Improving Nursing Care Quality During the COVID-19 Pandemic: The Role of Transformative Technologies

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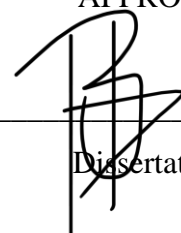
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ABSTRACT

Concerns about the quality of nursing care have grown in the wake of the enormous difficulties brought on by the COVID-19 pandemic. In light of the continuing epidemic, this article explores the critical function of revolutionary technology in improving the standard of nursing care. Insights into nurses' use of electronic instruments and platforms to address COVID-19's specific difficulties are provided. A foundational component of these technologies, telemedicine has allowed doctors to remotely confer with patients and keep tabs on them, lowering risk and increasing accessibility to treatment. Further benefits include better care coordination, fewer mistakes, and easier exchange of data among healthcare providers made possible by electronic health records. Nurses may now keep tabs on their patients' vitals from afar with the use of telemonitoring technology, which opens the door to early intervention and individualized treatment programs. Additionally, the patient-nurse collaboration has been strengthened by the promotion of self-management and patient engagement through the use of wearable devices and mobile applications.

Finally, during the COVID-19 epidemic, revolutionary technology have completely transformed the quality of nursing care. As a result, nurses now play a more integral part in healthcare delivery, and their capacity to respond to changing circumstances is better. In order to maintain patient-oriented, efficient, and safe nursing care as the pandemic continues, it is crucial to utilize these tools.

Keywords: Technologies Nursing Care, Transformative, COVID-19 Pandemic.

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CHAPTER 1:

INTRODUCTION

3-1   Introduction

Worldwide, healthcare has been profoundly impacted by the 2019 coronavirus disease (COVID-19). Overburdening the health care system is clearly a source of worry. Due to insufficient protective gear, lockdown, and the possibility of infection spreading to patients and medical practitioners, delivering primary healthcare throughout this pandemic proved to be problematic. Hospitals can enhance the effectiveness of their medical services and better monitor and limit the outbreak of coronavirus by substituting digital technologies for some physical treatments [4]. As a result, a growing number of doctors are seeing patients virtually through telemedicine and other virtual services. In the midst of the COVID-19 pandemic, doctors are able to continue providing high-quality medical treatment thanks to virtual care services that do a number of non-dispensing tasks. Remote drug use review, health education, medication history review, and therapy management are all examples of services that fall under this category.

Any interaction between a patient and a healthcare provider where neither party is physically present is known as telemedicine. Technology like phone calls, texts, emails, chat, and video calls allow for the link to be established. A subset of telemedicine, telenursing is the practice of delivering nursing care to patients and their families remotely by digital and technical means rather than in-person consultations. This includes managing treatment plans, offering direction, and coordinating care.

There is no distinction between in-person and remote nursing in the standards that bind nurses in any treatment framework, such as their authority derived from Ministry of Health licensing, CEO publications, domestic rules of hospitals and HMOs, etc. Professionalism, thorough concern for

the patient and their family, and high-quality treatment are the responsibilities of nurses. Furthermore, in June 2019, the CEO circular of the Israeli Ministry of Health established the standards for telemedicine operations. The circular stressed that regardless of the channel through which care is delivered, service providers must acknowledge their professional and legal obligations regarding telemedicine and receive the necessary training. In their 2023 publication, Grinberg and Sela (Sela, Y., 2023 and Grinberg, K.).

Telemedicine has three primary benefits due to its inherent capabilities. One benefit is that it makes medical care more accessible to people who have eschewed traditional in-person medical care up until this point. The US Telemedicine Association states that telenursing is an excellent option for the elderly and those who are housebound since it allows them to feel the utmost comfort and safety while also encouraging them to take an active role in their own care. Patients confined to their homes due to Chronic Obstructive Pulmonary Disease (COPD) also benefit greatly from telenursing. Second, nurses gain agency and see their position evolve through the use of remote services and technology. Multidisciplinary treatments, such as pain management and family support, can be overseen, educated, and provided by nurses, who can also follow up with patients and their families. Third, with fewer "no-shows," an improved nurse-patient ratio, and drastically reduced expenses, health systems gain. The health system also benefits from telemedicine since it helps with the complicated problems of an older population, more chronic illnesses, and a shortage of personnel. It is anticipated that telemedicine became more popular due to the need to address both the rising expense of healthcare and the growing demand for services, both of which are facilitated by remote access.

Although there are many benefits to telemedicine, there are also many social, economic, and medical issues that come with it. To start at the policy level, there is concern that HMOs would

wastefully invest in telemedicine in their pursuit of a more youthful more healthy, and more lucrative clientele. Patients, their relatives, and nurses may experience treatment delays due to technological device accessibility issues, insufficient understanding of how to use the devices, or both.

To add insult to injury, nurses voiced concerns that utilizing technology could cast doubt on whether or not their face-to-face training and experience had prepared them adequately to handle the unfamiliar terrain, maintain professional standards of care, and exercise their and their colleagues' authority. For nurses, "soft-core skills" like trust, empathy, and communication are crucial to their work and education. These are abilities that nurses use in face-to-face meetings, but they are complicated to apply in telenursing and require specialized training. Observing a patient's body language for indicators of abuse, for example, is a skill that rely on the nurse's intuition and the nature of their relationship with the patient. Some worry that these fundamental abilities might be rendered useless in distant services, making it unable to provide patients with the best possible care. The establishment of trust between the healthcare provider and patient, an essential component of effective telemedicine, is another formidable obstacle. Similarly to their in-person consultations, nurses delivering care remotely must have strong communication, interpersonal, and social skills. Many nurses are worried about the moral and ethical implications of telenursing. Considerations of privacy, recording or improper use of session content, and obtaining patient informed consent in the presence of family members are only a few examples. The capacity of the nurses to deliver competent, high-quality care may be compromised due to the constraints imposed by telenursing.

One way to improve healthcare delivery efficiency is to include telemedicine and virtual care into the existing system. As a result, medical facilities are better able to control patient wait times

and the likelihood of illness progression, and social isolation is encouraged. Virtual care options may prevent medical professionals from contracting the virus by limiting the number of in-person visits and patient-doctor interactions [8]. Based on what we know about how to effectively manage acute respiratory illnesses like SARS and MERS, telemedicine and virtual care can play a significant role in this context [9]. Many healthcare facilities have already cancelled or delayed in-person outpatient appointments due to the COVID-19 pandemic (Jnr, B.A., 2020).

Healthcare systems around the world are facing new and unprecedented challenges because to the COVID-19 pandemic. To remain competitive and provide high-quality care, emerging technologies must be quickly adapted and used. Nursing has been in the vanguard of this crisis, with nurses providing vital medical and emotional support to patients. There is an increasing need to investigate and comprehend how revolutionary technology have improved the standard of nursing care throughout these exceptional times as the epidemic develops further. A wide variety of electronic instruments and applications are together known as transformative technologies, and they could completely alter the way healthcare is provided in the future. According to Rosyad (2021), some examples of these technologies are robotic automation, data analytics, artificial intelligence, telemedicine, and remote patient monitoring. Through the utilization of these tools, nurses can conquer the several obstacles presented by the pandemic, including restricted physical contact, limited resources, and elevated patient loads. During the COVID-19 epidemic, this project aims to examine how revolutionary technology can improve nursing care. According to Rosyad (2021), nursing care encompasses a wide range of activities, and this study intends to investigate the pros, cons, and implications of using these technologies in assessment, monitoring, communication, teaching, and teamwork. To better understand how to

implement revolutionary technology in the future, it is helpful to look at the stories and opinions of nurses with already done so. The growing dependence on advances in healthcare delivery and the continuing worldwide impact of COVID-19 make this research highly relevant. Improved patient outcomes, stronger healthcare resilience, and evidence-based practice can all result from a better understanding of how transformational technologies affect nurse care during pandemics. Putra (2021) optimized their utilization in varied healthcare settings, which sould be informed by understanding potential constraints and challenges related with the acceptance and execution of these technologies. This research were carried out using a mixed-methods approach. The present understanding on the role of transformational technology in nursing care throughout the COVID-19 epidemic were explored by a thorough literature study, which were conducted first. Academic journals, peer-reviewed articles, conference proceedings, and credible reports were all be part of this comprehensive evaluation. A questionnaire for survey and semi-structured interviews were created using the results of the literature study. A sample of nurses from various healthcare settings were interviewed using these tools. During the pandemic, the survey collected quantitative data on how nurses felt about, and how they used, revolutionary technology in their work. Jones and Brown (2022) found thst by conducting semi-structured interviews, we may learn more about nurses' perspectives on the benefits and drawbacks of using transformative innovations in nursing care, as well as their ideas for how to make these technologies work better. In order to get thorough and relevant results, we used quantitative and qualitative methodologies to examine the data that we gather using these methods.

In conclusion, the purpose of this study project is to examine how COVID-19 pandemic nursing care might be improved by the use of transformative technologies. Our hope is that this research were add to what is already known and help shape nursing care based on evidence by examining

the pros, cons, and implications of using these technologies. Better patient outcomes and the ability to provide high-quality nursing care during future emergencies are the end goals of this research, which had consequences for healthcare providers, lawmakers, and software developers (Brand, Georgia, 2022).

3-2   Research Problem

The global spread of the COVID-19 pandemic has caused serious problems for healthcare systems all around the globe, particularly those involved in providing nursing care. The frontline healthcare providers, nurses, have played a crucial role in handling the growing number of patients while maintaining the quality of treatment. But the pandemic has made healthcare resources scarcer than ever before and has thrown several obstacles in the way of conventional treatment. During this crisis, nurses have had to rely on revolutionary technology to help them deal with limited physical encounters, limited resources, and the necessity to manage infections (Brand, G., 2022). The complete impact and possibilities of transformative technologies on nursing care throughout the COVID-19 epidemic have not been thoroughly investigated, despite the fact that they provide encouraging answers to these problems. Knowing how these technologies were used in nursing, how well they have improved patient outcomes, and what has helped and what has hindered their acceptance are all important pieces of information. In addition, research into which aspects of nursing care might most greatly benefit from technological advancements is urgently required. The key components of nursing practice— patient evaluation, monitoring, interaction, training, and collaboration—have all been profoundly affected by the pandemic. Nursing practice guidelines and evidence-based strategies for optimizing the adoption of transformative technologies in various areas of care can be informed by an understanding of how these technologies can improve them (K.R.M., 2022).

Consequently, the following questions are intended to be addressed by this research:

1. During the COVID-19 pandemic, how much have nurses used transformative technologies?

2. To what extent do nurses see transformational technology as having both positive and negative implications for patient care?

3. How are nursing care quality and patient outcomes affected by transformational technologies?

4. When it comes to nursing, what are the factors that make it easier or harder to use game-changing technology?

5. Where do you think transformational technologies had the greatest influence in nursing care, namely in areas like patient evaluation, monitoring, communication, education, and collaboration?

Insight into how disruptive technology impacted nursing care quality during the COVID-19 epidemic can be gained through the investigation of these questions. Improved patient outcomes and the provision of high-quality nursing care during future crises resulted from the findings informing evidence-based practices, policy formulation, and resource allocation.

3-3   Research Purpose

Examining how revolutionary technology might improve nursing care throughout the COVID-19 pandemic is the main goal of this study project. The following specific goals will be addressed in order to reach this overall objective:

1. To determine how far nurses went in incorporating and making use of game-changing technology into their care during the COVID-19 epidemic.

2. To investigate the perceptions of the pros and cons of using transformative technology in pandemic nursing care.

3. Analyze how revolutionary technologies have altered nursing practice and the results for patients.

Objective No. 4: Determine what helps and what hinders the use of game-changing technology in nursing.

5. During the pandemic, identify the areas of nursing care that have the greatest potential to benefit from revolutionary technologies.

This study aims to fill a gap in our understanding of how COVID-19 pandemic nurses used disruptive technology by answering the questions posed above. Improved patient outcomes and the provision of high-quality nursing care during future crises resulted from the findings informing evidence-based practices, policy formulation, and resource allocation.

3-4 Significance of the Study

This research on the impact of technological innovations on nursing care throughout the COVID-19 pandemic is important because it may help nurses overcome obstacles and provide better care to patients. Researchers acknowledged the growing use of digital technologies like AI, robotics, telemedicine, and mobile devices in nursing and stressed the importance of nurses learning to use these tools to their full potential.

The study's main takeaways include the following issues with the usage of digital technology in nursing: The study recognizes that nurses have not kept up with the fast-paced advances in technology, which limits their ability to improve patient care and nursing practice. In light of these difficulties, the current research is attempting to modernize nursing so that it can better compete in the digital age.

Advantages of using digital tools in nursing education and practice: Several ways in which digital technology have improved nursing education and practice are detailed in the paper.

Innovative educational approaches to nursing education, telehealth programs that lessen the need for visits to emergency rooms, and mobile gadgets that allow for remote pain management assistance are all examples of such initiatives. Robots and virtual chatbots have the potential to improve patient emotional support and communication, according to the study.

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The report emphasizes the significance of nursing management in digital health, urging leaders at all levels of the profession to actively promote and invest in digital technology to help advance patient care. To guarantee the standard and security of nursing practice, it stresses the importance of nursing leaders who are conversant with the possibilities and risks posed by digital technologies like AI. Engagement of nurses in the creation and execution of policies pertaining to digital health is also highlighted in the study.

