine on ambulatory care settings was also quite evident. Across the world health regulatory authority allowed health care facilities and providers to consult their patients remotely using telehealth services for the management of chronic and acute care diseases. The regular follow-up and refilling of medicine can be easily managed by telehealth services. Minor acute care cases could also be managed with telehealth service while continuing the home quarantine during the pandemic where home medication delivery is available as well. This results in the reduction of the spread of infection. A “covid-guide” was issued to German citizens by the German central institute, where patients examine themselves and answer questions with the help of telemedicine means in case of any health-related concerns. In case of alarming symptoms, patients can be referred to medical consultants for further review, which resulted in a reduced number of visits to the hospital and subsequent admission to the hospital (Peine, A. et al. 2020). In the above-mentioned study, almost 3000 participants participated in the survey for the period of 1 year from the 1st quarter of 2020 to the 1st quarter of 2021. The gender variation was almost equal male, and female, and they were asked during their understating regards the significance of telemedicine during the crisis of the COVID-19 pandemic. This included the university hospital staff, home

care nurses, and OPD nurses as well. Around 40% of the participants rated the significance of telemedicine as high and around 25 % remained neutral. Physicians (>55%), Nurses (>60%), and other healthcare professionals (>70%) rated telemedicine services as an either high or very high level for the continuation of health care services during the crisis of the COVID-19 pandemic in Germany (Peine, A. et al. 2020).

5. Relationship of Literature review and telehealth at Fakeeh University Hospital (FUH)

After reviewing literature with regards to the impact of telehealth on patient outcomes on a different spectrum ranging from physician-patient experience, the impact of consultation without physical examination and communication and impact on admission to hospital, I have considered Fakeeh university hospital as a case study to analyse the impact of telehealth on the above-mentioned spectrum. Considering the above literature review when compared to the strategies taken in the United Arab Emirates and particularly in Abu Dhabi and Dubai shows quite a success of telemedicine. Dubai health authority issued the guideline for initiating telehealth services across the emirates. Healthcare providers are given the importance of connected healthcare and telemedicine. To overcome the curb coronavirus, teleconsultation was provided to the resident of emirates through different initiatives such as doctors 24/7, doctors online, drive-through services, screening centers at the doorstep, home medication delivery, and patient counseling over web calls, zoom meetings or emails.

At Fakeeh university hospital Dubai, management adopted proactive strategies and transformed Fakeeh care into a smart hospital entity. Fakeeh university hospital was declared a smart hospital and telemedicine along with tele pharmacy services from day one. Fakeeh university hospital developed a mobile application called Fakeeh care, where patients can take an appointment for teleconsultation, can have their medical reports, lab results, and prescription and can request home medication delivery and counseling on medication appropriate use without visiting the hospital. With the implementation of telehealth services and in line with the objective of the above literature review I have selected the Fakeeh university hospital as a case study to analyze the impact of telehealth on patient outcomes to achieve the objectives and answer research questions of study.

6. Summary and Literature Gap

After the literature review, it is quite evident that telehealth services are well established in developed countries like in western and European countries however it is rare to find literature published in the middle east or underdeveloped countries. During pandemic 19 when telehealth emerged as the need of the hour, it was much needed to research telehealth services in the region focusing on physicians' and patients' perceptions of telehealth and its impact on patient outcomes. Fakeeh university hospital being a smart hospital adopted telehealth services, so selected as a case study for this research.

To conduct the case study, a research methodology needs to be established. In the next chapter research methodology will be discussed focusing on research philosophy, research approach, research Strategy, time limits of the study, Sampling Technique, data collection techniques, data analysis techniques, reliability and validity of research, and limitations of the research

Chapter 3: RESEARCH METHODOLOGY

Research methodology is the chapter that discusses how the research was conducted to answer the research questions mentioned in the introduction chapter in order to achieve the objectives of the research. There is a rationale provided for the research design by philosophical approach and with the justification of pragmatism. The research onion framework by Saunders is presented below before discussing the research philosophy, reliability, validity, resources, and ethics.

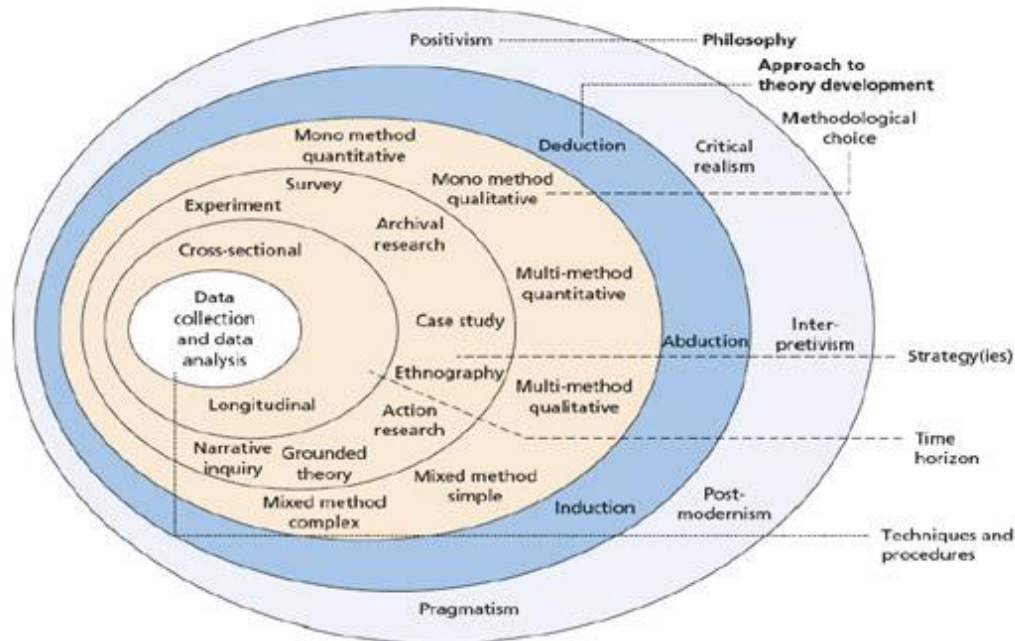


Figure 1: The research 'onion' (M. Saunders, Lewis, and Thornhill, 2019)

1. Research Philosophy and Paradigm

Research philosophy opted in this case study was pragmatism which is described in Wikipedia as a philosophical tradition that considers words and thought as tools and instruments for prediction, problem-solving, and action, and rejects the idea that the function of thought is to describe, represent, or mirror reality (Peirce, C.S. 1878). Paradigm is described by the common perception and beliefs between different research scholars or scientists for addressing the issues and sorting out its solution (Kuhn, 1970). It is a conceptual approach to conducting research that has been previously verified and in practice.

Philosophy of the research is not only to carry the research or answer the research question and achieve the objective, but it shall also allow the researcher to develop the research question, and objective behind the research questions and then to design the methodology how to conduct the research followed by an analysis of the findings, results, discussion, and conclusion.

Usually, researchers' research depends on their beliefs, perception, and intention. That's why it is equally important to understand the philosophy of the research and what methodology to be adopted to do research.

1.a. Justification for pragmatism

The main aim of this study was to analyze the impact of services provided through telehealth during COVID-19 and to investigate the impact on patient outcomes, particularly during the time frame of pandemic 2021-2022. The research was conducted on patients treated by Fakeeh University Hospital with the help of Telehealth service during COVID-19 by qualitative and quantitative research approach. A survey consisted of two parts, one with a quantitative approach having pre-determined answers which reflected the positivist philosophy toward more scientific while the second part of the survey was more toward qualitative research which is a form of interpretive paradigm and consists of open-ended questions to understand the perceptions and attitude of participants towards studied scenarios. (Yardley and Bishop, 2008).

The philosophy of pragmatism not only allowed for quantitative analysis of the impact of teleconsultation without physical examination in managing different types of diseases and the influence of telehealth on the number of admissions to hospitals but also qualitatively allowed to determine the patients' and physicians' satisfaction levels from teleconsultations.

2. Research Approach

A research approach used is a mixed-method, quantitative and qualitative also known as abductive i.e., combining deductive, and inductive approaches whereby it moves within and utilizes both inductive and deductive approaches. Suddaby describes an abductive approach that moves back and forth, in effect combining deduction and induction (Suddaby 2006). Abduction also seems to be an addition to traditional deduction versus induction thinking. This is demonstrated by earlier editions of Saunders, Lewis, and Thornhill's research textbooks (Saunders Lewis, and Thornhill, 2009,). Fakeeh university hospital data from the hospital's EHR was used in this retrospective research on patients treated between December 2020, and February 2022 (during the COVID-19 pandemic). These patients were contacted to get their consent to participate in the study.

3. Research strategy

A retrospective case study approach was used to answer the research questions. A retrospective study was conducted using patient data from visits before and after the pandemic began. Patients who had previously visited Fakeeh university hospital for a telehealth visit during the COVID-19 epidemic were the major focus of the study. Male or female; ethnicity (Arab or non-Arab; other); education and rurality were the independent factors. Patients who identify with race not defined, or patients without a recorded race in their health records were included in the "other" category for the race due to the small sample size. Self-reported data was used for all variables in the research. Secondly, hospital visit rates were examined between pre-and post-pandemic.

4. Methodological Choice

A mixed-methods design is characterized by the combination of at least one qualitative and one quantitative research component. For the intent of this research, the subsequent definition of mixed

methods research was applied (Schoonenboom, J. and Johnson, R.B. 2017):

“Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration” (Kolner Z S. 2017).

A combination of mixed approaches that consist of qualitative and quantitative approaches was opted to have a reliable and validated research methodology. The qualitative approach was used to access the understanding, attitude, and behavioral changes of participants toward telehealth services and their impact on communication and Patient-physician satisfaction level. The quantitative approach was used to retrieve demographic data, and satisfaction levels by grading a scale from 1 to 5, where 1 being extremely likely while 5 being extremely unlikely, and any recent illness that led to hospital admission. Hence this study used both open-ended and closed questions opting for mixed methods to collect data for answering the research question of patient-physician satisfaction level, impact on communication without physical examination, and impact on the number of admissions to hospital subsequently.

5. Research Time Horizon

The research time horizon was spanned between December 2020, and February 2022 (during the COVID-19 pandemic) on patients treated at Fakeeh University Hospital.

6. Study population, sampling, and size

The study population was comprised of health care providers and patients aged 18 and above of both genders being treated at Fakeeh university hospital. Those among this population who opted for the telehealth services at Fakeeh university hospital were eligible to participate in the study. Parents or caretakers assigned in hospital records for the pediatric population who opted for telehealth services were also eligible to participate in the study. Health care providers offering their services in Fakeeh University Hospital were randomly selected for interviews. A considerable factor was to choose those health care providers who were treating patients, particularly through Telemedicine service. Health care providers were mainly the physicians who were treating the patients.

A probability sampling approach was used, and a simple random sampling approach was opted to select the sample size. A sample size of a minimum of 100 participants was used for the survey. To compensate for the impact of non-response and attrition, the sample size was estimated to increase by 50% making it a minimum size of 150 Patient-Physician participants. A questionnaire was designed by modifying questions from previous studies conducted on different hospitals in developed countries to investigate the impact of telehealth services in consideration of the research questions and objectives of this study. The questionnaire was divided into 6 parts. The first part consisted of demographic data including age, gender, education, and nationality. The second part consisted of the knowledge and attitude of patients toward Telehealth services and COVID-19. General questions regarding telehealth and the COVID pandemic were asked in the second part. In the 3rd section, the satisfaction level of patients availing of telehealth

services was analyzed by using a grading scale from 1 to 5. In the next part of the questionnaire, behavioral changes of patients and medical staff during the COVID-19 pandemic were checked and the influence of telehealth services was assessed. In the fifth part, questions were designed to assess the impact of telehealth on patients-Physician communication without physical examination. The last part of the questionnaire was to inquire about any recent illness which led to the patient's admission to the hospital. For qualitative data collection participants were interviewed on three research questions about telehealth services at Fakeeh University Hospital.

7. Data Collection

Physicians working in Fakeeh University Hospital from December 2020 to February 2022 and patients treated during this time frame were included in this retrospective case study as a primary source of data collection. The data of providers who provided their services and patients who were treated subsequently by opting for telemedicine services was retrieved from the electronic health record of the Fakeeh University Hospital HIS system. Direct Interviews and surveys were conducted with physicians treating patients by using telemedicine services. A survey through the registration desk was conducted among patients being treated through telemedicine service during COVID-19. Survey information was used for further research after taking the consent of direct participants.

8. Data Analysis

Self-reported data were used for all variables in the research. The 'Thematic Analysis' was used for the qualitative data part. Interviews were conducted with participants in this study. In the thematic analysis of interviews, four major themes were identified including telehealth knowledge and satisfaction level, Telehealth positive impacts, Challenges of telehealth service, and Opportunities of telehealth service in Fakeeh University Hospital. Chi-square tests, systematic measures, and risk estimates were used for secondary data. SPSS Version 26 was used for statistical analysis, and a p-value of 0.05 was set and deemed statistically significant

9. Reliability and Validity

Reliability and validity are the phenomena used to evaluate the quality of research. Reliability is about the consistency of a measure, and validity is about the accuracy of a measure. Reliability is defined as the extent to which the results can be reproduced when the research is repeated under the same conditions and validity is defined as the extent to which the results really measure what they are expected to measure (Fiona M. 2019). Reliability was ensured to the maximum by eliminating all possible biases by focusing closely on all the methods developed to collect and analysis of the data. Moreover, all the participants were also contacted by email, WhatsApp, or other telehealth communication sources in the hospital to ensure the information received by answering the survey is correct. Validity can be varied and depends on how the participants responded to the survey. However, validity was ensured by maintaining the record of the study done during the period of this retrospective study. All the possible sources of communication were used to ensure the validity of the information collected.

10. Ethics

This study had the ethics approval from the research and scientific committee of Fakeeh university hospital Dubai and the ethical committee of the Westford research committee. Written and oral permission were taken from participants to share their personal experiences with telehealth in the research study. Additionally, all participants were granted confidentiality. The participants were de-identified for maintaining their privacy and confidentiality.

11. Resources and access to primary and secondary data

The approval to access HIS of Fakeeh university hospital called Yasasii was taken and used to access the primary data of the patients treated at the hospital either by telehealth services or in-house consultation and subsequent they were contacted to participate in the survey by answering the questionnaire which produced the secondary data. The help of information technology was taken to retrieve the raw and bulk data of the patients eligible for the study.

Chapter 4: RESULT

1. Qualitative Data analysis:

The “Thematic analysis” was used for the qualitative data part. Interviews were conducted with 10 participants in this study. In the thematic analysis of interviews, four major themes were identified including telehealth knowledge and satisfaction level, Telehealth positive impacts, Challenges of telehealth service, and opportunities of telehealth service in Fakeeh University Hospital.

1.a. Major theme 1 Telehealth Knowledge and Satisfaction level

Theme 1 was the major question in this study regarding patient-physician satisfaction levels from teleconsultation before and during the pandemic in Fakeeh University Hospital. It was also the part of variables in hypothesis H1a. Therefore, the analysis was considerably focused on participants’ telehealth knowledge and their satisfaction with the service. The majority of comments reported affirmative knowledge about telehealth services even before COVID-19 Pandemic, but it increased during the Pandemic time. As a result, the emerging subthemes described the participants’ high knowledge about telehealth as related to their satisfaction with telehealth services. The findings of a study conducted by Perle were also claiming the relationship (Perle, 2020). Consistent with this a study observed a high level of satisfaction with the use of telehealth (Katrina M. Serwe, 2020). Despite the information, it was very less exploited according to the implicit discussion of the interviewee. For example, one of the interviewees expressed:

“I knew telehealth service existed as an online healthcare facility, but I rarely availed the service before the Pandemic”.

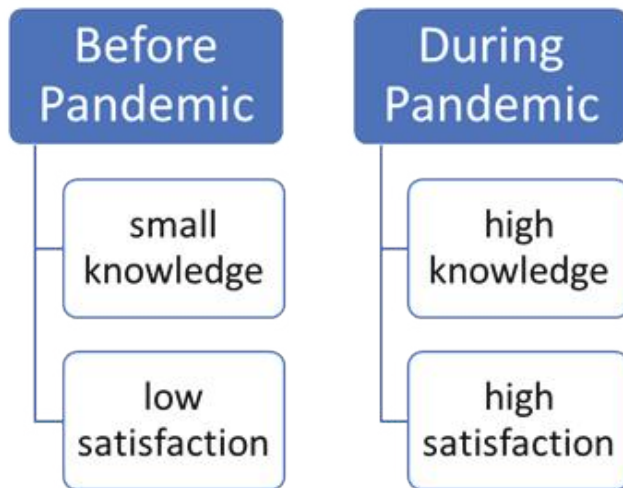


Figure 2: the major theme 1 before the pandemic was small knowledge about telehealth resulted in low utility and satisfaction with telehealth. During the pandemic, people became considerably familiar with the online telehealth service and expressed high satisfaction with it. However, it was reported the Pandemic not only promoted the telehealth service but also sparked the use of telehealth services. The emergence of Pandemic paralyzed the .

physical healthcare besides restrictions on businesses, markets, gatherings, and outside movements. The closure of public services spontaneously raised the chances of familiarity with the online application of healthcare. The frequency of use enabled participants to maintain a positive attitude towards telehealth services. One participant narrated her personal story in these words:

“Being a patient of chronic illness, I kept a record of my health through telehealth application amid the closure of cities. With time, I have become a regular user of telehealth and I am fully satisfied with this modern healthcare service”

1.b. Major theme 2 Telehealth's positive impacts

This theme was constructed by participants’ repeated reference to the positive impacts of increasing the use of telehealth services. It signifies the subthemes including easy access to availing telehealth services, saving of time and cost consumed by traveling to the hospital, improved patient-physician communication, and prompt response to emergencies.

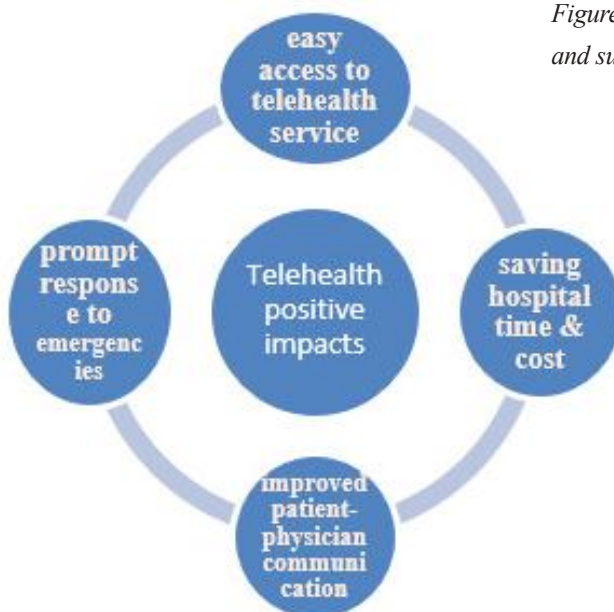


Figure 3: the major theme 2 telehealth positive impacts and subsequent subthemes.

One positive impact of telehealth was the reduced admissions to the hospitals such as teleconsultation protecting users from high-risk infectious diseases during the pandemic. Major theme 4 also included the physician side telehealth positive impacts as referred by participants. “I would say telehealth has covered my all-healthcare needs by numerously reducing my visit to the hospital for healthcare needs. I and my physicians were able to access my all-healthcare

records through a secured online portal. I had not to wait for long queues in hospitals for doctors' clinics, labs, or pharmacies.”. It was reported to be user-friendly and easy to access. Participants easily managed to avail the service, as said an interviewee, “I found teleconsultation very helpful, user-friendly, and easy to handle at Fakeeh University hospital”.

Patient-physician communication

This subtheme was codified from the participants' positive comments about the telehealth service. The participants were able to have their medical prescriptions through a telehealth service easily. There was no issue to share health concerns with the physician through safe online applications. This subtheme is an extension of the conclusion of the study by Serwe et al. According to them, telehealth offers a positive experience to students, clients, and professionals in healthcare education (Katrina M. Serwe, 2020). Telehealth allows consulting the doctors and other healthcare providers to speak from any part of the world from the ease of your home. Hence, the Patient-physician improved communication subtheme was analyzed under the major theme of opportunities for telehealth service.