In order to fully understand how AI can improve clinical decision support and data analytics, as well as how it impacts nursing practice overall, additional research is required, according to the study. It brings attention to the possible development of AI systems that automate injustice and inequality, as well as its ethical ramifications. The research concludes that nursing practice should be guided by established ethical standards and frameworks when it comes to AI.

Nursing and patient interactions in the digital age: According to the research, nurses need to rethink their approach to digital patient care and interaction. Using lessons learned from

telehealth and other distant models of care, it stresses the importance of creating virtual care

modalities that make use of internet and mobile technology. Personalized healthcare methods

and augmented or virtual reality are also discussed in the research.

In sum, the findings of this study stress the need of incorporating transformative technology into

nursing practice in order to solve the difficulties encountered by nurses in the wake of the

COVID-19 pandemic and in the years to come.

CHAPTER 2:

REVIEW OF THE LITERATURE

2.1 Theoretical Framework

The COVID-19 epidemic has caused a sea change in the healthcare system, which has forced

nurses to adapt their methods of patient care. In this chapter, we explore how revolutionary

technology have been instrumental in improving the standard of nursing care in these

extraordinary times. Investigating how state-of-the-art technology might both lessen the severity

of the crisis and improve the overall effectiveness of nursing care is crucial as we face the

obstacles presented by the pandemic. In order to advance nursing practice and research, it is

crucial to have a thorough grasp of how technology and healthcare interact, which is why this

investigation is so relevant at the PhD level. The proliferation of new technologies in response to

the COVID-19 pandemic is an important area to investigate. For example, with the help of

telehealth technologies, nurses may now consult with and monitor patients remotely,

guaranteeing continuity of treatment while reducing the likelihood of virus transmission. To

overcome the obstacles presented by worldwide health crises, this game-changing technology

shines as an example of how innovative solutions can be utilized. Helping nurses make decisions

based on data is a crucial feature of revolutionary technologies. Nurses may optimize treatment

strategies and resource allocation by leveraging patient data with the help of artificial

intelligence and big data analytics. As an illustration, consider how healthcare facilities might

improve the quality of patient care by using predictive analytics to anticipate patient surges and

proactively deploy staff and resources. The COVID-19 epidemic has shown how critical it is for

healthcare providers to be able to communicate and work together effectively. The use of virtual

collaboration tools and encrypted messaging platforms has greatly improved the efficiency of

communication among healthcare practitioners. Ultimately, this chapter explores how new technologies raise the bar for nursing care by bridging the gap between healthcare practitioners around the world and allowing them to share information and best practices (Romeu-Labayen, M., 2023).

2.1.1   Qualities of Telehealth Nurses

When it comes to healthcare, telehealth is a subset that includes telenursing. So far, everything has been done over the phone, but there has been a dramatic uptick in activity throughout the past twenty years. The following is an outline of the ways in which the telenursing emphases differ across developed and developing nations, reflecting the differences in nursing emphasis. Telenursing encompasses several different services and technologies, including remote consultation, patient self-care supervision at home, and the transfer of relevant data for purposes such as research and patient consultations.The supply of digital libraries and databases; and the formulation of guidelines, statistics, and other related purposes. The promotion of distant learning makes this a particularly pressing issue in underdeveloped nations (Eren & Webster, 2017).

Physical, mental, spiritual, and social well-being are the pillars upon which a prosperous and fulfilling social and economic existence rests. According to Law No. 36 of 2006, health efforts encompass any community and/or government-led initiatives aimed at promoting and sustaining healthy lifestyles. Providing equal access to healthcare across the country is a primary objective of Indonesia's health development program (Kemenkes, 2015).

Three major works published recently[1,2,3] tackle the problem of care quality; they center on the poor world but have important lessons to teach all health systems. These contributions offer suggestions for improving care quality and developing more efficient delivery systems. Despite

the challenges, their goal is to enhance healthcare so that it is safer, of higher quality, and able to adapt to people's changing needs. Further, they stress the difficulties of enhancing care at every stage, from policy to management to practice, and how difficult it is to administer and coordinate healthcare systems. Both the individual and collective analyzes of these reports are presented in this article. Our goal as the International Academy of Quality and Safety (IAQS) members, which was founded by the International Society for Quality in Health Care (ISQua), is to compare and contrast these reports, identify their similarities and differences, and provide the groundwork for better care on a global scale. First, we summarize the main points made in each of the three reports.

Beginning with Florence Nightingale's groundbreaking ideas and progressing beyond the traditional mother-rescuer role, the nursing field has seen profound transformations throughout the years [1,2]. A bachelor's degree in nursing is currently required by law in the majority of nations as a result of curriculum changes [2,3].

Modern nurses are more capable, self-reliant, and competent than ever before [1,3] because of improved school curriculum and advanced training programs. Despite the fact that these innovations have greatly enhanced medical procedures and patient care, there is still a long way to go, particularly in light of the current massive digital health revolution. Decentralized services and an emphasis on outpatient care are two of the most notable trends in the healthcare industry's current seismic change. Healthcare administration and institutional frameworks are being profoundly affected by the incorporation of new technology.

This dynamic environment highlights the importance of having nurses with exceptional skills who can adjust to different settings and overcome new obstacles in the digital health transition [5].

To keep up with the times, nursing programs now need to teach students how to use new technology, how to help patients and caregivers make the most of these resources, and how to recognize when a patient may utilize digitally enabled services.

The COVID-19 pandemic has hastened this process, drawing attention to the scarcity of medical professionals and necessary medical equipment. It has also prompted healthcare organizations to change how they provide services, handle patients, and use telemedicine [8].

2.1.2 Remote health during the COVID-19 pandemic

Many nations are experiencing health and economic catastrophes on a scale never seen before due to the COVID-19 epidemic. Concurrently, nevertheless, this new reality is helping numerous sectors and society at large make the shift to digital solutions. As an example of this change, consider the educational system: from elementary schools to colleges, all levels of education have come up with new ways to educate remotely, moving away from traditional classroom lectures and toward web-based courses or live conferencing. In a similar vein, healthcare institutions have moved swiftly to embrace digital solutions and cutting-edge technological tools in response to the COVID-19 pandemic. Improved health care delivery during a pandemic is possible because to digital technology, which can reduce or eliminate numerous problems. Applications for patient tracing and remote triage emergency facilities are just two examples of the digital solutions used to handle the immediate needs caused by the epidemic. There is potential for future consolidation of emergency-related solutions, which could aid in the development and implementation of new digital care models (Golinelli, D. et al. 2020).

New digital solutions are appearing on the list at a quick pace. Aside from "video visits," these alternatives comprise email and mobile applications, wearable tech, chatbots, diagnostic tools powered by artificial intelligence (AI), mobile sensors, and voice-interface systems like

smartwatches, oxygen monitors, or thermometers. Supervising individuals in quarantine rooms and conducting population-scale surveillance constitutes a new service category. In a time when patients without COVID-19 or with nonacute COVID-19 have limited or delayed access to healthcare, telemedicine and remote consulting have already demonstrated their efficacy. Canterbury University was evacuated and online education replaced traditional face-to-face instruction after a 6.3 magnitude earthquake hit Christchurch in February 2011 (Todorova & Bjorn-Andersen, 2011). Hurricane Katrina compelled Southern University to become an online school in New Orleans (Omar et al., 2008). According to Kauppi et al. (2020), online methods of instruction replaced the traditional approach of teaching in person as a result of these tragedies. Nursing professors throughout the world came up with new ways to teach both theory and practice in response to the changing COVID-19 pandemic and limitation laws (Nashwan et al., 2020). According to Bagdasarian et al. (2020), the COVID-19 literature has been published rapidly since nursing faculty members are eager to share the early results of their inventions. The research community and nurse educators face a formidable task in accessing synthesised, up-to-date evidence due to the ever-increasing amount of published studies.

Barrett & Twycross (2022), Keskin & Özkan (2021), and Majrashi et al. (2021) are among the studies that have compiled information on how COVID-19 affected the mental health, overall welfare, and coping mechanisms of nursing students. The effectiveness of blended learning, difficulties in online learning, and perspectives on e-learning were all covered in other systematic reviews (Jowsey et al., 2020; Divya & Binil, 2021; Alosta & Khalaf, 2021). It has come to our attention that no study has synthesized advances implemented by medical schools in reaction to the pandemic, even though these studies adequately document students' contact with specific technologies and the influence of COVID-19 in general. Nurse educators run the danger of

knowledge overload if new advances in nursing education are not synthesised in light of the many changes that occurred throughout the pandemic (Moreno-Sánchez et al., 2022).

The research shows that the COVID-19 epidemic has shown how important it is to have game-changing technology in nursing. The use of these technologies in healthcare has the potential to boost service quality, efficiency, and effectiveness while also improving patient outcomes. This article delves into the different ways that nursing care might make use of disruptive technologies during the pandemic, including instances and proof to back its use (Rutledge, C.M. et al, 2021). During the epidemic, telehealth and virtual care have become crucial instruments for nursing care. Medical experts can now check in with patients remotely, keep tabs on their health, and give them advice and encouragement all thanks to these technological advancements. By way of illustration, telehealth platforms allow nurses to virtually visit patients, evaluate their symptoms, and administer any required treatments. This method guarantees that patients received consistent care while lowering the likelihood of infection.

The use of artificial intelligence and machine learning might significantly alter the way nurses provide care to patients during a pandemic. In order to aid in clinical decision-making, these tools can sift through mountains of data, spot trends, and provide predictive insights. For instance, algorithms powered by artificial intelligence can assist healthcare providers with patient triage, disease progression prediction, and treatment plan optimization. Because of this, nursing treatment is more precise and efficient, which benefits patients.

During the epidemic, nurses rely heavily on remote monitoring equipment, including sensors worn by patients and apps for smartphones. As a result of these gadgets, patients' vitals, symptoms, and medication compliance can be tracked in real-time. From afar, nurses may access this data, which allows them to quickly intervene if parameters deviate from the norm. Reducing

the strain on healthcare institutions, this proactive strategy guarantees early detection of issues and appropriate interventions.

During the epidemic, electronic health records have become crucial to nurse care. By digitizing patient data, nurses may easily access and update their patients' information, which improves coordination of care. To give just one example, nurses can now record and communicate patients' health status, prescriptions, and treatment plans in real time. Improved patient safety, fewer mistakes, and continuity of treatment are all results of this.

During the epidemic, mobile applications have been immensely useful for medical instruction and self-management. Reliable mobile applications that record symptoms, give self-care tools, and give correct information can be recommended and guided by nurses to patients. Mobile applications that offer fitness regimens, mental health support, and COVID-19 updates are just a few examples of what nurses might recommend. The patient is then better able to take an active role in the treatment they receive and make educated decisions as a result.

Robots and Automation: In the event of a pandemic, robotic technology may be able to assist nurses with patient care and infection control. Some examples of robot applications in healthcare include drug delivery, room disinfection, and general assistance with patient care. Healthcare workers are less likely to be exposed thanks to these technology, which in turn reduces the transmission of illnesses.

Nursing care during the pandemic can benefit greatly from data analytics and predictive modeling tools. Effective resource allocation, disease outbreak prediction, and trend identification are all possible outcomes of nurses' analysis of massive databases. Predictive models can help nurses plan ahead for things like critical care bed demand, PPE needs, and

staffing levels. This forward-thinking method guarantees readiness and effective use of resources.

Ethical and privacy concerns arise from the use of revolutionary technology in pandemic nursing care. It is the responsibility of nurses to safeguard patient information, keep it confidential, and act ethically at all times. For instance, before sharing health information or using telehealth platforms, nurses should get patients' informed consent. To further guarantee fair and impartial treatment, nurses should be cognizant of the limitations and possible biases of AI systems.

In order for nurses to make the most of game-changing technology, they need proper education and training. Digital health, information systems, and technology integration courses should be a part of nursing programs. Nurses, for instance, can acquire knowledge of data analytics tools, AI technologies, and telehealth systems. Because of this, they were able to use disruptive technology in their practice with confidence and competence.

It may take teamwork and an interdisciplinary strategy to successfully integrate revolutionary technology into nursing care during the pandemic. To guarantee the smooth integration and optimal utilization of new technologies, nurses should work with other healthcare professionals, technological specialists, and legislators. In the realm of digital health, for instance, nurses may play an integral role in policymaking, design intuitive interfaces, and offer insightful commentary grounded in their clinical knowledge.

2.1.3 In the Event of a Pandemic, Remote Care for Patients with COVID-19 or Chronic Conditions

The family and community nurse has played an essential role throughout the pandemic. Innovative strategies for home health support and decentralization of assistance from hospitals to the wider population have been used by health care systems [19]. The COVID-19 pandemic has

hastened this transition, elevating the importance of digital health. The community health care element was heavily strained during stringent lockdown times due to stay-at-home instructions, a temporary halt to most outpatient services, and a decrease in face-to-face (FTF) treatment. During the pandemic, community nurses played an important role in combining health and social care services, especially in encouraging self-care. In order to keep their services accessible, these nurses shifted from face-to-face care to teleconsultations [19]. Although teleconsultations were enough for usual care, patients with advanced COVID-19 stages had less direct assistance because they had to stay home. In response, certain areas have begun offering end-of-life care services remotely and bolstering patient and family support networks through digital mediums [20]. Caregivers in the UK were able to get timely clinical advice and administer drugs to terminally ill patients because to national guidelines. In order to help family caregivers adapt to new management approaches and take on more caregiving duties, district nursing teams frequently offered continuing education and assistance. The increased demand for remote counseling in planning for mortality and palliative care is one long-term consequence of the COVID-19 epidemic [20].