1.c. Major theme 3 Challenges of telehealth service

Many a time participants focused on the technical challenges of telehealth service during interviews. The challenge to telehealth as a major theme was followed by several subthemes. A combined study accepted the fact that telehealth is not challenge-free despite having positive potential (Shawn R. Valenta, 2021). This theme is developed from the participants' personal opinions about telehealth, ‘Fulfilling healthcare needs without a physical examination is always a challenge for telehealth consultation’. The physical examination is a prerequisite to further investigation and diagnosis of the patient's health status. The proper health checkup requires laboratory intervention which means the physical presence of the patient inside the hospital. This may lead to the severity of the disease instead of curing it on time. Thus, the participants shared a high risk of mortality in case of serious illness.



Figure 4: the cycle of major theme challenges to telehealth and its phases.

Since telehealth is all in all an online application or calls service, the availability of certain technologies is yet another challenge identified in the talk of participants. Mobile devices, computers, the internet & networking services but the digital information and communication tools pose a threat to the emerging telehealth service. Many Interviewees generally reported:

“The availability of digital services and an absence of physical examination are a key challenge in the implementation of teleconsultation during emergency medical needs where a surgical intervention and comorbidities may require to be ruled out”

1.d Major theme 4 Opportunities of telehealth service

The in-depth conversation on the subject explored several ways of helping the telehealth service in this world of digitalization. The theme 4 opportunities of telehealth service are a salient pattern constructed from the data. It was identified during the response to the major question. ‘Do you see any influence of telehealth on the number of admissions to the hospital during COVID-19?’. For example, ‘getting counseling on time from my doctors has reduced the need for admission to the hospital markedly’.

On the other hand, the theme of the pandemic was found to be significantly related to the major theme 4 opportunities for telehealth services. Caetano rightly concluded the Pandemic offers an opportunity for telehealth services (Rosângela Caetano, 2020). Almost all of the interviewees repeatedly conveyed the relationship between these themes. They expressed, ‘Pandemic increases the demand for telehealth. Teleconsultation has been very successful for the treatment of minor ailments and for the follow-up of chronic ailments in refilling the prescriptions’. This relationship has been illustrated in the graph below:



Figure 5: Opportunities for Telehealth Services

With the pandemic arrival, there was an increase in demand for telehealth services in the country. In the analysis of theme 4, the logical connection to the promotion of telehealth was the true support by government ‘healthcare’ regulatory authorities and health insurance as well.

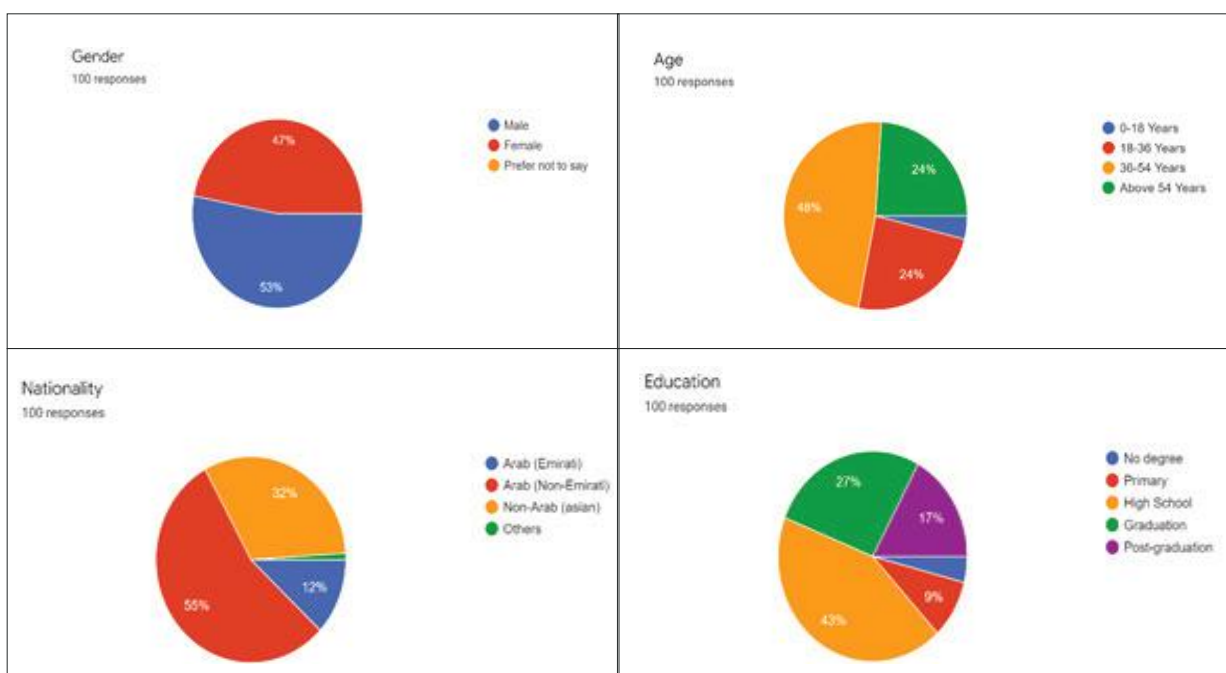


Figure 6: Demographic characteristics

		Statistics				
		GENDER	AGE	NATIONALITY	EDUCATION	ARE RESIDENT OF EMIRATE
N	Valid	100	100	100	100	100
	Missing	0	0	0	0	0
Mean		1.44	3.10	2.19	2.95	2.47
Std. Deviation		.499	.990	.706	1.095	1.915
Range		1	4	4	5	7

Figure 7: Demographic statistical analysis

The above statistics table shows the demographic characteristics of the participants in the research study. These demographic characteristics are gender, age, nationality, education, and a resident of the emirate. The sample consisted of 100 participants. So, the valid number count stands at 100 in the first row as there is no missing value as per row second of the table. The mean value for gender is 1.44 indicates equality of both genders in the participation of this study. The mean value for age 3.10 shows the respondents belong to the third age group on average i.e., 36-54 Years old. The mean value in the column of Nationality shows the participants belonged to the second category on average which is Arab (Non-Emirati). The mean value for education is 2.95 shows the average respondents in the study had their 'high school' as education level. The mean value for a resident of the emirate was 2.47 showing the average number of participants was from Dubai and Sharjah. Below is the specialty of the physicians who participated in the survey.

Specialty for Physician

10 responses

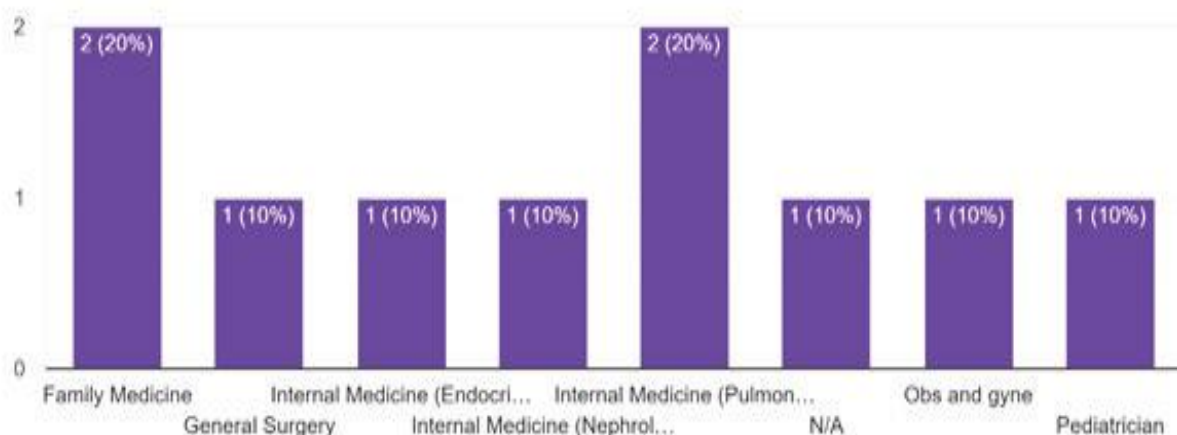


Figure 8: Participant Physician's specialty

3. Patient-physician satisfaction level

3.1. Contingency Table

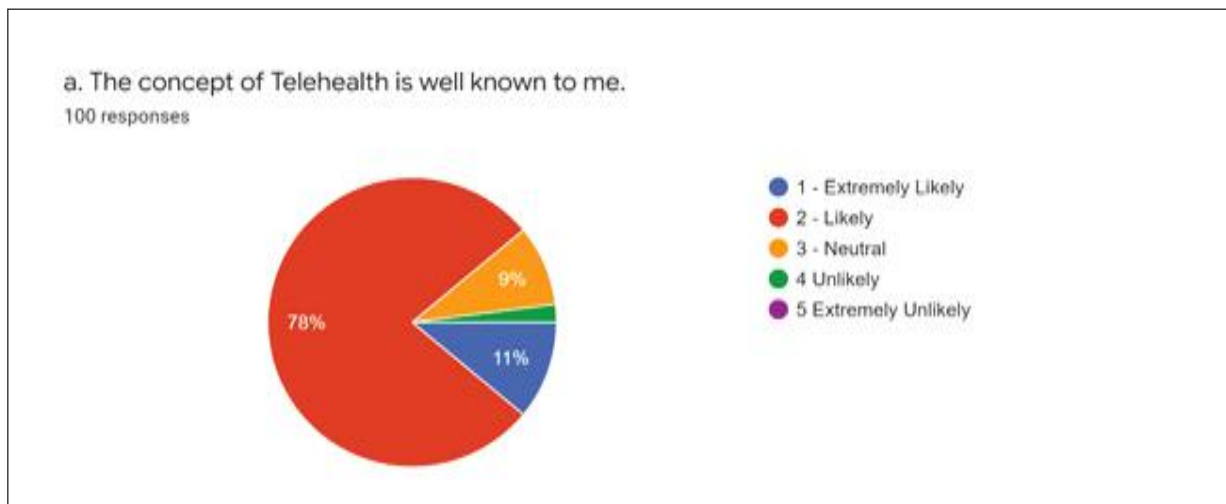
H0: there is no relationship between patient-physician satisfaction level from teleconsultation and Patient's knowledge & attitude about telehealth and COVID-19

H1: there is assumed to be a relationship between patient-physician satisfaction level from teleconsultation and Patient knowledge & attitude about telehealth and COVID-19