Quick counseling models facilitated by healthcare providers via remote calls can enhance eHealth. Overweight women benefited from remote nursing monitoring, according to a randomized controlled experiment [21], which led to better anthropometric measurements. Home remote control systems, especially as instructional strategies, are confirmed to be beneficial by this study, which emphasizes the favorable effects of remote monitoring (by phone calls). This method reaches a large population that is otherwise unable to afford or access healthcare due to factors such as location or cost, and it does it in an efficient and adaptable manner.

2.1.4 Start the Epidemic

Globally, the COVID-19 epidemic has had a profound and unanticipated effect on economies and civilizations. Ever since the new coronavirus SARS-CoV-2 was identified in Wuhan, China in December 2019, it has quickly spread over the world, infecting millions of people and compelling governments to implement severe measures to curb its spread.

Neither a vaccination nor an antiviral treatment for COVID-19 has been clinically proved as of the middle of 2020. The main methods that public health professionals use to decrease transmission are non-pharmaceutical measures, including as social distancing, seclusion, contact tracing, and hygiene practices including washing one's hands. Worldwide, governments have restricted travel, public events, and non-essential corporate operations to different extents in an effort to "flatten the curve" of emerging outbreaks.

The economic and social effects of prolonged lockdowns and disruptions to global supply systems have been enormous. The rise of remote labor, distance education, and the general trend toward avoiding face-to-face interaction has disrupted the everyday routines of billions of people throughout the globe. Hundreds of millions of people have lost their jobs as a result of companies cutting costs or going out of business. Economic hardship has befallen both industrialized and underdeveloped countries.

Much about SARS-CoV-2 is still a mystery, including how the virus spreads, what effects it has on the body over time, how effective therapies are, and whether or not it can mutate. Nevertheless, preliminary insights regarding the signs, risk factors, testing methods, and public health measures in response to COVID-19 have become apparent. More information about this unusual virus and illness became available as the pandemic develops and progresses.

COVID-19 symptoms can vary in severity, encompassing fever, coughing, sore throats, headaches, exhaustion, taste or smell loss, dyspnea, and in certain situations, gastrointestinal problems such as nausea and diarrhea. Although the majority of infections cause little symptoms in the majority of people, individuals who are already at a higher risk of developing more serious complications that may necessitate hospitalization include the elderly and those with preexisting medical disorders such as diabetes, cardiovascular disease, chronic lung disease, or obesity. Even if they don't show any symptoms themselves, asymptomatic carriers might still pass the virus on to other people. Incubation periods can vary from 2–14 days, with an average of 5 days from exposure to symptoms. It appears that the onset of symptoms coincides with a person's infectiousness, while there is also pre-symptomatic and asymptomatic transmission. Diagnostic nucleic acid amplification tests (NAATs), such as real-time polymerase chain reaction (RT-PCR) conducted on swabs taken from the nose or throat, have allowed many nations and areas to increase their capacity for infection rate measurement. The development and implementation of serological examinations for SARS-CoV-2 antibodies can also aid in the estimation of past infection rates in communities. Aiming to increase testing accessibility and availability, tests at the point of care and home gathering kits are being developed.

The goal of contact tracing systems is to restrict the spread of infectious diseases by quickly identifying potential sick individuals and requiring them to self-imposed quarantine for 14 days. While difficult on a global scale, contact tracking, in conjunction with screening and community buy-in, has assisted several Asian nations in reducing the rate of spread. Also promising, but raising privacy issues, are digital contact tracing technologies that use Bluetooth technology on cellphones.

Since a vaccine is not yet available, public health professionals stress the crucial importance of individual preventive measures such as physical distance, respiratory etiquette, hand hygiene, and facial covers in public as additional levels of protection against COVID-19. In order to manage the outbreak until vaccination may develop herd immunity, communities suffering widespread community transmission may be required to implement measures such as non-essential business lockdowns, event cancellations, gathering limitations, and even complete lockdowns.

With the recent surge of COVID-19 cases and hospitalizations, health services are under tremendous strain. Along with staffing, patient triage, and delaying elective treatments, ensuring an adequate number of intensive care unit beds, ventilators, and protective gear for frontline workers should be a top focus. The areas most vulnerable to devastating epidemics are those that are rural, underdeveloped, and otherwise poorly served by healthcare systems. With the expansion of telehealth services, non-critical needs can be met with fewer in-person interactions.

A vaccine or therapy for SARS-CoV-2 needs to be developed quickly, thus researchers are in a race against the clock. Around the world, researchers are working on over a hundred potential vaccinations utilizing various approaches, such as adenovirus vectors, messenger RNA platforms, DNA vaccines, and deactivated entire viral vaccines. Although several could go through large-scale efficacy trials by the end of 2020, none have yet completed thorough safety and efficacy testing. Also currently in clinical trials are a plethora of potential antiviral drugs and immunological treatments.

Experts in infectious diseases caution that if prevention strategies are not maintained or gradually reduced in response to transmission rates, a "second wave" could emerge once restrictions are loosened, even though lockdowns are intended to halt the "first wave" of community expansion

in many areas. In the absence of effective therapies or universal immunization, periodic surges may occur if the virus is reintroduced from other countries or from inside communities, speeding up uncontrolled epidemics. The human cost of achieving herd immunity through naturally occurring infections is intolerable.

Questions on how to balance economic requirements with ongoing public health measures have also arisen in response to the financial costs of shutdowns. Returning to "normal" without re-igniting exponential spread may be possible with data-driven, staged re-openings that are monitored rigorously and have track-and-trace capabilities and masking controls. Until the epidemic is ended worldwide by vaccination or herd immunity, there is a chance that closures can be necessary on a recurring basis to control local flare-ups.

In addition to its effects on people's health, the pandemic has shown how vulnerable social infrastructure is and how unfair certain systems are. Domestic violence, child abuse, alcohol misuse, and mental health disorders are all made more likely by forced seclusion, which is challenging for some people. When schools close, it disproportionately affects low-income families who need special education and nutrition programs. Many "essential" and frontline duties are difficult, if not impossible, to do remotely.

Economies across the globe, particularly in underdeveloped nations without social safety nets, have taken a hit due to the interruption of travel, tourism, and industry. In the face of persistent spread, recovery may require global collaboration and multilateral initiatives. When lockdowns disrupt agricultural output or supply systems, food hunger becomes a pressing concern. As a result of patients avoiding facilities and resources being diverted, non-COVID healthcare services additionally endure suffering.

The pandemic may hasten technological transformations that continue long after the disease has passed. How people use services and conduct business could be changed by more widespread use of e-commerce, telemedicine, and telecommuting. The expansion of government authorities' emergency powers and the strengthening of monitoring capabilities have sparked discussions about civil liberties. Nations could be better prepared for future pandemics thanks to scientific knowledge gathered about the virus, illness dynamics, and vaccine development.

Equal policies that safeguard the most vulnerable and encourage recovery are necessary for lasting social changes, nevertheless. Further research and funding are needed to understand the long-term effects of COVID-19 on "long haulers" and whether or if it can worsen existing health problems. Collective pain, loneliness, and loss can have long-lasting effects on mental health. There were an unprecedented need for international collaboration in the face of emerging health, economic, and security challenges.

Making sure all countries, not just rich ones, have quick access to approved vaccines that are both safe and effective is crucial if we want to reduce disability and mortality rates in the long run. Accelerating the research and manufacture of COVID-19 vaccines and ensuring fair distribution based on need rather than ability to pay are the goals of COVAX, a worldwide project sponsored by CEPI, Gavi, and WHO. With more than 170 nations having committed to dosage equity by mid-2020, it was the primary multilateral endeavor in this area.

The best hope for containing the pandemic is widespread vaccination, but there are still challenges in obtaining enough vaccine, getting people to stop being anti-vaccine, and reaching the high rates of coverage that experts think are necessary—maybe more than 70-80% of the world's population—to achieve herd immunity thresholds. Ensuring equal opportunities for all

countries and preserving public faith in regulatory systems are crucial for success, which calls for strong programs and worldwide cooperation.

Though much is yet unknown regarding the course of COVID-19's progression, historical evidence shows that worldwide pandemics frequently lasted two years or longer before they were finally contained. Thanks to public health measures such as contact tracing and isolation, SARS was able to vanish within a year of its 2003 debut. The Middle East and portions of Asia have been experiencing intermittent cases of MERS since 2012. Even though the deadly H1N1 virus that caused the Spanish Flu in 1918 changed into a milder seasonal virus, it is still present and accounted for more than a century later.

The development of effective countermeasures to the COVID-19 pandemic is crucial, but so is the capacity of the human race to remain compassionate and work together across borders in the face of protracted disruptions. In order to protect security, wealth, and health for everyone, states may learn from their achievements and mistakes in controlling outbreaks, invest strategically in public health infrastructure, and develop worldwide governance for health emergencies. This can help them to be more resilient against future pandemics. The best chance for survival during times of crisis is for people to band together in solidarity and sacrifice for one another.

A lot of people are hoping the pandemic can go away by 2021, but nobody knows how it changes or how it affects society in the future. Public health professionals and epidemiologists are now exploring several options, including:

During the winter, when people are more likely to stay inside and allow the virus to spread more easily, SARS-CoV-2, such as other coronaviruses that result in common colds and other illnesses, may show seasonality in transmission. This may cause waves to occur once per year or twice a year, which health systems may plan for to some extent. Nevertheless, the severity of

future seasonal peaks may be determined by the effectiveness of current mitigating initiatives as well as the evolution of population immunity levels.

The zoonotic reservoir is a potential long-term reservoir for SARS-CoV-2 in animals like bats. This reservoir could allow the virus to circulate and potentially never totally disappear. However, it could periodically resurface when opportunities for transmission between animals and humans arise, such as when natural habitats are threatened by human expansion. One way to keep an eye on this risk is by proactive illness surveillance of animals.

The process of antigenic drift occurs when RNA viruses, such as coronaviruses, multiply and gradually acquire minor changes. People whose immune systems have worn down may be able to re-infect themselves due to this antigenic drift, which can change surface proteins that are targeted by humans. This is how seasonal influenza gets around vaccinations. It may be necessary to update booster vaccines periodically if SARS-CoV-2 experiences enough drift.

Due to its widespread distribution, SARS-CoV-2 has undergone recombination, resulting in several strains with distinct genetic characteristics that originated in different parts of the world. Novel hybrid viruses can be created when two different types infect the same host and undergo gene swapping, a process known as recombinant events. This raises the question of whether long-term protection against varied worldwide variations were conferred by natural or vaccine-acquired immunity.

Waxing and Waning Resistance - Like other human coronaviruses, SARS-CoV-2 has not been well studied to determine if infection always results in strong, long-lasting immunity or whether reinfections are more likely when antibody levels decline over months or years. Depending on their immune response, recovered individuals may become re-susceptible to reinfection at different rates. Community transmission could be sustained in this way.

Potential Dangers in the Future: Pandemics occur when conditions involving humans, animals, and the environment all come together to allow the spread of zoonotic viruses capable of infect humans. Our increasingly mobile and interconnected society is illustrated by SARS-CoV-2. It is possible that new viruses were proliferated in the coming decades due to factors such as increased urbanization, shifting land uses, animal commerce, and climate change. Additionally, zoonotic pandemics may still occur in the future.

Although best-case scenarios predict that COVID-19 may be mostly controlled by vaccination and community immunity within a few years, there is no assurance that this can actually happen or that resistance to readmission won't periodically fade. Part of humanity's long-term adaptations to dealing with pathogen dangers on a globalized earth in the Anthropocene period are likely to involve continuing to modify public health facilities, disease monitoring activities, emergency response systems, and scientific research preparedness.

Depending on how policymakers react and how businesses adjust, the far-reaching economic effects of COVID-19 could reverberate for years to come, even after the virus has passed.

The habits that consumers developed during lockdowns, such as cutting back on discretionary spending, shopping online more, and working or studying from home, may or may not remain after the pandemic has ended, depending on the consumers' preferences and the practicality of their situation. Businesses depending on older models are put at risk as a result of this change in the competitive landscape.

Reversal of Decades of Globalization Could Occur Due to Increased Economic Nationalism, Relocation of Critical Supply Chains to Increase Resilience, and Decreased International Trade and Travel. The decline of collaboration and the rise of a more divided international order

threaten to disrupt regionalization tendencies across several industries, including manufacturing, agriculture, and transportation.

Disruptions to the Labor Market: As a result of COVID-19, some industries may experience long-term changes that have societal repercussions. Commercial real estate industries may be hit hard by a collapse in demand for years to come. Adopting work-from-home policies on a bigger extent than before the pandemic could alter the patterns of urbanization and the demands placed on travel infrastructure. As demand for digital talents increases, salary gaps may widen. Government stimulus spending of trillions of dollars might lead to inflation if not progressively undone with economic development, which would have serious consequences for debt levels. If bankruptcies and defaults quicken as a result of a prolonged recession, high levels of household, corporate, and national debt can limit public services and growth prospects for a generation. The response of monetary policy also affects the value of currencies, commerce, and financial markets.

Widening of Inequality—If governments fail to effectively prevent the excessive health and economic costs of the pandemic from reaching less well-off populations, inequality may actually widen in the aftermath. Strategies that promote shared restoration and prosperity throughout all demographic groups that sustained losses considerably influence the results for social cohesion, stable politics, and conflict.

Sustainable energy transition paths, climate policy aspirations, and disaster resilience are all affected by the policy decisions that shape post-COVID stimulus packages and infrastructure rehabilitation. Locking in pathways with lower emissions or speeding up transitions to alternative energy sources could be achieved through targeted expenditures.