3.2. Measurement Procedure

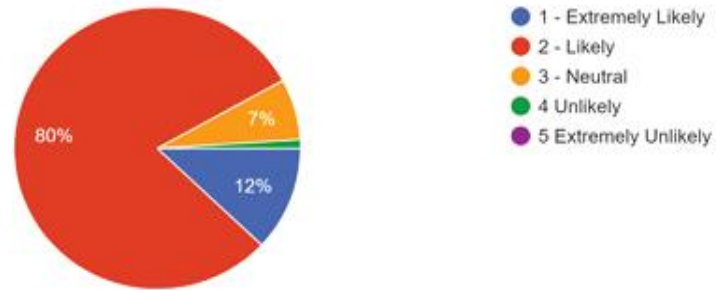
To answer the research question “what is the patient-physician satisfaction level from teleconsultation before and during the pandemic in Fakeeh University Hospital?”, the researcher reviewed the literature on the Impact of Telehealth on patient outcomes during COVID-19. The in-depth analysis of the existing literature paved the way for the presumption of this study. Hence, the researcher developed the research hypothesis “there is assumed to be a relationship between the patient-physician satisfaction level from teleconsultation and Patient's knowledge & attitude about telehealth and COVID-19. The relationship contains two variables that are patient-physician satisfaction level and Patient's knowledge & attitude about telehealth and COVID-19. The statements for Knowledge and attitude about Telehealth and COVID-19 variable included the concept of Telehealth and awareness of the COVID-19 pandemic, its precautions and complications, and its impact on health, Telehealth is the need of the time, and there is an increasing demand for remote consultation. These 4 Likert scale statements were computed into the original variable i.e., Patient's Knowledge and attitude about Telehealth and COVID-19. Similarly, the other concept measuring statements Telehealth services are user-friendly and easy to access, consultation with a physician is more convenient through telehealth services, telehealth provides for my healthcare needs, and rating teleconsultation experience vs traditional face-to-face consultation were computed into a single variable that is patient-physician satisfaction. Hence, the computation of the variable enabled the researcher to further measurements of the relationship or differences between the variables stated in the hypothesis.

1st Variable: Knowledge and attitude about Telehealth and COVID-19



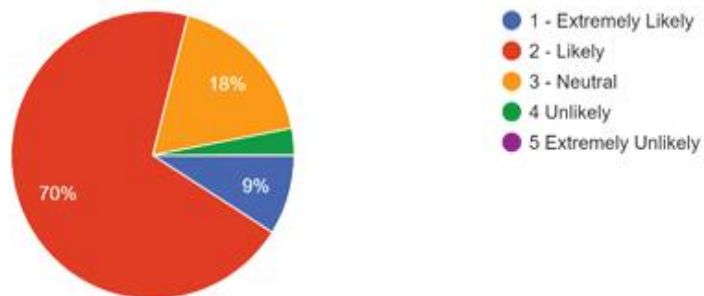
b. I am aware of the Covid-19 pandemic, its precautions and complications, and its impact on health

100 responses



c. Telehealth is the need of the time in the United Arab Emirates

100 responses



d. There is an increasing demand for remote consultation using telehealth services.

100 responses

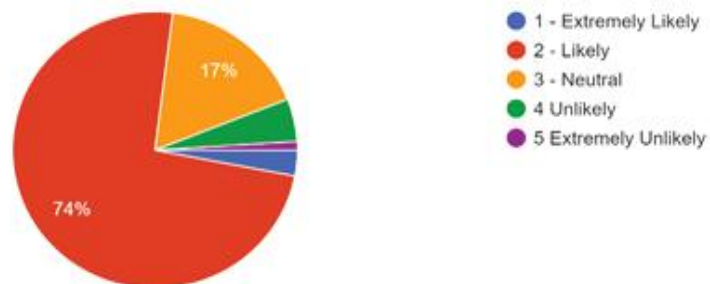
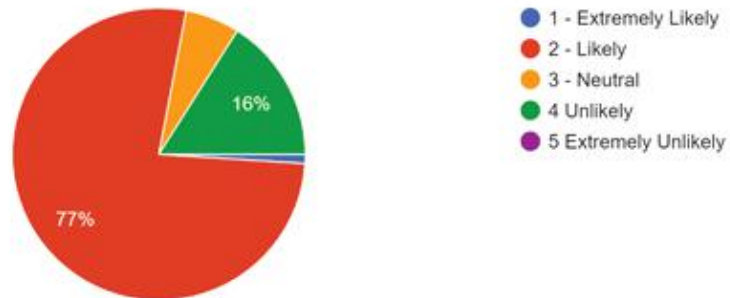


Figure 9: Responses to Knowledge and attitude about Telehealth and COVID-19

2nd Variable: Patient-physician satisfaction

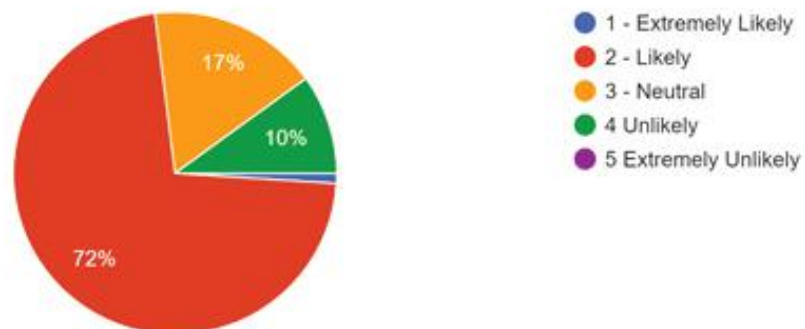
a. Telehealth services are user-friendly and easy to access

100 responses



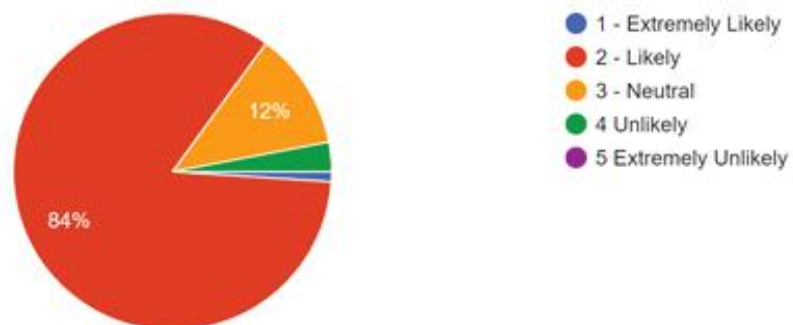
b. consultation with a physician is more convenient through telehealth services

100 responses



c. Did telehealth provide for my healthcare needs?

100 responses



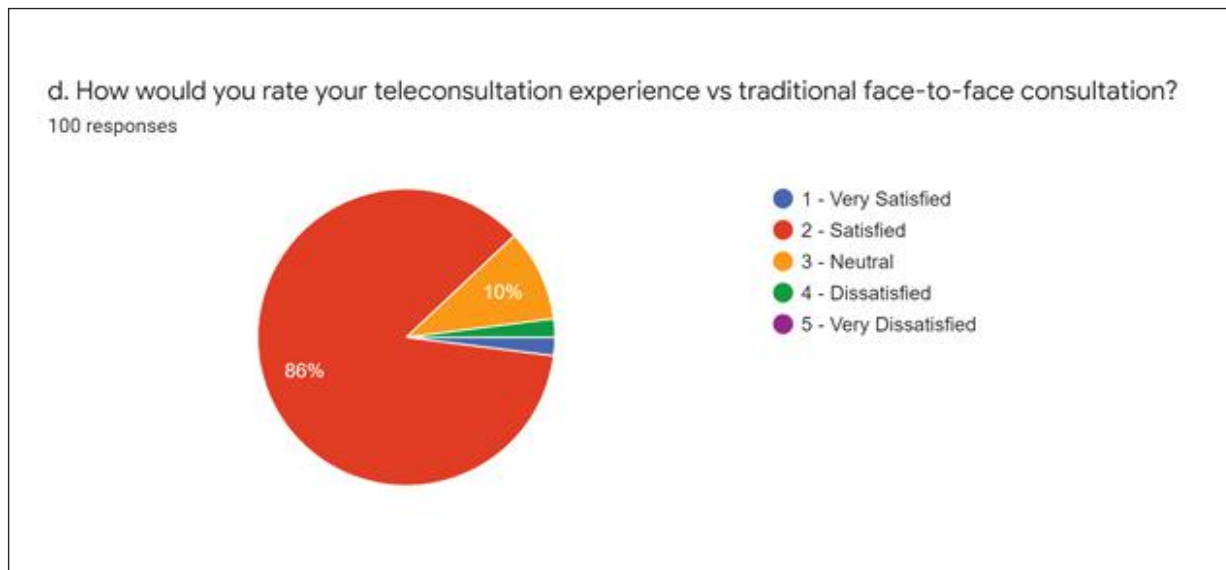


Figure 11: Responses to Patient-physician satisfaction questions

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	94.885 ^a	2	.000
Likelihood Ratio	104.341	2	.000
Linear-by-Linear Association	80.293	1	.000
N of Valid Cases	100		

a. 1 cell (16.7%) has an expected count of less than 5. The minimum expected count is 3.12.

Figure 12: Chi-Square statistical analysis of Patient-Physician Satisfaction level

To test the hypothesis, the Chi-square test was employed on SPSS Version 26. The above Chi-square test cross-table shows the relationship between patient-physician satisfaction levels from teleconsultation and Patient's knowledge & attitude about telehealth and COVID-19. As only 1 cell (16.7%) has an expected count of less than 5, there is no violation of the assumption of running the Chi-square test. Thus, it is safe to run the Chi-square test for the analysis of H₀ and H₁. The above Chi-square P-value of .000 is lower than the significant level of .05. The above Pearson Chi-square value 94.885^a is larger than the tabulated value of 5.991 of 2 degrees of freedom. Therefore, the null hypothesis H₀ is rejected, and research hypothesis H₁ is accepted. In other words, it is shown in the Chi-square statistics that there is a significant difference in the participants' knowledge & attitude about telehealth and COVID-19 and patient-physician satisfaction level from teleconsultation. In conclusion, there is a significant relationship between the patient-physician satisfaction level from teleconsultation and the Patient's knowledge & attitude about telehealth and COVID-19.