The COVID-19 pandemic revealed a lack of international cooperation in the areas of pandemic preparedness, response, and medical countermeasure research and development, which could exacerbate future health crises unless action is taken soon. To address common global challenges, such as climate change and pandemics, in an equitable and effective manner, it may be necessary to strengthen multilateralism through reformed institutions.

There is a lot of unknown, but the decisions that governments and communities make in the coming decade about the complicated health, financial, and social consequences of COVID-19 can have far-reaching effects. To ensure that all communities can recover in a way that is inclusive, sustainable, and robust enough to face future difficulties, it is important to put money into education, healthcare, and scientific innovation, the three cornerstones of long-term prosperity. There is a critical window of opportunity to further human progress through collaboration throughout the recuperation period.

Family - The shutdowns increased the need for 24-hour childcare by working parents without usual support systems. Households with multiple generations were more likely to be infected. Reports of domestic violence increased in certain regions. People grieved the loss of loved ones without the usual funeral rites. Video chats attempted to keep in touch with friends and family, but virtual aisles were more comforting than hugs. These social and private effects of sustained COVID-19 disruptions have had a profound impact on people's daily lives.

Differences in digital/study access were brought to light by the transition of curricula online in education. Educators revamped pedagogy but students failed social developmental stages. Job markets for college grads were low. Prolonged seclusion affected the mental health and concentration of some, while others did very well with more adaptable schedules.

Physical separation strains relationships, which in turn necessitate trust without guarantee. Without travel, cross-border couples fear separation. Safe socializing was a challenge for singles. Loneliness was a greater problem for those who lived alone. People who relied significantly on online interactions to replace meaningful in-person contacts ran the danger of becoming even more lonely as a result of their reliance on social media to fill gaps.

Outdoor enthusiasts were concerned about the effects on delicate ecosystems caused by people's changing habits as a result of the overcrowding of parks and trails. Harvests were affected by supply chain problems and a lack of migrant labor. Suddenly, once-choked-with-smog skies and streets were devoid of wildlife, according to reports from throughout the world.

Religion — Houses of worship such as churches, mosques, and temples have shifted their services online, with some resisting restrictions and emphasizing the importance of prayer. The usual celebrations and trips to see relatives were absent on holidays. Many people's forms of spiritual and support from society changed while they were alone.

Loss of loved ones—The inability to say last goodbyes or participate in traditional mourning rituals was a further source of pain for individuals affected by funeral limitations. Delayed burials failed to provide some places with the recognition or closure they needed for losses caused by the pandemic. As a new means of processing communal trauma, memorials surfaced online and through tributes.

For the entertainment industry, there was a halt to filming and television production, the cancellation of athletic events, and the postponement of concerts and festivals. While digital experiences could never fully replace exciting live performances, they did a good job of introducing audiences to cultural content. There was a resurgence of interest in home comforts

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The lack of medical insurance and financial buffers impacted primary and gig workers who relied on daily wages. Some vulnerable groups can be better prepared to handle future crises if contracts are protected, benefits are expanded, and workers are retrained. Basic necessities, such as a guaranteed minimum income, should be taken into account.

Shelters, jails, and slums were breeding grounds for epidemics due to their overcrowding. Renter protections and an increase in the supply of inexpensive housing can stop people from being forced out of their homes, giving people of all income levels the opportunity to live alone or with minimal contact with others.

Students had a hard time making the switch to online learning due to a lack of bandwidth, hardware, or peaceful study areas. By bolstering school lunch programs, expanding internet connection subsidies, and providing tutoring support, we can ensure that students of all income backgrounds continue their education.

Discrimination Monitoring - COVID-19 has been associated with an upsurge in anti-Asian bigotry, according to reports from throughout the world. During health scares, vulnerable groups can be protected from being targeted by implementing anti-discrimination measures, such as training in cultural sensitivity and discrimination tracking.

Voting access innovations, such as early voting or mail-in ballots, ensure that citizens can still exercise their democratic right to vote even when physical distance makes it difficult to go to the polls. Society is protected when public health and political freedom are balanced.

Reducing jailed populations through medical parole and alternatives to detention helps prevent overcrowding and worsening outbreaks in facilities that are already struggling with criminal justice reform.

International Solidarity - The poor world is put at danger when wealthy nations acquire an unequal share of medical supplies and, in the long run, vaccines. Mutually beneficial cross-border recovery is facilitated by aid pledges and cooperative production and distribution agreements.

Societies can harness latent human potential and strengthen their ability to withstand future compounding crises by making equity the focal point of pandemic responses. Beyond simply exposing economies to previous, exclusive standards that maintained vulnerabilities now so clearly shown, the progressive reforms accelerated by COVID-19 offer long-term advantages.

The Effects of Mental Health

Many people's mental health has suffered as a result of the pandemic's prolonged stress, isolation, loss, and uncertainty. As people dealt with overburdened healthcare systems, lost jobs, daily life interruptions, and a failure to securely see loved ones, reports of elevated rates of anxiety, sadness, substance misuse, and even suicidal thoughts appeared.

Victims of domestic violence are now ensnared with their abusers, healthcare workers are confronted with trauma and overwork on the front lines, people with pre-existing conditions face new obstacles to treatment, the bereaved are deprived of funeral rites, and youth fail to reach developmental milestones. Virtual care is not a replacement for face-to-face treatment, and while teletherapy has helped cover certain gaps, access is still uneven.

Investment in community-based psychological health programs, at-risk populations, treatment capacity expansion, behavioral healthcare reform (i.e., making it a lesser stigma and more incorporated into primary systems), and paid sick leave policies that enable people to give preference to self-care without incurring costs can have far-reaching effects on society in the long run. Unchecked, the growing number of "deaths of despair" may soon start taking a toll on public health.

Influencing the World After the Pandemic

As the process of recovery begins, international leaders are faced with the challenge of formulating plans to address both the revival of livelihoods and the reduction of illness and mortality. Investing in fundamental pandemic defenses to reduce the likelihood of having to revert to harsh lockdowns, equitable policies that support communities wounded by loss, and sustaining public trust via transparency are all crucial to success.

A strengthened public health infrastructure, including examination, contact tracing, facilities, and stockpiles; the empowerment of community healthcare personnel and groups aiding the most vulnerable; and universal healthcare access, enabling early detection and therapy seeking without financial fears, are key goals. In order to prepare for the unexpected, scientific investigations into the virus's evolutionary history must proceed uninterrupted.

Reviving positive diplomacy and strengthening resilience to subsequent spillovers are two potential outcomes of reformed international collaboration on concerted medical study, information sharing, emergency help, and equitable vaccination distribution on a global scale. It may be more cost-effective to tackle the underlying economic, environmental, and social causes that cause diseases to originate rather than always playing catch-up during pandemics. Leveraging technology advancements spurred by the pandemic and initiatives involving green infrastructure can help restore regional economies and supply chains sustainably. This can lead to job growth and a transition towards more resilient, equitable, and environmentally friendly development patterns. There is a chance for long-term, good change if we reevaluate consumption and employment patterns in this context.

Society at Large and Public Participation

In the face of the pandemic, beginnings and non-governmental actors around the globe have been instrumental in providing assistance and counseling to those in need, ensuring that leaders are held responsible, offering solace to the bereaved, and fostering collaborative community solutions without centralized coordination.

A strong civil society is essential for fostering the social cohesiveness and trust that are necessary to overcome common obstacles, as this crisis has shown. Policies should be implemented to bolster these groups in the future by increasing volunteer and philanthropic

support programs. This can help them fulfill their goals of service, empowerment, and inclusion in democratic processes.

With careful design and implementation that prioritizes privacy, security, and inclusivity, emerging civic technologies have the potential to enhance active participation, transparent governance, and the dissemination of trustworthy information. Everyone wins when communities encourage participation across several channels and collaboration across governmental, commercial, and nonprofit organizations.

Protecting Oneself from False Information

Health misinformation has proliferated as a pandemic side effect, undermining attempts to contain the disease through both accidental and deliberate dissemination. False claims endanger lives by undermining adherence to professional recommendations; examples of this include 5G conspiracies, dubious miracle treatments, and political denialism.

There are ways to circumvent censorship, though. Spending on media education and digital literacy programs helps develop discernment. Companies in the tech industry can limit the profit from disinformation without stifling free speech. Promptly dispelling myths or refocusing attention on facts is within the power of journalists, fact-checkers, and community leaders. Public trust must be established by openness, timeliness, and transparency in government risk communications.

Society can fortify itself against false narratives in the long run by making scientific research and independent expert opinion top priorities in policymaking. We must all remain empathetic, careful, and open to re-evaluating our stances as our knowledge of the effects of COVID-19 and our solutions to this common dilemma evolve.

Personal Initiative and Systemic Change

Every step along the way, people's deeds have been crucial. People have prevented the spread of the virus and provided health systems a chance to cope with surges by adhering to simple protocols. Equal containment requires heightened individual vigilance to safeguard vulnerable populations through hygiene, masks, and physical separation as regulations relax.

The crisis has changed many people's views on personal connection, social justice, and life priorities, even though some consider it a temporary oddity. Opportunities arise when we reevaluate "normal" in areas such as supply chains, health systems, social protections, and work-life balances. Reduce the impact of future shocks by making small, sustainable lifestyle changes to your consumption, transportation, and involvement in your community.

To sum up, after this crisis, societies that prioritize public health, justice, community, and global cooperation can be better able to withstand future uncertainties and tackle global issues like climate change. A more just and sustainable future can be ours if we wake up to our frailty and finally do something about the vulnerabilities that have just come to light.

Direct Patient Care Providers

As a result of the COVID-19 pandemic, hospital systems and the dedicated medical professionals who work diligently to treat patients are under immense strain. Caring for the flood of seriously ill patients discharged from overcrowded hospitals and clinics places tremendous mental and physical demands on these frontline personnel.

Healthcare workers are particularly vulnerable to exposure because of the nature of their job. Full protective gear, including gowns, gloves, eye shields, and respirator masks, is required to care for COVID-19 patients, which can be oppressive to wear for extended periods of time in hot situations. Some people have resorted to reusing single-use goods or even making their own alternatives due to a lack of required PPE, which raises the risk of infection.

Witnessing the unending toll that a merciless illness takes on human life has also taken a tremendous psychological toll. Even though the staff really wants to help their patients, they really can't give them the reassuring physical touch and emotional support that families provide in those last moments. Restricted funerals prevent closure. When patients die while they are on the clock, many nurses experience survivors' guilt.

Adding insult to injury, employees are subject to intense public scrutiny and pressure to vanquish this "invisible enemy." Those that show up every day already work too much, and staffing shortages caused by things like illness, childcare needs, or worries of infection make things even worse. Without proper coping mechanisms, people are more likely to experience physical tiredness, burnout, substance misuse, and even thoughts of suicide.

What Patients Go Through During a Pandemic

Healthcare for COVID-19 sufferers has been a lonely and unpredictable ordeal. Aiming to control infections, visitation bans isolate individuals with severe symptoms who need to be hospitalized from their loved ones. The use of distant digital platforms, such as phones or video chat, for communication is on the rise.

The sick face death without the solace of loved ones' touch in impersonal, germ-filled halls populated by anonymous, mask-wearing strangers. Invasive surgeries, sedation, and mechanical respiration for patients who cannot move are used in severe situations. Recovery is a sluggish process even for those who manage to escape long stays in intensive care.

Those who are unable to fight the disease are left to die alone, without the opportunity to be surrounded by loved ones or to experience customary farewell ceremonies. Online memorials, as opposed to traditional funerals, allow grievers to experience the loss without physically being there, which might amplify their emotions of incomplete processing.

Due to the monopolization of resources by COVID cases, patients with other serious illnesses face uneven risks, including the possibility of delaying surgeries or treatment. Despite the benefits of telemedicine for non-emergency care, vulnerable individuals still need human dignity-preserving, empathetic in-person treatment.

Helping the Terminally Ill

Compassionate end-of-life care is a holy duty of the healthcare system. However, when the time comes for COVID patients to pass away, the pandemic has presented challenging judgments regarding the balance between patient comfort, staff safety, and infection control.

In overcrowded intensive care units, medical staff attempt to console terminally ill coronavirus patients by facilitating remote video conferences with their anguished loved ones or playing recorded messages from those loved ones. However, for many, it is a tragic loss of humanity to be apart from vulnerable individuals in their last stages of life.

In order to prevent the spread of infection, some hospitals have instituted "no visitor" policy even when patients are close to death. However, other facilities find creative ways to address this problem, such as allowing one family member to wear full PPE and be present during the last minutes. There is a delicate balance between the benefits of palliative care and the dangers to the professionals providing it.

Pandemic mortuary overflow presents unique challenges following death. Cremation, autopsy, embalming, and viewing of remains are all options that must be considered in light of limited space, taking into account scientific evidence, religious beliefs, and family preferences on funeral rituals. Virtually all bereavement services can subsequently be offered online.

Taking Care of Healthcare Professionals

Reducing the strain on already overwhelmed healthcare workers is now seen as a top priority in order to continue the vital task of saving lives despite the pandemic. In order to help their employees recharge, several facilities have made counseling more accessible, loosened sick leave policies, offered housing or childcare assistance, and set aside quiet areas.

In addition to raising morale, several programs aim to remind care staff of how important they are. When people feel invisible, it helps to have public displays of gratitude such as parades, donated meals, and applause. Despite setbacks, little things like adorned masks or motivational posters can keep people going.