SYMETRIC MEASURES			
		Value	Approximate Significance
Nominal by Nominal	Phi	.974	.000
	Cramer's V	.974	.000
N of Valid Cases		100	

Figure 13: Symmetric Measures analysis of Patient-Physician Satisfaction level

As the null hypothesis is rejected and the research hypothesis is accepted, ‘the symmetric measures’ analysis is used to assess the strength of the effect of the relationship between patient-physician satisfaction levels from teleconsultation and Patient’s knowledge & attitude about telehealth and COVID-19. Cramer’s V .97 indicates the strong effect of the relationship between patient-physician satisfaction levels from teleconsultation and Patient’s knowledge & attitude about telehealth and COVID-19.

4. Impact of teleconsultations without physical examination on the physician-patient communication

4.1. Contingency table

H0: There is no impact of teleconsultations without physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital

H1: There is an impact of teleconsultations without physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital

4.2. Measurement Procedure

The above research hypothesis H1 was constructed to clarify directions for the research question ‘what is the impact of teleconsultations without a physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital?’ The independent variables included in the hypothesis impact of teleconsultations without a physical examination and the dependent variable was physician-patient communication. The scale contained the statement ‘Teleconsultation is more convenient than Face to face physical examination’ for the independent variable. On the other hand, ‘I have the convenience to share my health issues with my physician through safe online applications’ statement measured the impact on the dependent variable.

Independent Variable: Impact of teleconsultations without a physical examination:

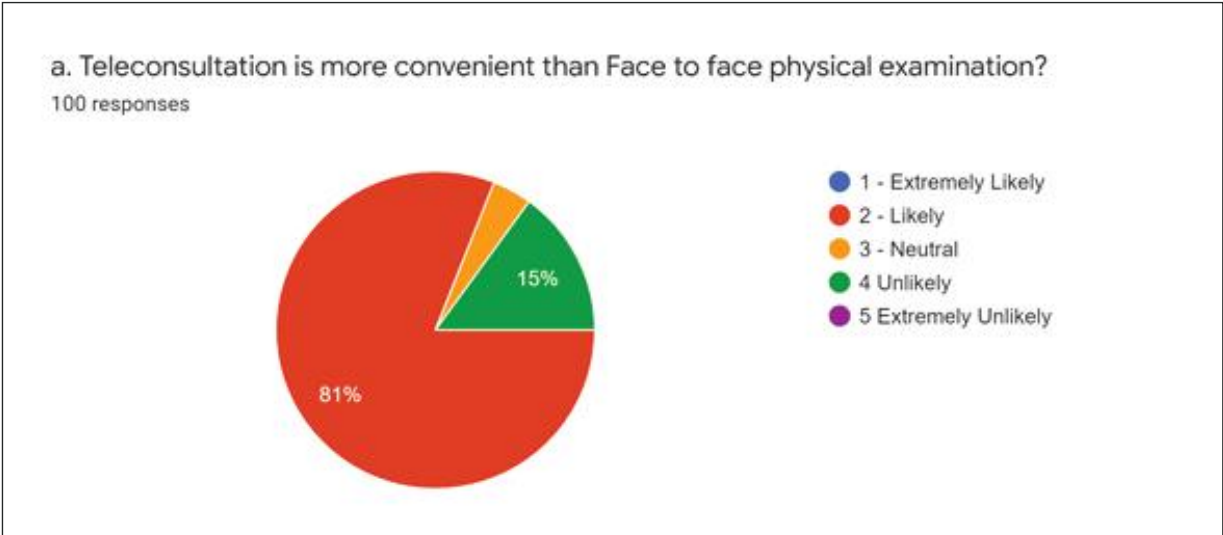


Figure 14: Responses to impact of teleconsultations without a physical examination

Dependent variable, Physician-patient communication:

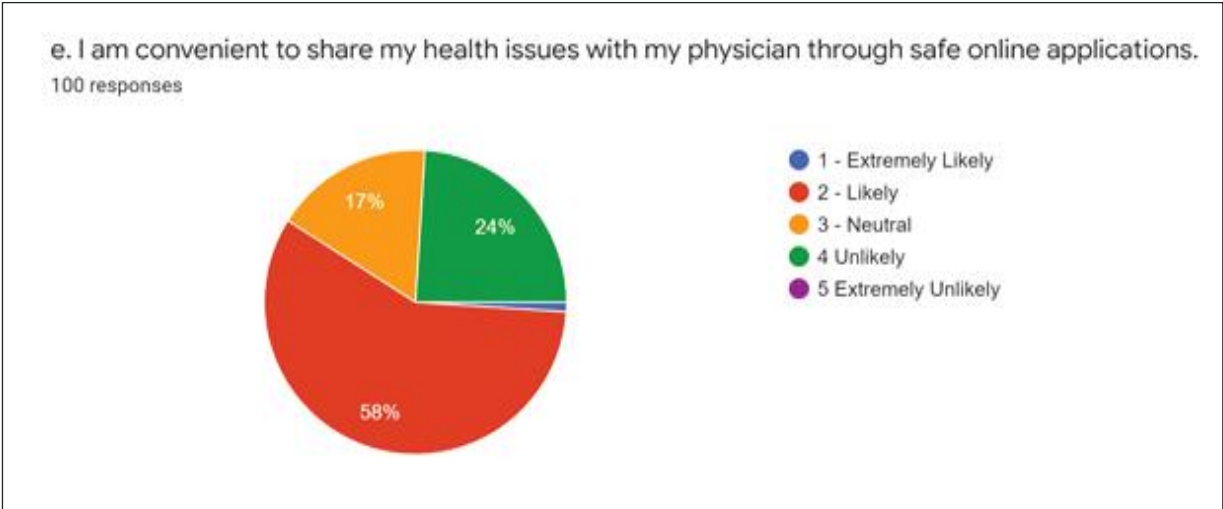
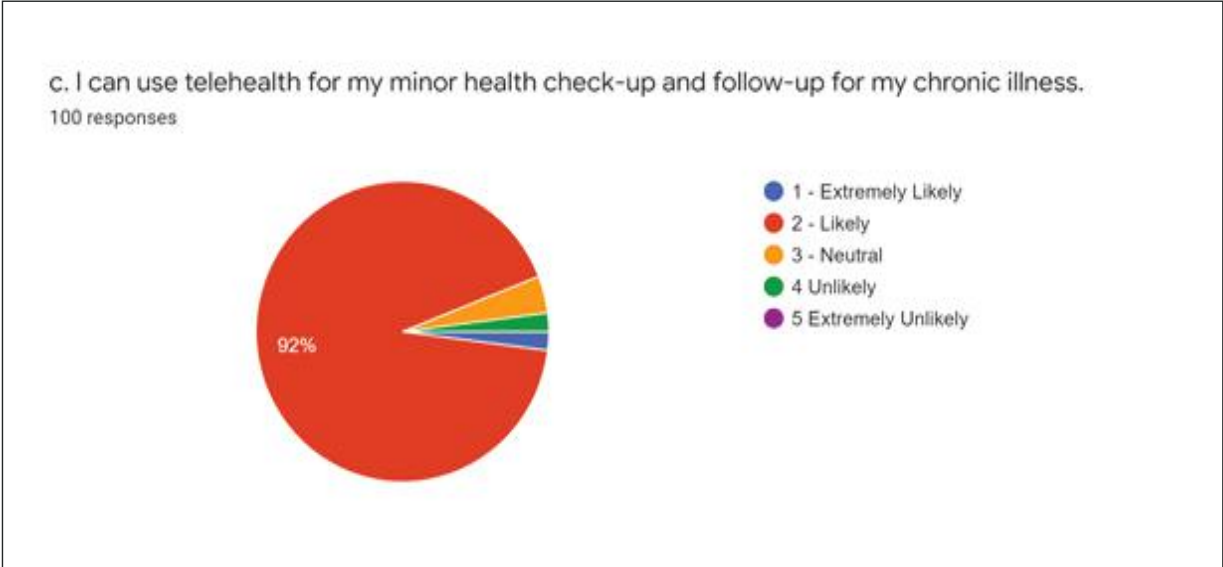


Figure 15: Responses to Physician-Patient Communication questions

CHI-SQUARE TESTS					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	39.408 ^a	1	.000		
Continuity Correction ^b	36.128	1	.000		
Likelihood Ratio	36.472	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	39.014	1	.000		
N of Valid Cases	100				
a. 0 cells (0.0%) have an expected count less than 5. The minimum expected count is 6.24.					
b. Computed only for a 2x2 table					

Figure 16: Chi-square analysis of Impact of teleconsultations without physical examination on the physician-patient communication

In order to test the hypothesis, the Chi-square test was employed on SPSS Version 26. The chi-square test can be used for categorical variables association (Connelly, 2019). The above Chi-square test cross-table shows the relationship between the impacts of teleconsultations without a physical examination and physician-patient communication during the COVID-19 pandemic. As no cell (0.0%) has an expected count of less than 5, there is no violation of the assumption of running the Chi-square test. Thus, it is safe to run the Chi-square test for the analysis of H0 and H1. The above Chi-square P-value .000 is lower than the significant level of .05. The above Pearson Chi-square value of 36.128 exceeds the tabulated value of 3.84 of 1 degree of freedom and the Continuity Correction value is 36.472. Therefore, the null hypothesis H0 in this study has been rejected whereas the research hypothesis H 1 in his study has been accepted. In other words, Chi-square statistics confirm there is a significant relationship between the impacts of teleconsultations without physical examination on physician-patient communication.

SYMMETRIC MEASURES			
		Value	Approximate Significance
Nominal by Nominal	Phi	.628	.000
	Cramer's V	.628	.000
N of Valid Cases		100	

Figure 17: Symmetric Measures analysis of Impact of teleconsultations on the physician-patient communication

The null hypothesis H0 this study has rejected whereas the research hypothesis H 1 this study has accepted, the symmetric measures are used to assess the strength of the effect of the relationship between the variables (McHugh, 2013). These two variables are the impacts of teleconsultations without a physical examination and the physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital. The Phi .62 indicates the strong effect of the relationship between the impact of teleconsultations without a physical examination and the physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital.

RISK ESTIMATE			
	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for TELECONSULTATION IS MORE CONVENIENT THAN FACE TO FACE PHYSICAL EXAMINATION (Agree / Neutral)	25.500	7.842	82.914
For cohort I HAVE CONVENIENT TO SHARE MY HEALTH ISSUE WITH MY PHYSICIAN SAFE ONLINE APPLICATIONS = Agree	2.986	1.671	5.337
For cohort, I HAVE CONVENIENT TO SHARE MY HEALTH ISSUE WITH MY PHYSICIAN SAFE ONLINE APPLICATIONS = Neutral	.117	.052	.263
N of Valid Cases	100		

Figure 18: Risk estimate of Impact of teleconsultations on the physician-patient communication

In order to test the impact of teleconsultations without a physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital., the odd ratio was calculated as shown in Risk Estimate Table. The above-given Risk Estimate table contains the odd ratio for the impact of teleconsultations without a physical examination on physician-patient communication during the COVID-19 pandemic. As the odd ratio is 25.500, teleconsultations without a physical examination 25.5 times the more contributed impact on physician-patient communication.

5. Influence of telehealth on the number of admissions to the hospital

5.1. Contingency table

H0: there is no influence of telehealth on the number of admissions to the hospital during COVID-19

H1: there is an influence of telehealth on the number of admissions to the hospital during COVID-19

5.2. Measurement Procedure

The above research hypothesis H1 was constructed to find a reasonable answer to the research question ‘what is the influence of telehealth on the number of admissions to the hospital during COVID-19?’. The independent variables included in the hypothesis influence telehealth and the number of admissions to the hospital during COVID-19. ‘How frequently you are using telehealth services’ question was asked for the

independent variable. For the dependent variable, ‘Did telehealth service prevent you from admission or visit to hospital’ question was asked from participants.

Independent Variable: How frequently you are using telehealth services:

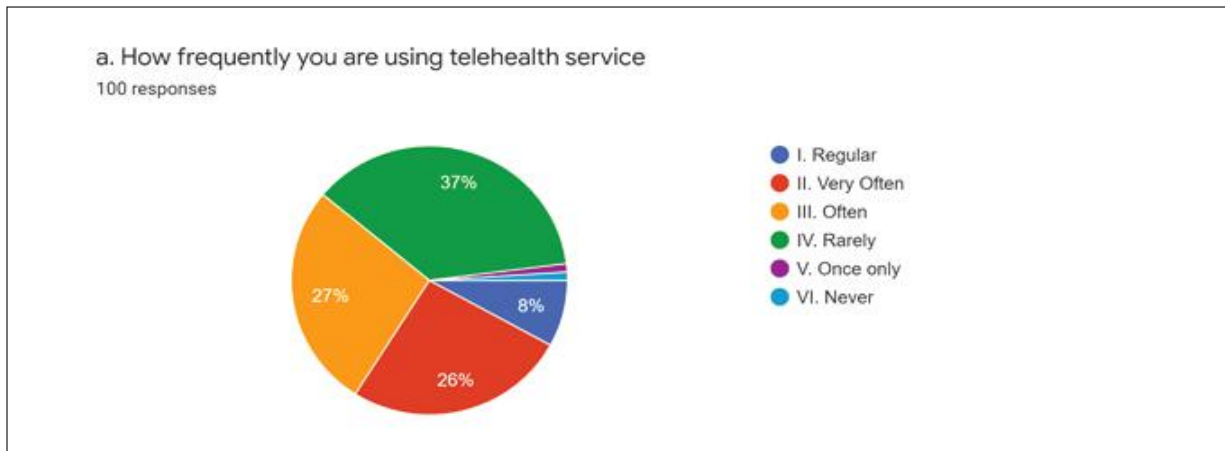


Figure 19: Response to use of telehealth services

The dependent variable, ‘Did telehealth service prevent you from admission or visit to hospital’ question was asked from participants.

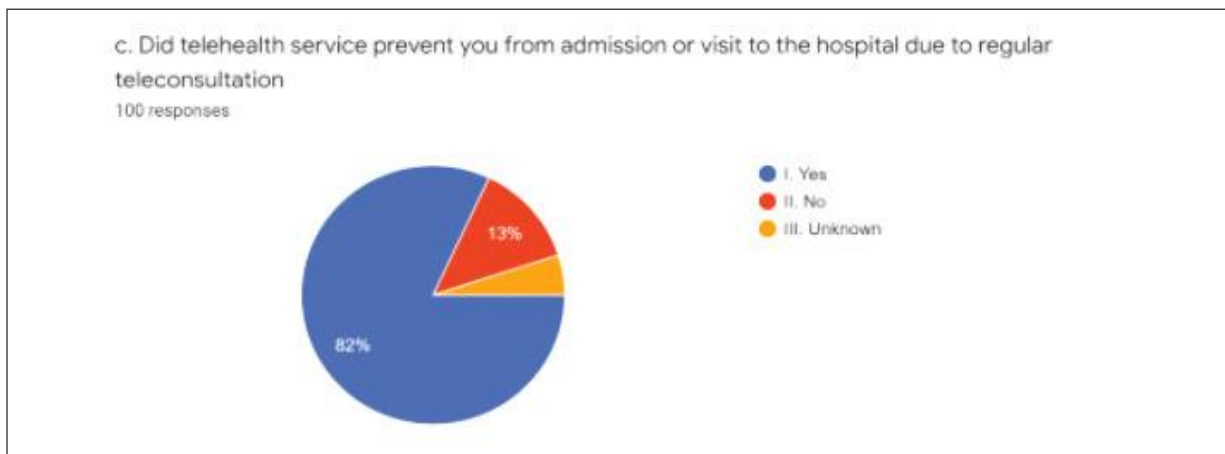


Figure 20: Response to the use of teleconsultation and visit to hospital

CHI-SQUARE TESTS			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.296 ^a	2	.000
Likelihood Ratio	22.934	2	.000
Linear-by-Linear Association	.499	1	.480
N of Valid Cases	100		
a. 1 cell (16.7%) has an expected count of less than 5. The minimum expected count is 3.96.			

Figure 21: Chi-Square analysis of the Influence of telehealth on the number of admissions

In order to test the hypothesis, the Chi-square test was employed on SPSS Version 26. The above Chi-square test cross-table shows the influence of telehealth on the number of admissions to the hospital during COVID-19. As only 1 cell (16.7%) has an expected count of less than 5, there is no violation of the assumption of running the Chi-square test. Thus, it is safe to run the Chi-square test for the analysis of H0 and H1. The above Chi-square P-value .000 is lower than the significant level of .05. The above Pearson Chi-square value of 18.296a is larger than the tabulated value of 5.99 of 2 degrees of freedom. Therefore, the null hypothesis H0 in this study has been rejected whereas the research hypothesis H 1 in this study has been accepted. In other words, the Chi-square test shows there is an influence of telehealth on the number of admissions to the hospital during COVID-19. In conclusion, telehealth significantly decreased the patients' number of admissions to the hospital during COVID-19.

SYMMETRIC MEASURES			
		Value	Approximate Significance
Nominal by Nominal	Phi	.428	.000
	Cramer's V	.428	.000
N of Valid Cases		100	

Figure 22: Symmetric Measures Analysis of Influence of telehealth on the number of admissions

The null hypothesis H0 in this study has been rejected whereas the research hypothesis H 1 has been accepted, the symmetric measures are employed to assess the strength of the effect of the relationship between the influence of telehealth and the number of admissions to the hospital during COVID-19. Cramer's V .42 indicates the moderate effect of the relationship between the influence of telehealth and the number of admissions to the hospital during COVID-19.

6. Discussion

6.1. Patient-Physician satisfaction levels from teleconsultation

The first objective of this study was to determine and compare the patient-physician satisfaction levels from teleconsultation during the COVID-19 pandemic in Fakeeh University Hospital. This study enabled the determination of the satisfaction level of the physician and patients.

The first objective research hypothesis was formulated that there is assumed to be a relationship between the patient-physician satisfaction level from teleconsultation and Patient knowledge & attitude about telehealth and COVID-19. The relationship contains two variables: Patient-Physician satisfaction level and Patient's knowledge & attitude about telehealth and COVID-19. The statements for Knowledge and attitude about Telehealth and COVID-19 variable included the concept of Telehealth, awareness of the COVID-19, precautions, and complications, Telehealth is the need of the time and increasing demand for remote consultation.

While the symmetric measures' analysis depicted the strength of the effect while Cramer's V 0.97 indicates the strong effect of the relationship between patient-physician satisfaction levels from teleconsultation and Patient's knowledge & attitude about telehealth and COVID-19.

Considering the COVID-19 pandemic both physicians and patients rated very satisfied with the experience of teleconsultation vs traditional face-to-face consultation. Published articles and research across Europe and developed countries showed the demand for telehealth services was high and end-users were satisfied with the experience of telehealth services.

A study was conducted on the residents of Dubai where more than 80% of the participants were satisfied with the service of telehealth. (Al-Sharif, G.A., et al, 2021) claim correlates with this study. A study conducted by Cho, D et al to evaluate patient satisfaction with telehealth in ambulatory cardiology stated that patients were overall satisfied with their experience of telehealth consultation with an outpatient cardiologist, which supports the results of this study conducted at Fakeeh University hospital (Cho, D et al, 2021).

6.2. Impact of teleconsultations on physician-patient communication

The second objective of the study was to analyze the impact of teleconsultations without physical examination on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital. Analysis of the data collected as a result of a survey from the physicians and patients who got treatment from Fakeeh university hospital showed highly satisfied and is in line with the studies published in developed countries.

To answer the second objective the research hypothesis as stated in the result section proved that the result of the Chi-square test with a P-value of .000 concluded that there is a significant relationship between the impacts of teleconsultations without physical examination on physician-patient communication during the COVID-19 pandemic.

The symmetric measures are used to assess the strength of the effect of the relationship between the variables which is supported by the study by McHugh (McHugh, 2013). The Phi 0.62 with a significance value of 0.000 indicates the strong effect of the relationship between the impact of teleconsultations without a physical examination and physician-patient communication.

Using Risk estimate to test the impact of teleconsultations without a physical examination on physician-patient communication during the COVID-19 pandemic the odd ratio is 25.500, with CI 95 % proving that teleconsultations without a physical examination 25.500 times the more contributed impact on the physician-patient communication.