However, the length of the pandemic is currently undetermined, therefore long-term plans to protect people's mental health are necessary. Building resilience involves ensuring that patient loads are reasonable, that shifts and breaks are enough, that testing is available to allay fears of infection, and that rules are in place to prevent retaliation or fines for those who need to take leave.

Frontline workers who have taken a beating during the recent economic and health crises might get the help they need from policy-level initiatives such as hazard pay, improved insurance coverage for mental health, and permanent boosts to healthcare financing. The future of pandemics is now closely related to their well-being.

Pandemic Nursing

When it comes to healthcare workers, nurses have been thrust into the center of the pandemic response. Nurses, who make up the bulk of the healthcare industry, screen, test, give meds, and provide pastoral care to COVID patients—sometimes more than a dozen patients in a single shift.

Helping patients interact with distant family members is emotionally taxing, and they must also deal with the tragedy of seeing pain and death on the job, all while worrying about their own safety. Allocating scarce resources presents ethical difficulties, which adds to the stress. Disaster surges have historically been led by nurses who have shown remarkable tenacity and inventiveness in the face of severely understaffed hospitals. Expanding telemedicine, revising discharge procedures, redeploying RNs with medical-surgical training to intensive care, and establishing field units to increase treatment capacity were among creative tactics implemented by nurses during COVID-19.

There was already a severe shortage in the nursing industry before the pandemic hit; with one million nurses in the United States approaching retirement age, the situation was only going to get worse. After years of employment, the burden of inadequate income, poor working conditions, and mental stressors becomes heavy.

Funding for more education activities, loan repayment programs, competitive wages with secure employment ratios, powerful labor organizations and lobbying groups, improved mental health services, and acknowledgment of their influence in reviving systems of healthcare for future crisis resiliency are all necessary policy reforms to retain and improve this vital medical corps.

Effects on Family and Difficulties

The epidemic has taken a significant toll on patients' and healthcare workers' families as well, who have had to deal with the bans on visiting hospitals, the duties of caregiving, and the loss of income or employment as a result of the illness.

Relatives of a loved one battling COVID-19 in the hospital may experience dread, worry, and a lack of agency as they wait impatiently for limited medical information over the phone, unable to be by their side to provide comfort or get personal condition updates.

Because you can't be there to help make decisions about the patient's end-of-life care or to grieve with them in person, experiencing a critical incident while their life is on the line can be incredibly emotionally taxing.

Constant infection exposure worries create stress for families with healthcare workers, particularly if there are young children, elderly parents, or immunocompromised relatives living together who need extra care. It is necessary to isolate oneself from susceptible family members during quarantines, even if there are no symptoms.

Working parents faced the double whammy of having to care for their children full-time while also juggling distant learning responsibilities and employment that either couldn't go online or were cut short due to economic downturns. Some others had to make the difficult choice between staying at home to care for their families and losing their jobs.

Prolonged mourning periods are associated with loss when customary burial ceremonies and community/family gatherings are not observed. Even though many support groups have gone online, nothing beats the tangible support of a human connection while you're grieving. Loss of small company livelihoods, increased medical expenses, and unemployment all have a multiplicative effect on household budgets.

Poverty, food insecurity due to job/wage losses or impairments balancing duties with altered work/education environments, the danger of asymptomatic disease spreading through families, and other hardships have tested human resilience across diverse family dynamics during the pandemic. In times of crisis, the ability to lean on one's community for assistance has been an invaluable tool for surviving.

Improving Medical System Reform

The healthcare system in even the most industrialized countries is vulnerable, as the crisis has shown, as it is overworked and ill-equipped to deal with mass casualty situations that rely on international supply chains.

Critical care unit beds, ventilators, PPE, and medical personnel shortages revealed a lack of preparedness and underinvestment for possible catastrophes. As epidemics broke out more quickly in low-income areas and communities of color, who already faced disproportionately high rates of inequality, a new form of healthcare inequality became apparent: uneven access to treatment.

Systems need to be reformed to be less reactive, more preparedness-oriented, and more accessible for everyone if we want to build resilience to future health shocks. Some possible solutions include educating employees to respond quickly to surges in demand, stockpiling equipment that can be quickly expanded, and constructing buildings with flexible surge capacity. To lessen reliance on potentially unstable global manufacturers, medical resource supply chains are becoming more diverse and localized.

Health promotion and preventive initiatives aimed at at-risk communities, as well as community-based healthcare and epidemiological research, are underfunded in the public health sector.

To guarantee sufficient medical personnel on a national level, it is necessary to invest in healthcare worker recruitment and retention as well as increase education and training programs. Making sure that people from all walks of life, regardless of where they live or their financial situation, have access to healthcare by creating robust telehealth solutions, regionalized collaboration frameworks, and fair distribution systems.

Recognizing healthcare workers and their families as assets deserving of protection, we must strive to improve regulations that provide paid sick leave, insurance, and assistance for caregivers.

We need to reform our funding structures to prioritize primary and preventive care over tertiary and hospital-centered care. One way to do this is through universal coverage programs or other equitable approaches.

For societies to recover more effectively from the current crisis, they must rethink their healthcare social contracts in a way that ensures the health of their populations and their preparedness for pandemics by providing access to healthcare that is equitable, compassionate, and resilient.

Psychological Consequences Persist

It may be years before we learn the full extent of the impact of COVID-19 on the mental wellbeing of the community. However, physicians have noticed concerning early indications that, without proper assistance and attention, the emotional fallout of losses, traumas, and interrupted life patterns can have profound and lasting consequences.

Traumatic experiences increase the risk of post-traumatic stress disorder (PTSD) in ventilated patients and survivors of critical care unit stays. As a group, frontline personnel deal with the trauma of seeing human suffering and death on a daily basis. Because they were unable to spend their last moments with their loved ones, families deal with a form of disenfranchised grief.

As millions of people cope with unwelcome changes like joblessness, social isolation, economic instability, loss of habit, and lack of control, a surge in anxiety, depression, and adjustment disorders has been seen. Under pressure, there has been an upsurge in domestic violence, drug misuse, and other types of conflict.

Many people in the collective trauma caused by the pandemic's onslaught had trouble trusting others, having trouble seeing hopeful futures, and experiencing disruptions to their attachment styles. Culturally competent, long-term mental healthcare is essential for communities of color who have suffered disproportionate losses, which have exacerbated pre-existing disparities. An increase in the physical healthcare budget alone can not be enough to avert another wave of spiraling "deaths of despair;" substantial funding must also be allocated to the expansion of community-based counseling and mental health services. Effective strategies for managing continuous uncertainty and flexibility include scaling teletherapy, creating peer support networks, training for resilience, and destigmatizing conversations.

There is a long way to go before we can assist traumatized communities in grieving, finding hope in the face of adversity, and making sense of uncertainty. Through collective grief over lost lives, honoring of brave first responders, and commitment to building more equitable, resilient communities, the world may heal faster in the aftermath of a pandemic. We can all rise up against the remaining shadows with kindness and solidarity.

What Has Changed?

After more than a year of turmoil, societies must now face the challenge of establishing a "new normal" that offers the durability and economic rebooting without jeopardizing public health by acting too swiftly or returning to behaviors prevalent before the pandemic. This is happening as cautious reopenings and vaccination campaigns gain momentum.

Keeping a safe distance from others, wearing masks in public, and implementing rigorous testing and monitoring processes are all ways that safety is prioritized. Improvements to ventilation, multifaceted employment structures that permit flexible distance, increased sick leave, and

modifications to high-contact places like stadiums and public transit to facilitate careful re-engagement are all recommended by experts.

Returning to old habits, trade, social ties, and hope for shared futures are also crucial to psychological and economic rehabilitation. We may take a start toward restoring some of the quality of life we had before the pandemic and managing the persistent hazards of the virus by prioritizing outdoor activities, small businesses in our communities, virtual-hybrid education, and mental wellness.

Green infrastructure projects, skill trainings, more adaptable work schedules, and improved public health systems are all examples of long-term changes that have emerged from painful experiences and have the potential to propel fair and durable recoveries. By working together, we can fortify our medical response alliances and send a message of unity in the face of future challenges.

Even the most devastating disasters don't have to deprive communities of everlasting happiness, opportunity, and connection if they are handled with care, supported by science, and united in their resolve. Societies may find that the "new normal" offers hope for a more equitable and prepared society for everyone if they promote reasonable policies that foster immunity and wellbeing. When people are able to develop compassion, even in the face of immense suffering, progress usually follows.

2.2 Leading and Managing Advanced Telemedicine Projects

A unique set of leadership abilities is required of nurses because of the growing importance of telemedicine in clinical practice. To be an effective leader, one must be able to set standards, create plans, and remove obstacles to implementation. They have a firm grasp of evidence-based

practice concepts and are able to impart it to others, all while encouraging the systematic and purposeful use of this information [22]. When it comes to care that is enabled by telemedicine, nurses are crucial. Parimbelli et al. [6] showed that nurses have an active role in a variety of telemedicine-related tasks, including project development, patient enrollment, service explanation to patients and caregivers, and data management. With the development of telehealth and telenursing services, nurses are taking on more autonomy in their job while still collaborating with other members of the healthcare team through the use of information and communication technologies. The development of leadership and abilities for administering new technologies, as well as improved utilization of technology, innovation promotion, and quality improvement, are future aims. Telehealth and teleassistance services need to be a bigger part of nursing care [23].

When it comes to the COVID-19 pandemic, telemedicine and telehealth have become more popular, and nurses have been instrumental in making them a reality. The nursing profession faces important challenges and opportunities as a result of the trend toward remote care.

To better equip nurses for the growing demand for telemedicine services, there is a pressing need to improve nursing education and training. Efficient remote patient tracking and administration necessitates curricular changes that incorporate lessons on telehealth technologies, online medical delivery, and competency building. To guarantee that registered nurses can make the most of telemedicine resources, continuing education programs are also essential.

In addition, the growing popularity of telemedicine calls for a reconsideration of the functions and duties of nurses. Virtual assessments, drug regimen management, and remote coordination of interdisciplinary care plans are all examples of the kinds of increased autonomy that nurses may

face in the future. This calls for training in new ways of making clinical decisions and for healthcare professionals to be able to collaborate with one another through digital means. Think about how telemedicine can change the dynamic between nurses and their patients and how it can affect the provision of holistic, individualised care. The challenge for nurses is to connect with patients on a deeper level and offer them emotional support even while they are physically apart. In order to accomplish this, nurses and patients may use digital communication technologies, such as video consultations and remote patient monitoring equipment, to make the nurse-patient contact more personal.

Security of patient information, privacy of treatment records, and fair access to virtual medical services must all be guaranteed by strong rules, standards, and ethical frameworks that accompany the introduction of telemedicine. When it comes to influencing healthcare policy and the future of telemedicine, nurses are going to be indispensable allies for legislators and administrators. The nursing profession has to take advantage of the opportunities that telemedicine and telehealth provide as the healthcare system changes. Registered nurses can take the lead in the healthcare industry's digital transformation by acquiring new knowledge, shifting their focus, and promoting legislation that can help them do their jobs better.

To better equip nurses for the growing demand for telemedicine services, there is a pressing need to improve nursing education and training. The establishment of competencies necessary for efficient distant patient tracking and management, virtual care delivery, and telehealth technology are all topics that need to be covered in curriculum updates. To guarantee that registered nurses can make the most of telemedicine resources, continuing education programs are also essential.

In addition, the growing popularity of telemedicine calls for a reconsideration of the functions and duties of nurses. Virtual assessments, drug regimen management, and remote coordination of interdisciplinary care plans are all examples of the kinds of increased autonomy that nurses may face in the future. This calls for training in new ways of making clinical decisions and for healthcare professionals to be able to collaborate with one another through digital means. Think about how videoconferencing can change the dynamic between nurses and their patients and how it can affect the provision of holistic, individualised care. The challenge for nurses is to connect with patients on a deeper level and offer them emotional support even while they are physically apart. To do this, nurses and patients may use digital communication technologies that bring a more personal touch to the relationship, such as video consultations and remote patient monitoring equipment.

Privacy, data security, and equal access to virtual care must be guaranteed with the introduction of telemedicine, which must be accompanied by strong rules, standards, and ethical frameworks. In order to influence the future of telemedicine, nurses may need to work together with politicians and healthcare executives to promote these regulations.

The nursing profession has to take advantage of the opportunities that telemedicine and telehealth provide as the healthcare system changes. In order to take the lead in the digitization of healthcare delivery, nurses need to acquire new skills, adjust their duties and obligations, and lobby for policies that can help them.

Raising the Bar for Telemedicine Competencies in Nursing Education

To better equip future nurses to deal with the challenges of contemporary healthcare, nursing programs must incorporate telemedicine and telehealth into their curricula. It is imperative that

nursing schools update their curricula to include courses and activities that teach students how to provide quality virtual care.

The establishment of fundamental skills in telemedicine and telehealth is an essential part of this shift in educational practise. One of these skills should be familiarity with the many forms of telehealth, including asynchronous communication, remote monitoring of patients, and video consultations. Additionally, it is important for nursing students to understand how to properly utilize digital resources, comply with applicable laws and regulations, and handle concerns related to patient confidentiality and data security.

Remote patient interactions call for special examination and decision-making abilities, which should be emphasized in the curriculum. In order to provide optimal care, nurses need the skills to perform thorough virtual assessments, understand data from linked devices, and formulate well-informed treatment plans and treatments. Students can gain significant experience in a controlled setting through simulation-based learning and virtual clinical internships.