This correlates with the study conducted during the COVID-19 pandemic, in Saudi Arabia showing an increasing trend in the use of telemedicine during the pandemic. Majority of the physicians believe the success of telemedicine depends on the type of specialty. It is evident that telemedicine is cheaper than onsite visits and saves time however as the service is new to the region there is little reluctance to accept

the way of disease management. (Kaliyadan F, 2020). Like many other studies, challenges with regards to the technology implications and physical examination for diagnostic purposes were one of the concerns with this service. Overall, the success of telehealth services is very evident however it requires closer feasibility check and regulatory guidelines, continuity, and sustainability (Nanda M and Sharma R. 2021).

An article published on bain.com, that telehealth uses in the United States increased 100-fold during the pandemic although this option was available to patients before the pandemic. Secondly, the study found that physicians adopted the telehealth model successfully and will continue to treat their patients through this service even after the pandemic is over (Bain's report 2020). Nanda and Sharma (2021) also conducted more than 1000 studies reviewed from PubMed and found that doctors and patients both were highly satisfied and showed great affinity to continue the telehealth consultation even once the COVID-19 pandemic is over (Nanda M and Sharma R. 2021).

The main concern in other published studies showed the reluctance of sharing their health records in an online portal however in Fakeeh university hospital considering the secured source of information technology, patients were enough confident to share their health records with physicians and likewise, physicians and other healthcare providers were confident enough to share healthcare records with patients using online portal looking at the fact of results showed the likeliness of sharing health issues with physicians through safe online applications portal.

Behavioral changes due to COVID-19 and the influence of telehealth were also studied during the analysis of the impact of telehealth. The main issue during COVID-19 was the restrictions to access healthcare facilities due to the COVID-19 pandemic and some healthcare facilities mandates to have COVID-19 screening before visiting the facility or any procedure performed. During this period telehealth services made this easy to access healthcare services. Likewise reflected in studies done in developed countries where telehealth service centers were established under the direction of local governments. Similar manner Ministry of health UAE and Dubai health authority issued the regulation to license facilities for telehealth services which made easy access to healthcare services, especially for patients residing in remote areas.

6.3. Influence of telehealth on the number of admissions to hospital

The third objective of this study was to investigate the influence of telehealth on the number of admissions to hospitals during COVID-19. To collect the data for the said purpose participants were asked how frequently they were using the telehealth services.

To have a reasonable answer to the research question 'what is the influence of telehealth on the number of admissions to the hospital during COVID-19?'. The independent variables and dependent variables were analyzed as mentioned in the results. The Chi-square value of 18.296a with 2 degrees of freedom, P-value .000 concluded that telehealth has a positive influence on the number of admissions to the hospital during COVID-19 thus telehealth significantly decreased the patients' number of admissions to the hospital during COVID-19.

The analysis of the symmetric measure showed the Cramer's V 0.42 value which indicates the moderate effect of the relationship between the influence of telehealth and the number of admissions to the hospital during COVID-19. This analysis also paves the pathway for further studies if telehealth is helpful in serious life-threatening emergencies or acute care which requires physical examination or interventions. The result of this study correlates with a study conducted by Peine, A. et al, on telemedicine in Germany during pandemic 19 by a national survey to analyze the acceptance of telemedicine in public and among healthcare providers and its implications healthcare system, (Peine. A. et al. 2020)

Chapter 5: CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

1. Conclusion

The results of qualitative as well as quantitative data were analyzed in detail in the chapter. The 'thematic analysis was carried out for the qualitative data in this study. Four themes were identified as the major reflections on the interviews of the participants. These were telehealth Knowledge and satisfaction level, Telehealth positive impacts, Challenges of telehealth service, and Opportunities of telehealth service in Fakeeh University Hospital. All these themes were analyzed from the major three research questions of this study. The analysis of these major themes helped to deduce the hypotheses of the study. The hypotheses of the study were: 1) there is a relationship between patient-physician satisfaction level from teleconsultation and Patient's knowledge & attitude about telehealth and COVID-19, 2) there is an impact of teleconsultations without physical examination on the physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital, 3) there is an influence of telehealth on the number of admissions to the hospital during COVID-19. The quantitative data analysis was taken to test the above-mentioned 3 research hypotheses of the study. In the first hypothesis, Likert scale items were computed into one single variable Patient's knowledge & attitude about telehealth and COVID-19, and then it was tested on Chi-square inferential statistics to establish differences between the two variables in the hypothesis. The rest of the two hypotheses were also tested on the Chi-square test. The results of all the tests enabled the researcher to accept these research hypotheses. There was found a significant relationship between patient-physician satisfaction levels from teleconsultation and Patient's knowledge & attitude about telehealth and COVID-19 as symmetric measures values show. The pandemic impacted the knowledge and attitude of people about the telehealth service while increasing the use of teleconsultation. The impact of teleconsultations without physical examination on physician-patient communication during COVID-19 was also significant. As a significant influence of telehealth, it reduced the number of admissions to the hospital during COVID-19 in Fakeeh University Hospital. Lastly, a risk estimates analysis was carried out to calculate the odds ratio size for the relationship between teleconsultations without physical examination impact and physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital. Overall, both qualitative and quantitative analysis show the positive role of telehealth services in the results chapter of the study.

2. Implications

The emergence of COVID-19 was responsible for the patient-physician distance consultation in the form of new health technology i.e., telehealth. It was developed to mitigate the negative consequences of the novel deadly virus COVID-19 as well as to maintain regular health consultation (Garfan et al. 2021). This study aimed at determining patient-physician satisfaction levels from teleconsultation before and during the pandemic (relative consultation, overall patient experience) in Fakeeh University Hospital. The results imply a significant difference between the pre- and post-pandemic compared to satisfaction levels. Additionally, teleconsultations impacted on physician-patient communication during the COVID-19 pandemic in Fakeeh University Hospital. Without a physical examination, several risks were analyzed in the findings of the study ranging from lack of proper diagnoses to the severity of the disease.

However, the immediate availability and easy access to the digital service impressively influenced the number of admissions to hospitals during COVID-19. The results implied patients suffering from chronic illnesses or minor ailments were able to maintain regular health check-ups and then the physicians easily accessed their health records through telehealth applications. The results implication of this study offers a productive approach for future research studies. Hence, the implications of the study are positive about the Impacts of Telehealth on patient outcomes during COVID-19 at Fakeeh University Hospital Dubai.

The concept of telehealth in UAE was not well established before pandemic 19 as there are numbers of health care providers across the country and access to such facilities are very easy. However, during COVID-19, due to the movement restriction, telehealth services adoption becomes the norm in society. With the emergence of COVID-19 connected health care was the need of the hours. Patients were overall satisfied with the quality of telehealth services in a study conducted to understand the perception of telehealth services on patient satisfaction in the emirates of Dubai, United Arab Emirates, however, patients suggested a few areas of improvement. To understand in detail the perception of telehealth among patients as well as among healthcare providers conducting more studies was important that's why the researcher decided to have this case study which can have implications in the future implementation of more health care initiatives. During the COVID-19 pandemic, this research presents a complete systematic analysis of telehealth's potential. According to the WHO's request for research on the COVID-19 infection and the presentation to health care professionals at this early stage of the outbreak of the most current data released, this study enabled to investigate of the function of telehealth during the COVID-19 epidemic. Unmet healthcare demands are becoming more apparent as the COVID-19 pandemic spreads over the globe. As a result, increasing reliance on telehealth as an innovative solution is being called for. As the outbreak of COVID-19 continues to grow, telehealth can solve many of the fundamental issues in delivering health care services. We may also avoid direct physical contact and reduce the danger of COVID transmission by using telemedicine, allowing us to give ongoing care to the community. The outcomes of this review research strongly urge that doctors and patients use telehealth technologies to prevent and control COVID-19 infections.

This study also paved the future era of telemedicine and investigated that telehealth has a positive impact on teleconsultation of minor ailments and follow-up of chronic illnesses without the need of visiting a hospital. Considering the successful implementation of telehealth services at Fakeeh University Hospital, management has decided to build occupational virtual clinics for staff, where staff can fulfill their healthcare needs with remote consultation with healthcare providers.

The appropriate application of telehealth technologies can enhance the provision of healthcare services by facilitating communication between physicians, nurses, allied health professionals, and patients. These services include but are not limited to scheduling appointments, assessments, providing medical advice, treatment, therapy, laboratory testing, diagnostics, surgery, monitoring chronic conditions, counseling, and prescribing and dispensing medications. However, one of the challenges of telehealth services is to see the continuity after the COVID-19 pandemic and the second is the provision of technology in remote areas.

3. Recommendations

This case study at Fakeeh university hospital assembled substantial information to analyze the impact of telehealth on patient outcomes during a COVID-19 pandemic and the findings of this study have highlighted the positive impact of COVID-19 on the use of telehealth services as concluded by (Garfan et al. 2021) and highlighted below are recommendations to expand the telehealth at the larger level.

1. Fakeeh University Hospital should create more awareness of telehealth as it is more efficient in treating minor ailments and follow-ups for chronic illnesses.

2. Fakeeh University Hospital Information technology shall ensure to provide a secured online portal for telehealth services by partnering with one of the seasoned tech companies providing an online platform for telehealth services in the region such as Okadoc.

3. Proper training to the end-user of telehealth services should be given to ensure the appropriate use of the service.

4. Doctors and patients shall use telehealth technologies to prevent and control COVID-19 infections spread.

5. Further studies should be continued to test the use of telehealth services post- COVID-19 pandemic.

To utilize the telehealth service for patient outcomes, the following strategies are suggested:

1. The proper utilization of the telehealth service is highly dependent on the availability of digital services such as the internet, mobile networks, and computer devices. To obtain maximum results, telehealth is need of the hour to ensure all these facilities.

2. In order to expand the telehealth service, the application of telehealth should be promoted by media campaigns. The physicians should also display the positive side of this digital health service. As a result, this will help to exploit teleconsultation in this emerging digital world.

3. The authorities should ensure the availability of expert professionals on telehealth applications 24x7. As the patient-physician communication gap is a true obstacle to the physical health service, teleconsultation allows for improved patient-physician communication.

4. A great focus should be placed on the correction of the telehealth service flaws. Unless these technical errors are addressed, there is very prospect that telehealth will be replacing the dominance of physical health infrastructure.