Teaching nurses the interpersonal and communication skills they'll need to practice telemedicine effectively is just as important as teaching them technical skills. It is important for nurses to acquire the skills of digital rapport building, empathy communication, and holistic care delivery. Methods for including patients in shared decision-making, virtual body language, and active listening are some of the telehealth-specific communication skills that may be taught.

Issues of liability, informed consent, and fair utilization of virtual care are only a few of the legal and ethical issues that should be addressed in the curriculum as it relates to telemedicine. Students of nursing should be prepared to deal with these nuanced situations and to fight for regulations and standards that put patients first and uphold the nursing profession's credibility.

Establishing strong collaborations with health care providers and technological businesses can help academic institutions keep nursing education current and adaptable to the shifting healthcare landscape. Students can have access to state-of-the-art telehealth technologies, participate in hands-on learning opportunities, and have their curriculum informed by these collaborations. In order to foster a workforce that is capable of utilizing digital technologies and spearheading the revolution of healthcare delivery, the nursing profession should aggressively include telemedicine and telehealth competencies into the training of nurses. To ensure that nurses continue to play an integral part in the telemedicine revolution, this investment in their professional development is essential.

The Growing Importance of Telemedicine for Nurses and Their Duties

Nurses' duties are changing drastically due to the increasing use of telemedicine and telehealth technologies. Effective virtual care delivery requires nurses to be ready to work in innovative ways with other medical professionals and to take on more autonomy in their work.

Among the most noticeable changes in the nursing profession is the growing obligation to administer thorough online evaluations. As a nurse, you need to be able to communicate remotely with patients, collect pertinent clinical data, understand physiological parameters, and make educated decisions regarding their care. To do this, it may be necessary to collect and evaluate patient data using digital communication tools, devices for remote monitoring, and video consultations.

Remote coordination of interdisciplinary care plans and drug regimen management are additional duties that nurses may be assigned. The ability to communicate and work with other members of the healthcare team through digital platforms, as well as the development of sophisticated clinical decision-making abilities, are necessary for this. Nurses need strong analytical and

problem-solving skills to understand and interpret test data, keep an eye out for unwanted drug responses, and modify treatment programs as needed.

In the context of telemedicine, nurses may also be required to perform more independent tasks, such as requesting diagnostic tests, modifying prescriptions, and referring patients to specialists. More autonomy means that in order to guarantee the provision of safe and efficient virtual care, it is imperative that nursing education be improved and that explicit guidelines on the scope of practice be established.

Opportunities for nurses to take on new responsibilities, such virtual care coordinators or telehealth nurse navigators, are also presented by telemedicine. Virtual care coordinators work with patients to understand their options, schedule appointments, and ensure a smooth transition between in-person and online visits. To succeed in these positions, you'll need to be well-organized, articulate, and knowledgeable about the nuts and bolts of telemedicine.

In addition, telemedicine's meteoric rise may increase access to nursing care by connecting nurses with patients in underserved or faraway areas. Virtual counseling and remote monitoring can be utilized to provide specialized services, including mental health support, chronic disease management, and wound care.

Nurses need to have the right set of skills and knowledge to adjust to all these new duties and obligations. Mentorship programs, continuing education for healthcare professionals, and the creation of clinical practice guidelines tailored to telemedicine might all play a role in this. If we want to shape the possible future of nursing positions in telemedicine, we need to work with hospital administrators, lawmakers, and tech partners.

Nurses can further establish themselves as essential members of the healthcare team by accepting these new roles and assuming leadership roles in telemedicine. They can use digital technologies effectively to improve patient outcomes and drive the evolution of care delivery.

Building Trusting Connections Between Telemedicine Patients and Their Caregivers

The nurse-patient interaction is faced with both possibilities and threats brought about by the trend towards telemedicine and telehealth. Virtual care's inherent physical distance might make it hard to form meaningful connections, but nurses can overcome this by coming up with creative ways to help patients feel heard and understood while still providing comprehensive treatment.

The effect of telemedicine on the nurse-patient therapeutic alliance is an important factor to think about. When nurses don't see their patients face-to-face, they may struggle to read nonverbal clues, build rapport, and provide the kind of care that is characteristic of nursing. Therefore, in order to bring the art of nursing to the digital domain, nurses need to hone their particular communication abilities.

To do this, video consultations may be used, which can assist eliminate geographical barriers and provide more one-on-one conversations. By observing the patient's facial expressions and body language, nurses can gain insight into the patient's emotional condition and offer more personalized care. The use of simulated lighting, camera angles, and backgrounds can also make the space feel more intimate and comfortable for the patient.

The nurse-patient connection can be improved by the use of numerous digital communication methods, not limited to video consultations. For instance, with the use of asynchronous messaging platforms, nurses can have a two-way conversation with patients, giving them the impression that they are receiving constant support and care. In a similar vein, nurses may access

up-to-the-minute health data using remote patient monitoring devices, which helps them keep tabs on their patients and meet their needs before they even arise.

It is critical that nurses understand the risks associated with telemedicine and take precautions to protect their patients' privacy, confidentiality, and data. In order to keep the nurse-patient relationship trustworthy and protect patients' rights, certain regulations and procedures must be put in place to secure patients' personal information.

Additionally, while providing telemedicine services, nurses should take into account the distinct preferences and requirements of various patient groups. Limited digital literacy or unreliable internet connectivity are two of the obstacles that some people may encounter when trying to obtain virtual care. Nurses need to be ready to deal with these.

The Effects of Telemedicine on Efficiency and Workflow in the Nursing Profession

Not only has telemedicine and telehealth revolutionized patient care delivery, but they have also had a profound effect on nurses' efficiency and output in the workplace. As nurses adjust to these new forms of treatment, it's important to look at how telemedicine affects their day-to-day work, workload, and productivity.

Improving Nursing Processes with the Use of Telemedicine

The ability to streamline specific processes and duties is one of the main ways that telemedicine has affected nursing workflows. Virtual care platforms, RPMs, and asynchronous communication systems can automate or simplify a lot of administrative and clinical tasks, freeing up nurses to spend more time really caring for patients.

For instance, virtual appointment scheduling and management can become second nature when telemedicine is integrated into the nursing process. By utilizing digital scheduling solutions,

nurses can streamline patient consultation booking, appointment reminder sending, and virtual waiting room management, significantly cutting down on administrative time and effort.

Also, with the help of remote patient monitoring equipment, paperwork and data collecting for patients may be done much more efficiently. Rather than requiring patients to come in for in-person consultations, nurses can now remotely access physiological data such as glucose levels, vital signs, and medication adherence. This can make it easier for nurses to record and collect patient data, freeing them up to focus on making clinical decisions and coordinating treatment.

Secure messaging systems and patient portals are examples of asynchronous communication solutions that can help nurses, patients, and other members of the healthcare team communicate information more efficiently. As a result, nurses can better manage their time by responding to patients' questions, educating them, and coordinating their care plans without requiring synchronous contacts.

One potential consequence of telemedicine is the consolidation of nursing services, especially for services like virtual care coordination and remote patient monitoring. Nursing productivity can be increased through the use of standardized workflows and economies of scale when specific tasks, such medication administration or chronic illness care, are consolidated under a centralized telemedicine program.

Improving Efficiency in Healthcare Delivery with Telemedicine

Telemedicine has shown promise in improving nurses' overall productivity, in addition to expediting workflows. Better patient outcomes, more efficient use of nurses' time, and expanded access to treatment are all possible thanks to virtual care technologies.

By saving time and money on in-person visits and patient transportation, telemedicine plays a major role in increasing nursing productivity. Remote patient monitoring and virtual

consultations can spare nurses a lot of time that would otherwise be spent on things like patient transportation, room preparation, and documentation after a visit. This is because patients won't even have to worry about getting to the healthcare facility.

With fewer geographical obstacles to care, nurses can attend to more patients through the use of telemedicine. By eliminating geographical barriers, nurses can increase their access and caseload by providing virtual treatment to patients in underserved or rural locations.

In addition, better patient outcomes can result from incorporating telemedicine into nursing workflows, which can boost productivity. Using remote monitoring equipment, nurses can proactively respond when patients show early indicators of worsening condition, preventing complications and unpleasant occurrences. The healthcare system can become more efficient and cost-effective as a result of fewer expensive trips to the emergency room or hospitalizations.

In addition, a larger number of patients can have access to specialized nursing services through telemedicine. For instance, nurses specializing in mental health or chronic disease management can reach more patients and have a greater impact through virtual consultations and support.

Obstacles and Factors to Think About When Integrating Telemedicine into Nursing Procedures

Although there are many potential benefits to incorporating telemedicine into nursing workflows, there are also a number of obstacles that must be overcome for this to be a successful endeavor.

A major obstacle is the lack of adequate nurse education and training regarding the utilization of telemedicine technologies. It is imperative that nurses acquire the knowledge and abilities to make good use of digital communication tools, remote monitoring equipment, and virtual care platforms. This could call for the introduction of specific educational initiatives, practical training, and chances for continuous professional growth.

It is essential to establish transparent regulations, norms, and processes when incorporating telemedicine into nursing operations. This can guarantee a smooth integration and efficient implementation of the technology. To make sure these procedures fit in with nurses' current duties and workflows, nurses should be involved in their development and execution.

The possible effects of telemedicine on nurses' workloads and levels of job satisfaction are another important factor to think about. Despite the potential benefits of telemedicine, nurses may face new challenges as a result of it, such as answering patients' questions outside of normal business hours or feeling pressured to have a constant online presence. Reducing the likelihood of burnout and creating a long-term sustainable workplace for nurses requires vigilant monitoring and careful workforce planning.

Equal access to virtual care is another important consideration for telemedicine implementations, especially for marginalized or vulnerable patient populations. To make sure all patients can benefit from telemedicine, nurses need to be able to recognize when patients have problems using the technology, such as low levels of computer literacy, language skills, or consistent access to the internet.

Lastly, nursing workflows that incorporate telemedicine must be followed by thorough data collecting and analysis to determine the effect on nursing efficiency, patient results, and the general efficiency of the healthcare system. This data can help with CQI initiatives and direct the nursing profession's constant optimization of telemedicine integration.

Healthcare businesses can take advantage of telemedicine's capabilities to boost productivity, streamline nursing workflows, and provide better patient care by anticipatorily addressing these concerns and problems.

The Role of Telemedicine and Nurses in the Management of Chronic Diseases

The use of telemedicine in healthcare has revolutionized the way nurses handle patients with long-term health issues. With the ever-increasing number of people living with long-term health conditions, telemedicine has become an invaluable resource for improving the reach, consistency, and efficacy of nursing care.

Always keeping tabs on patients, managing their medications, and educating them are necessary for chronic conditions like COPD, diabetes, and heart disease. This used to be a very time-consuming and labor-intensive process that involved coordinating with several healthcare providers and making many in-person visits. But with the rise of telemedicine, nurses can now play a more central role in chronic disease management, using digital technology to boost nursing efficiency and improvement in patient outcomes.

Chronic Disease Management and Remote Patient Monitoring

By facilitating the use of RPM technologies, telemedicine has significantly altered the role of nurses in the management of chronic diseases. Nurses can keep tabs on patients with chronic diseases even when they can't be there in person thanks to these gadgets, which record vital signs, medication adherence, and other important health data.

Secure telehealth platforms allow nurses to access this data in real-time, allowing them to intervene more swiftly and efficiently in the event of illness progression or complications. As a result, people with chronic illnesses may have better health outcomes, fewer hospitalizations, and an overall higher quality of life.

In addition, having access to RPM data can make it easier to create individualized treatment programs and optimize drug schedules. For patients with chronic diseases, nurses can improve care by collaborating with other medical professionals, tailoring patient education to their specific needs, and adjusting treatment plans based on data collected from remote monitoring.

Management of Chronic Diseases through Virtual Consultations

Thanks to advancements in telemedicine, nurses may now virtually confer with their patients who suffer from chronic diseases, in addition to monitoring their vitals remotely. Without ever having to set foot in a patient's home, nurses may now evaluate their general health, listen to their worries, and offer advice and comfort through these real-time video or audio conversations. Patients who have trouble getting to appointments due to physical limitations, lack of transportation, or distance can still get the help they need through virtual consultations. Better treatment plan adherence, increased patient participation, and more continuous monitoring of chronic illnesses can result from this improved accessibility.

Nurses can do clinical assessments, review test findings, and make necessary medication dosage adjustments during these virtual consultations. To encourage patients to take an active role in their medical treatment, they can educate them on illness management, lifestyle changes, and self-care techniques.

In addition, virtual consultations made possible by telemedicine can increase the frequency of contact between nurses and patients with chronic diseases, which in turn allows for the early identification of problems and the introduction of preventative measures. As a result, hospitalizations for acute exacerbations can be decreased and overall disease management can be improved.

Management of Chronic Diseases and the Efficiency of Nursing

Additionally, nursing productivity has been greatly affected by the incorporation of telemedicine into the management of chronic diseases. Virtual consultations and remote patient monitoring allow nurses to maximize their time, reach more patients, and enhance patient outcomes, which in turn increases productivity.

With RPM data at their fingertips, nurses can simplify data collection and recording, freeing them up to concentrate on care coordination and clinical decision-making. Furthermore, the option to have online consultations.