5. Telehealth services are user-friendly and easy to access. The management shall invest in optimizing the use of telehealth services even post-pandemic.

6. Telehealth services provide all healthcare needs except in emergency situations or situations where physical or surgical intervention is required.

7. Teleconsultation is more convenient than Face to face physical examination and it saves time for traveling to hospitals.

8. Timely and regular counseling by the physicians using telehealth services reduces the number of visits and admission to the hospital

4. Limitations

Research is a case study that was conducted only in a single hospital which is already classified as a smart hospital and patients being treated in this hospital are already used to such services.

This study focused mainly on the time of pandemic COVID-19 so there are further studies required to investigate the trend and perception of telehealth services on physicians and patients in the post-COVID-19 era.

Chapter 6 : REFERENCES:

Al-Sharif, G.A., Almulla, A.A., AlMerashi, E., Alqutami, R., Almoosa, M., Hegazi, M.Z., Otaki, F. and Ho, S.B. (2021). Telehealth to the Rescue During COVID -19: A Convergent Mixed Methods Study Investigating Patients' Perception. *Frontiers in Public Health*, [online] 9, p.730647. doi:10.3389/fpubh.2021.730647.

Anand, G., Larson, E.C. and Mahoney, J.T. (2020). Thomas Kuhn on Paradigms. *Production and Operations Management*, 29(7), pp.1650 –1657. doi:10.1111/poms.13188.

Bain. (2020). The Doctor Is Online: Why Telehealth Will Outlast the Pandemic. [online] Available at: <https://www.bain.com/insights/why-telehealth-will-outlast-the-pandemic/> [Accessed 26 Jun. 2022].

Cho, D., Khalil, S., Kamath, M., Wilhalme, H., Lewis, A., Moore, M. and Nsair, A. (2021). Evaluating factors of greater patient satisfaction with outpatient cardiology telehealth visits during the COVID -19 pandemic. *Cardiovascular Digital Health Journal*, [online] 2(6), pp.312 –322. doi:10.1016/j.cvdhj.2021.10.005.

Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W.-C., Wang, C.-B. and Bernardini, S. (2020). The COVID-19 Pandemic. *Critical Reviews in Clinical Laboratory Sciences*, [online] 57(6), pp.365–388. doi:10.1080/10408363.2020.1783198.

Connelly, L. (2019). Chi-square test. *Medsurg Nursing*. Coursehero.com. (2022). [online] Available at: <https://www.coursehero.com/file/71459465/Connelly-L-Chi-Square-Explainedpdf/> [Accessed 1st Jun. 2022].

Doraiswamy, S., Abraham, A., Mamtani, R. and Cheema, S. (2020). Use of Telehealth during the COVID-19 pandemic: A scoping review (Preprint). *Journal of Medical Internet Research*, 22(12). doi:10.2196/24087.

Garfan, S., Alamoodi, A.H., Zaidan, B.B., Al-Zobbi, M., et al. (2021). Telehealth utilization during the Covid-19 pandemic: A systematic review. *Computers in Biology and Medicine*, 138, p.104878. doi:10.1016/j.combiomed.2021.104878.

Health regulation sector, DHA, Health policies and standards department. Standards for telehealth Services, Version 3, 2021. Policy, T. (n.d.). Health Regulation Sector. [online] Available at: <https://dha.gov.ae/uploads/112021/95f0311b-e0fd-4025-9b02-9b777c289a99.pdf> [Accessed 1 Jun.].2022

Kaliyadan, F., A. Al Ameer, M., Al Ameer, A. and Al Alwan, Q. (2020). Telemedicine Practice in Saudi Arabia During the COVID-19 Pandemic. *Cureus*. doi:10.7759/cureus.12004.

Katrina M.S., Heindel, M., Keultjes, I., Silvers, H. and Stovich, S. (2020). Telehealth Student Experiences and Learning: A Scoping Review. *Journal of Occupational Therapy Education*, 4(2). doi:10.26681/jote.2020.040206.

Koonin, L.M. (2020). Trends in the use of telehealth during the emergence of the COVID-19 pandemic — united states, january–march 2020. *MMWR. Morbidity and Mortality Weekly Report*, [online] 69(43). doi:10.15585/mmwr.mm69

Malouff, T.D., TerKonda, S.P., Knight, D., Abu Dabrh, A.M., Perlman, A.I., et. al. (2021). Physician Satisfaction With Telemedicine During the COVID-19 Pandemic: The Mayo Clinic Florida Experience. *Mayo Clinic Proceedings: Innovations, Quality & Outcomes*, 5(4), pp.771–782. doi:10.1016/j.mayocpiqo.2021.06.006.

Maheu, M., Allen, A. and Whitten, P. (2002). *E-Health, Telehealth, and Telemedicine: A Guide to Startup and Success*. [online] Google Books. John Wiley & Sons. Available at: https://books.google.ae/books/about/E_Health_Telehealth_and_Telemedicine.html?id=T8gwl0kBW4C&redir_esc=y [Accessed 26 Jun

McHugh, M.L. (2013). The Chi-square test of independence. *Biochemia Medica*, 23(2), pp.143–149. doi:10.11613/bm.2013.018.

Middleton, F. (2019). Reliability vs validity in research. [online] Scribbr. Available at: <https://www.scribbr.com/methodology/reliability-vs-validity/>.

McElroy, J.A., Day, T.M. and Becevic, M. (2020). The Influence of Telehealth for Better Health Across Communities. *Preventing Chronic Disease*, 17(64). doi:10.5888/pcd17.200254.

Nanda, M. and Sharma, R. (2021). A Review of Patient Satisfaction and Experience with Telemedicine: A Virtual Solution During and Beyond COVID-19 Pandemic. *Telemedicine and e-Health*. doi:10.1089/tmj.2020.0570.

NABIDH Dubai's health record system platform, accessed on 5th march on <https://nabidh.ac/#/comm/landing>

Peine, A., Paffenholz, P., Martin, L., Dohmen, S., Marx, G. and Loosen, S.H. (2020). Telemedicine in Germany During the COVID-19 Pandemic: Multi-Professional National Survey. *Journal of Medical Internet Research*, 22(8), p.e19745. doi:10.2196/19745.

Perle, J.G. (2020). Introduction to Telehealth for Clinical Psychologists: a Novel Course Designed to Improve General Knowledge and Hands-on Expertise with Technology-Based Modalities. *Journal of Technology in Behavioral Science*, 5(4), pp.383–394. doi:10.1007/s41347-020-00147-6.

P

ersoskie, A. and Ferrer, R.A. (2017). A Most Odd Ratio. *American journal of preventive medicine*, [online] 52(2), pp.224–228. doi:10.1016/j.amepre.2016.07.030.

Qian, M. and Jiang, J. (2020). COVID-19 and social distancing. *Journal of Public Health*. 30, 259-261 [online] doi:10.1007/s10389-020-01321-z.

Rahaman, T. (2021). An Introduction to Telehealth and COVID-19 Innovations – A Primer for Librarians. *Medical Reference Services Quarterly*, 40(1), pp.122–129. doi:10.1080/02763869.2021.1873647.

Rosângela Caetano, A. B. (2020). Challenges and opportunities for telehealth during the COVID-19 pandemic: ideas on spaces and initiatives in the Brazilian context. *Cadernos de Saúde Pública* .

Raykos, B.C., Erceg-Hurn, D.M., Hill, J., Campbell, B.N.C. and McEvoy, P.M. (2021). Positive outcomes from integrating telehealth into routine clinical practice for eating disorders during COVID -19. *International Journal of Eating Disorders*, 54(9), pp.1689–1695. doi:10.1002/eat.23574.

Saunders, M., Lewis, P. and Thornhill, A. (2009). Saunders, M., Lewis, P. and Thornhill, A. (2009) *Research Methods for Business Students*. Pearson, New York. - References - Scientific Research Publishing.[online] Scirp.org. Available at: [https://www.scirp.org/\(S\(351jmbntvnsjt1aadkposzje\)\)/reference/ReferencesPapers.aspx?ReferenceID=1903646](https://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1903646).

Scirp.org. (2018). Greenwood, R. and Suddaby, R. (2006) Institutional Entrepreneurship in Mature Fields The Big Five Accounting Firms. *Academy of Management Journal*, 49, 27-48. - References - Scientific Research Publishing. [online] Available at: <https://www.scirp.org/reference/ReferencesPapers.aspx?ReferenceID=2251276> [Accessed 26 Jun. 2022].

Stowe, S. and Harding, S. (2010). Telecare, telehealth and telemedicine. *European Geriatric Medicine*, 1(3), pp.193–197. doi:10.1016/j.eurger.2010.04.002.

Schoonenboom, J. and Johnson, R.B. (2017). How to construct a mixed methods research design. *KZfSS Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, [online] 69(2), pp.107–131. doi:10.1007/s11577-017-0454-1.

Scirp.org. (2015). Peirce, C. S. (1878). How to Make Our Ideas Clear. *Popular Science Monthly*, 12, 286-302.-References-Scientific Research Publishing. [online] Available at: [https://www.scirp.org/\(S\(i43dyn45teexjx455qlt3d2q\)\)/reference/referencespapers.aspx?referenceid=1470661](https://www.scirp.org/(S(i43dyn45teexjx455qlt3d2q))/reference/referencespapers.aspx?referenceid=1470661) [Accessed 1 Jun. 2022].

UN News. (2022). ‘COVID-19 is not over’, Tedros warns World Health Assembly. [online] Available at: <https://news.un.org/en/story/2022/05/1118752#:~:text=The%20Seventy-fifth%20World%20Health%20Assembly%20is%20being%20held> [Accessed 26 Jun. 2022].

Valenta, S.R., Glanville, M. and Sederstrom, E. (2021). Telehealth Development, Implementation, and Sustainability Challenges: An Introduction into the Telehealth Service Implementation Model (TSIMTM). *Telemedicine*, pp.61–69. doi:10.1007/978-3-030-64050-7_4.

Yardley, L. and Bishop, F. (n.d.). Mixing Qualitative and Quantitative Methods: A Pragmatic Approach. *The SAGE Handbook of Qualitative Research in Psychology*, pp.352–371. doi:10.4135/9781848607927.n20.

Wikipedia Contributors (2019). Pragmatism. [online] Wikipedia. Available at: <https://en.wikipedia.org/wiki/Pragmatism>.