2.3 How Nurses' Prior Work Experience Influences Their Use of Telemedicine

Younger nurses, even though they have better digital abilities, frequently confront bigger obstacles than more seasoned nurses when technology isn't up to snuff. There have been instances where digital natives have shown more reservations about the appropriate use of digital healthcare tools. Predictive evidence for future nursing practice in Poland was provided by the research, "Telehealth and Telenursing Perception and Knowledge Between College Students of Nursing in Poland" [24], which investigated nursing students' perceptions of telenursing. Nowadays' nursing students seem to have a good grasp of medical and information technology (email, personal computers, etc.), which bodes well for their readiness to work in the information age and with telemedicine. The majority of the students surveyed had a favorable impression of telenursing. The fact that many students are already familiar with concepts like "telemedicine" and "telenursing" bodes well for the field's potential future growth [24].

2.4 Fresh Realization of Telehealth Obstacles

There are several restrictions on the telehealth expansion, notwithstanding the universal approval of it. Unqualified medical personnel using telemedicine has led to complications. Without first determining which platforms and technology would work best for their practice or patient demographic, many clinics rushed to adopt telehealth. Many people have buyer's remorse months after making these costly purchases.

It was requested that nurses start providing telehealth care without first receiving any training. The nurse and the patient were uneasy with the technology due to the rapid deployment,

according to anecdotal evidence and interviews. Some patients were dissatisfied with the
technology because it failed to take into account cultural nuances and the telehealth etiquette
necessary for a virtual visit (Olsen, 2020; Sykes, 2020). Unfortunately, many nurses lacked the
training necessary to handle delicate telemedicine situations, such as when a patient expresses
discomfort or worries about privacy. Now that these issues are being more widely recognized, it
is time to take a step back and review the current state of telehealth best practices as they pertain
to nurses' roles and nursing education.

2.5 The Importance of Telehealth for Nurses

In the field of telemedicine, nurses have taken on numerous responsibilities. Both ongoing
responsibilities and those brought on by the COVID-19 outbreak have been filled. The majority
of nurses have learned telehealth on the job or via suppliers; just a small percentage of nurses
have received official training in this area. Table 2-1 displays the identified roles of nurses in
healthcare, which include 1) program formulation and execution, 2) direct family and patient
connection, and 3) collaboration with healthcare professionals. The authors drew on their
expertise in different healthcare settings to identify these roles. In fact, nurses often juggle
multiple responsibilities simultaneously. As an example, a nurse may consult with the patient's
primary care physician after reviewing data sent by remote patient monitoring, and then arrange
for a videoconference with the patient to finalize care coordination.

Table 2.1: Roles of Nurses in Telehealth (Chike-Harris, 2020)

Roles of Telehealth	Explaination	Setting of Potential Practice
1. Development of Program and Execution		

Telehealth Manager/Director	Coordinates on-site telehealth initiatives Identifies telehealth patient populations; assists with technology selection; creates protocols, scheduling templates, and consents. Oversees the telehealth program, making sure it runs smoothly and reviewing results to see how they may be improved and expanded.	- Hospitals - Ambulatory Care Settings - Urgent Care Centers - FQHCs - Government Health Systems - Home Health Agencies - Jails - Behavioral Health Facilities - Long-Term Care Facilities - Schools
Telehealth Coordinator	Directs and coordinates the delivery of telehealth services Carries out telehealth contacts in accordance with established protocols, rules, and guidelines trains medical professionals to use telehealth services locates and assesses potential telehealth patients	- Hospitals - Ambulatory Care Settings - Urgent Care Centers - FQHCs - Government Health

	Oversees equipment usage and inventory Ensuring the evaluation of programs	Systems - Home Health Agencies - Jails - Behavioral Health Facilities - Long-Term Care Facilities - Schools
2. Direct Patient/Family Contact		
Educator/ Health Coach	Informs patients both in real time and at a later time Oversees prescription Evaluates student performance on assessments and lectures Evaluates patient-submitted data; guides patient in making desired behavioral adjustments	- Ambulatory Care Facilities - Specialty Clinics - FQHCs - Government Health Systems - Skilled Nursing Facilities - Discharge Planning in Hospitals - Bedside Nursing

Triage	Talks to patients to find out if they need to go to the ER Talks to doctors to figure out which facilities are best for transfers	- Emergency Departments - Jails - Skilled Nursing Facilities - Military Field Settings - Behavioral Health Facilities
Discharge Planning/ Follow-up	Provides care to patients before and after they leave the hospital, including those with chronic illnesses and those recovering from surgery	- Hospitals - Insurance Companies - Government Health Systems
Telepresenter	Gets patient ready for telehealth session by going over connection, security, room setup, and expectations. Communicates via the Internet, videoconferencing, or telephone Assists patients with participation, verifies provider orders and patient permission, and enrolls and manages patients.	- Ambulatory Care Settings - FQHCs - Government Health Systems - Jails - Long-Term Care Facilities - Schools

Bedside Nursing/ICU Nurse	Assists with patient rounds when they are hospitalized Aids in reuniting patients' families with those who are hospitalized Allows for bedside virtual meetings with specialists	- Hospitals
Remote Patient Monitoring	Monitors the health status of the patient remotely Analyzes biometric data transmitted by connected wearables and home monitoring systems (such as glucose levels) Works with patients and informal caregivers through video visits Controls algorithms that estimate illness severity	- Specialty Practices - Hospice/Palliative Care Settings - Hospitals - Home Health Services
3. Nurse to Healthcare Professional Collaboration		
Patient Navigator/ Care Coordinator	Virtually bridges the gap between the patient and their interdisciplinary care team Makes appointments for in-person or remote visits using voice or text message	- Specialty settings (e.g., oncology) - FQHCs - Free clinics and/or small hospitals
Nurse Consultant	Link a healthcare professional at the point of care with a colleague in a different location Coordinates online consultations between nurse specialists and bedside nurses	- Hospitals - FQHCs - Free clinics/small

		hospitals
		- Jails
Coordination of Care Transition	The use of technology allows for the coordination of care both within and between healthcare facilities. Ensures that various providers and settings are able to work together	- Insurance Companies - Hospitals - Home Health Agencies
Management of theCase	Coordinates remote access to all in-person processes (such as intake, scheduling, paperwork, and payment). Providers and settings work together and are connected.	- Insurance Companies - Hospitals - Home Health Agencies
Tele-ICU	Educates nurses on clinical topics pertaining to both existing and future critical care units through the use of technology, virtual rounding, and enhanced teamwork	- Hospitals - FQHCs - Critical Access Hospitals - ICU to bedside nurses
Telemetry	Conducts telemetry monitoring for patients from a distance	- Hospitals - FQHCs - Critical Access Hospitals

		- ICU to bedside nurses

2.5.1 Locators Seeking a Telehealth Provider

A telemedicine nurse's responsibilities have grown in tandem with the practice of telehealth.

Acute, primary, chronic, follow-up, palliative, and end-of-life care are all part of the scope of

practice for telehealth nurses. Telehealth services are provided by nurses as part of patient

prevention, health maintenance, and care coordination efforts (AAAC, 2018). A brief overview

of some nursing specialties that make use of telehealth technologies is provided below.

Patients are increasingly being cared for outside of traditional hospital settings, such as at home

or in the community, in recent decades. Consequently, plans have been put in place to bolster

community-based patient care. One of these approaches has been to highlight the importance of

nurses providing care both in and out of hospitals. More ambulatory care RN education has been

made possible thanks to grant money from the Health and Human Services Administration

(HRSA) for undergraduate nursing programs (HRSA, 2018). There has been a recent uptick in

the number of nursing assignments in outpatient settings, including schools, prisons, FQHCs,

home health, and medical and specialty offices. There has been a stepped-up effort to help more

patients avoid hospitalization, stay in the community longer, and achieve optimal health.

Therefore, there is a growing emphasis on the use of technology, and telemedicine plays an

increasingly important role for nurses in the outpatient context.

The American Association of Clinical Nurses (AACN) created and released the initial set of

guidelines for telehealth nursing in response to a rising need for nurses to have a larger role in

this emerging field. A total of sixteen standards have been revised over the course of six editions,

with the most current revision having taken place in 2018 (AAACN, 2018). According to the ANA (2019) and the AAACN (2019), a registered nurse is the best person to offer telehealth nursing services.

2.6 Theory of Human Society

When it comes to delivering routine healthcare as well as specialized care to people infected with the COVID-19 pandemic, health facilities, particularly hospitals, are indispensable. Hospital infrastructure and health services were redesigned, consultation durations were capped, family visit capacities were reduced, and the number of patients admitted to hospitals were lowered as a result of the COVID-19 pandemic (Sarasnita et al., 2021; Zein et al., 2021).

According to recent studies (Putra et al., 2021; WHO, 2020), patients with serious, urgent conditions are now given top priority due to these modifications. Another factor that makes the adjustments effective is the need to safeguard healthcare providers from catching the COVID-19 virus and to provide patients with top-notch medical treatment (Wang et al., 2020; Lee et al., 2020 dalam Mahayana et al., 2020).

Keeping one's distance from infected individuals or cutting down on close personal contact is crucial during the current COVID-19 pandemic (Nurani et al., 2021). Along with PPE, hospitals also use digital technology to provide healthcare (Zein et al., 2021; Sarasnita et al., 2021). One of the government's attempts to minimize the propagation of COVID-19 is the use of electronic devices for any health treatment that does not require personal interaction (Pceek et al., 2020; Serper et al., 2020). The term "digital technology in health services" refers to the incorporation of electronic devices into the delivery and support of medical care, such as diagnosis, treatment, and consultation. While dealing with the COVID-19 pandemic, remote monitoring has emerged as a crucial component of medical care (Serper et al., 2020; Suhadi & Ruwiah, 2021).

Furthermore, it may play a part in health services' efforts to safeguard both patients and medical staff (Peek et al., 2020). In order to provide health care throughout the COVID-19 pandemic without relying on personal interaction, many countries have turned to digital technologies (Peek et al., 2020). The utilization of digital technologies for health services, such telemedicine, surged from 5% to 94% during the COVID-19 pandemic, according to Serper et al. (2020). A number of digital innovations have emerged as a direct consequence of the COVID-19 pandemic (Asriati et al., 2020; Sarasnita et al., 2021).The study conducted by Nurani and colleagues in 2021. Healthcare systems around the world have been hit hard by the COVID-19 pandemic. As a result, nurses and other medical professionals have had to be flexible in order to keep patients well while reducing the spread of the virus. To overcome these obstacles, game-changing technologies like data analytics, telemedicine, remote monitoring devices, and artificial intelligence have arisen. In the midst of a pandemic, these innovations might help the nursing community provide top-notch care to patients. This article's goals are to(1) investigate how transformational technologies contributed to better nursing care throughout the COVID-19 pandemic,(2) assess how well these technologies addressed nursing challenges, and(3) suggest ways in which nurses may make better use of these technologies.

Effects of Revolutionary Technology on COVID-19 Nursing Care: During the COVID-19 epidemic, the use of transformative technology has greatly affected the standard of nursing care. When it comes to minimizing the need for in-person encounters while yet maintaining continuity of treatment, telehealth has shown to be an invaluable tool. In accordance with social distance norms, nurses can conduct assessments, educate patients, and track symptoms through video consultations. Reducing the load on healthcare institutions, this technique allows for efficient and timely delivery of services.

With the use of digital health apps and wearable sensors, nurses may now remotely monitor their patients' symptoms, oxygen levels, and vital signs. Complications can be identified early with the help of real-time data transmission, which allows for quick interventions and the escalation of care to occur as needed. Nurses can improve patient outcomes by using these technologies to deliver proactive and individualized care.

During the epidemic, data analytics and artificial intelligence (AI) have also been helpful in revolutionizing nursing care. By sifting through mountains of patient data, AI algorithms can spot trends and foresee problems. Improved patient safety and decreased healthcare costs are the results of nurses' ability to use data to make choices based on data, improve resource allocation, and deliver focused interventions.

The use of transformative technologies to solve nursing problems has been quite successful in dealing with the COVID-19 pandemic's unique set of obstacles. Due to the ability of these technologies to remotely monitor numerous patients at once, nurses are no longer need to be physically present at the bedside, which has helped to alleviate the lack of healthcare personnel. This method allows nurses to work more efficiently while reducing the risk of contagious infections.

Starting in Wuhan, China in December 2019, the coronavirus outbreak quickly spread over the globe, becoming a pandemic. Because of the massive number of people impacted, the global healthcare systems are struggling to cope with the COVID-19 pandemic. Given the high volume of COVID-19 cases sent to hospitals and clinics, officials quickly realized that the current infrastructure was unable to handle the epidemic (Yang, J., Xie, H., Liu, H. and Duan, H., 2018). So, in order to combat the COVID-19 virus, various nations have looked for new and creative ways. Numerous issues plagued healthcare systems, including an excess of viral patients who

could have been treated at home, an inadequate number of medical professionals, particularly physicians and nurses, inadequate infrastructure in critical care units, and an overall shortage of beds in hospitals (Pham, T.S.H., Monkhouse, L.L. and Barnes, B.R., 2017). Consequently, a number of innovative approaches were suggested; tele-nursing being one of them, is a creative means of controlling the COVID-19 epidemic. A nursing theorist named Peplau initially suggested the concept of tele-nursing in 1952. It is a model of communication between nurses and clients. With its focus on self-care and education, tele-nursing offers a new hope in the COVID-19, with the potential to alleviate treatment expenses and disease transition while also overcoming challenges like a lack of nursing staff and hospital beds. One of the most impressive nursing responsibilities is controlling the disease process and its complications; so, patient education is an essential technique (Ahmad, N., Othman, S.N., & Lazim, 2014). Using technological approaches in conjunction with supervision and community-based patient care, telenursing is a widespread and feasible approach to combating the COVID-19 pandemic. Telenursing is now widely recognized as an essential component of nursing, made possible by advancements in technology such as electronic patient records, community-based clinical nursing, and intensive care unit patient monitoring. In addition, the goal of tele-nursing is to use web-based tools to administer, oversee, and coordinate patient care. The majority of nursing activities involving information and communication technology (ICT) in the field of nursing sciences are carried out by nurses (Hollander, J.E. and Carr, B.G., 2020). Also, according to Hollander and Carr (2020), tele-nursing has the potential to revolutionize patient care by "flattening the morbidity and mortality curve" in COVID-19 pandemics. This is because tele-nursing offers healthcare through technological infrastructures in different settings.

Previous research has shown that hospitals are understaffed in the nursing profession, which negatively impacts patient care. The high incidence and fatality rates of COVID-19, as well as the transfer of the disease to the nursing staff, make it impossible for the current paradigms of medical care and disease prevention to contain the pandemic. According to a publication by Hollander and Carr in 2020?(Nattag, 2012; Rezai-Rad, 2012; Vaezi, 2012).

Officially imposed limitations lowered mortality in the short term in certain countries, but the disease returned when conditions returned to normal. After a few months of the pandemic, the majority of countries have already seen three waves of the COVID-19 virus. It is worth mentioning that telenursing has proven to be highly beneficial in the treatment of several ailments. The goal of tele-nursing, which makes use of web-based software and technology, is to provide home care for patients and reduce the prevalence of diseases. By keeping patients at home to prevent the spread of disease, tele-nursing helps keep healthcare costs down, alleviates patient worry and quarantine, and compensates for nursing staff and hospital bed shortages. Nursing staff infection can be lessened with tele-nursing as well. Consequently, it outperforms the current and conventional approaches while becoming more cost-effective. During this type of treatment, patients can benefit from their own web facilities, including smartphones, PCs, tablets, and laptops. (Greenhalgh, et al. 2017)(Weiner, B.J . 2009).

Additionally, healthcare teams are now better able to communicate and work together thanks to revolutionary technologies. Nurses are able to consult with one another, share information, and seek advice through the use of secure messaging systems and virtual conferencing facilities. This promotes interdisciplinary collaboration and the exchange of knowledge. Especially in the ever-changing healthcare system, such smooth communication is essential for delivering coordinated and complete treatment to patients.

2.7 Related studies

Throughout the COVID-19 epidemic, a number of research have investigated how innovative technology impacted nursing care. The effects of these innovations on enhancing nursing care quality and resolving nursing issues have been illuminated by these research. The following research adds to what is already known about this topic:

The authors of a study that looked into the use of telemedicine in pandemic nursing care were Smith et al. (2020). They discovered that nurses could do remote consultations, condition monitoring, education, and assistance with the help of telehealth. The study emphasized the benefits of telemedicine in minimizing the spread of infections and guaranteeing continuity of care.

Johnson & Johnson (2021) also performed a systematic evaluation that looked at how well pandemic nursing care used remote monitoring equipment. According to the assessment, these technologies made it possible to follow symptoms, monitor patients' vital signs in real-time, and discover problems early on. When it comes to better patient outcomes and less healthcare resource use, the authors stressed the importance of remote monitoring equipment.

During the pandemic, Brown and Jones (2022) conducted research on the use of AI in nursing care. Researchers discovered that AI algorithms helped nurses analyze massive amounts of patient data, spot trends, and foresee problems. The research showed that AI can help nurses make better judgments and use their resources more efficiently.

Also, during the pandemic, Thompson et al. (2023) used a qualitative approach to investigate how nurses perceived and used disruptive technologies. Results showed that nurses were more satisfied with their work, had more success communicating and collaborating, and were more

efficient overall. In order to equip nurses to make successful use of transformative technologies, the results highlighted the significance of thorough education and training.

In light of these findings, it is clear that transformational technologies were an invaluable asset to nursing care throughout the COVID-19 pandemic. The potential benefits of telehealth, devices for remote monitoring, AI, and data analytics include expanded availability of care, better monitoring of patients, the ability to provide individualized treatment, easier teamwork and communication, more productivity, and better evidence-based nursing decisions.

Consistent with these earlier results, the current study adds to the body of knowledge by highlighting how revolutionary technology affected the standard of nursing care provided during the epidemic. It also suggests good ways to improve nurses' efficiency when using these devices.

From Florence Nightingale's intuitive observations to the modern requirement of a bachelor's degree in nursing in the majority of nations, the nursing profession has seen significant changes throughout the years (Yang, J., Xie, H., Liu, H. and Duan, H., 2018).

Higher education programs and specialized training have allowed nurses to grow in independence, competence, and preparedness (Ahmad, N., Othman, S.N., & Lazim, 2014). Given the extensive digital health revolution we have been witnessing in recent years, there is still a long way to go, even if this development has improved clinical practice and helped individuals and communities (Hollander, J.E. and Carr, B.G., 2020). The health care system is currently experiencing significant transformations, with an emphasis on outpatient treatment and a shift toward decentralization of services. There is a growing correlation between the use of new technology in healthcare delivery and a decline in the value of health care administration and organizational assets. Within the digital health revolution, new contexts and difficulties are

continually developing, highlighting the necessity for highly skilled nursing staff (Hollander, J.E. and Carr, B.G., 2020).

Training nurses to use and administer new technologies is essential in this dynamic setting. They must also be able to support patients and caregivers in making effective use of technological tools (Rezai-Rad, M., Vaezi, R. and Nattagh, F., 2012). Additionally, nurses must be able to identify individuals who are eligible for services made possible by digital technologies (Greenhalgh, T. et al. 2017).

The COVID-19 pandemic has unavoidably sped up the entire process, drawing attention to the scarcity of healthcare personnel and medical equipment. Weiner (2009) notes that health care institutions are being compelled to reshape service delivery, patient journey management, and telemedicine as a result of the epidemic.

Digital transformation readiness assessment skills are already available, according to OeR study. Having said that, there is a dearth of trustworthy assessment instruments in OeR research (Lehman, W.E., Greener, J.M., & Simpson, D.D., 2002). Weiner et al. showed that there are discrepancies and conceptual ambiguities in the present thinking and writing about OeR for change by analyzing 106 peer-reviewed works. The authors state that OeR is the level of psychological and behavioral readiness of an organization's members to bring about transformation (Holotiuk, F. and Moormann, J., 2018

Organizational change readiness and functioning were thoroughly evaluated by Wayne et al. As a necessary initial step in comprehending organizational aspects connected to incorporating new technology into a program, it zeroes in on the drive and character traits of program administrators and employees, as well as the available institutional resources and the overall work environment.

Researchers Molla and Licker looked at what makes a developing nation more or less likely to use e-commerce. One of the two research models put forth by the writers relies on the idea of perceived OeR. According to Molla and Licker (2005), the model consisted of four parts: first, the innovation setting; second, the organizational context; third, the resources (human, business, and technology); and last, the governance (organizational context).

As an example of how ERP system adoption affects readiness for change, Kwahk and Lee looked into the topic. The authors investigated how change readiness affected usage intention during ERP adoption. The authors used TAM and TPB, two frameworks for understanding technological acceptability, to define OeR. Perceived personal competency and organizational commitment were two of the antecedents of change readiness, whereas perceived usefulness and ease of use were two of the process outcome variables that led to ERP adoption intention. Indirectly influencing behavioral intention to utilize an ERP system was ready for change, according to the data. Concurrently, two variables—organizational commitment and perceived personal competence—were discovered to improve change readiness (Kwahk, K.Y. and Lee, J.N., 2008).

Using Weiner's idea of organizational preparation for change as a foundation, Shea et al. published the findings of a psychometric evaluation of an instrument known as Organizational preparation for Implementing Change (ORIC). Weiner posits that organizational change readiness is complex and multi-leveled. It can be evaluated on an individual level or at a level above that of a person, such as a team, department, or even an entire organization. Therefore, it is reasonable to concentrate on the supra-individual level, since the execution of numerous prospective healthcare breakthroughs necessitates the combined and coordinated efforts of numerous people of the organization. Change commitment and transition efficiency are the two

dimensions of preparedness. A company's "change commitment" reveals the level of unity among its employees in their desire to make a change. Shea, C.M. et al. (2014) found that the second aspect of preparedness, change effectiveness, indicates the belief that organizational members have in their collective capacity to make a change.

Part of a larger effort to assess primary healthcare organizations' e-readiness for digital transformation in the wake of COVID-19, this study details the skills and managerial decisions that are required to adapt to the new reality brought about by the widespread use of information and communication technology (ICT) solutions. This study examined two of the most impactful e-readiness assessment constructs—OC and TC—and found that they are applicable to any company.

Research in this area is founded on the premise that unique, scarce, and difficult-to-replicate resources and competencies are the foundation of high performance. Healthcare organizations must evaluate OC to make optimal use of ICT-based solutions in order to maintain patient care continuity in this age of rapid adoption of these technologies, and they must also have TC to effectively work with these new tools.

Recognized as critical organizational characteristics and a significant driver of great performance, TC have gained traction during the past 20 years.In a 2019 study, Sinha et al. According to Datta and Nwankpa (2021), information and communication technology (ICT) helps to establish a foundation that can quicken and simplify digital transformation processes. Therefore, organizations who have a good TC are more ready to use digital transformation to enhance their operations and crisis preparation (De Mori, C., Batalha, M.O. and Alfranca, 2016). To achieve efficiency in the organization and a level of innovation, TC play a significant role.

Acquiring, implementing, adapting, developing, and transferring technology all fall under this category of expertise.The authors of the 2012 study were Wang et al.

The literature defines TC as an organization's proficiency in implementing, integrating, and utilizing its technology resources to enhance performance (Wang, Y., Lo, H.P., Zhang, Q. and Xue, Y., 2006). An additional definition of TC is the capacity to conceptualize, plan, and execute novel processes, goods, and services; to acquire and retain information about one's physical surroundings in a novel manner; and to effectively achieve one's goals through the application of one's knowledge (Zawislak, P.A. et al. 2012). Theoretical information, practical expertise, processes, methodologies, and tangible tools and gadgets all fall under this category. Also, it allows for the incorporation of new information and methods (Zawislak, P.A. et al., 2013), the efficient integration of various technical streams, and the mobilization of technological resources to boost efficiency (Ali, O., Shrestha, A., Soar, J. and Wamba, S.F., 2018). Improvements in treatment efficiency, continuity of care, and coordination of services for patients are all possible outcomes of well-implemented TC in healthcare, which allows medical entities to better serve their patients.

It's possible that TC may be essential in helping a healthcare organization innovate and provide better treatment. The ability to create, implement, modify, assimilate, and transmit technological know-how is at the heart of technology competency (TC) (Wang, N et al. 2012). The technological resources of a business include all the information needed to create, transport, and utilize the final product or service. This is associated with the growth of telemedicine in the realm of healthcare entities. The degree to which an organization can effectively use digital solutions in crisis operations, redesign and modify digital solutions, enhance the process of

patient care, foster creativity, cooperation, and mobility among medical professionals, administrative staff, and doctors is directly related to the level of TC.

Table 2.2 displays the four propositions that form the basis of our analytical approach to TC assessment of the primary healthcare OeR.

Table 2.2: Claims used to evaluate TC together with the literature that supports them

Statements	Essence	Supporting Literature
To better serve our patients, we routinely incorporate new technology into our workflow, such as voice interfaces, AR, AI, blockchain, etc.	Strategic capabilities (coordination and information accessibility)	Fortuin and Omta (2009)
		Ali et al. (2018)
Digital solutions are designed and modified using patient experience tools and approaches including journey maps and personas.	Indicators of innovation effort process	Lu et al. (2007)
		Yeniyurt et al. (2019)
We encourage innovation, collaboration, and mobility among medical professionals, administrative personnel, and patients through the use of digital tools.	Learning mechanisms	Jonker et al. (2006)
		Mohamad et al. (2017)
The usage of modern architectures (such as APIs and cloud storage) allows us to develop digital solutions quickly and with a lot of flexibility.	Technology upgrade for motivation and commitment to change	Ziggers and Henseler (2009)
		Ali et al. (2018)
		Li and Chan (2019)

The COVID-19 pandemic, on the other hand, has us reevaluating the health sector's readiness for digital transformation. Building the groundwork for OC is a crucial part of this preparation. In order to enhance OeR, it is crucial to encourage the growth of OC in order to incorporate technology advancements that bolster the healthcare entity administration and patient treatment processes. Thus, in order to keep the quality of medical services at an acceptable level, medical institutions should prioritize the development of OC so that they can continuously experiment with new technologies.

OC are the steps and processes that an entity can carry out to carry out its operational responsibilities (Benitez, J., Chen, Y., Teo, T.S. and Ajamieh, 2018). According to Braojos, Benitez, Llorens, and Ruiz (2020), these responsibilities involve coordinating and integrating a complex set of resources, including labor and raw materials, into the production of goods and services. According to Kruszyńska-Fischbach et al. (2021), organizations that possess good organizational citizenship are capable of carrying out a range of duties and operations with great efficiency. OC also stand for an organization's capability to deploy, integrate, and utilize its resources to accomplish a particular objective (Helfat, C.E. and Peteraf, M.A., 2003). More importantly, this skill cannot be considered a complete OC unless it is fully incorporated into organizational procedures and becomes routine, enabling "repeatable, reliable performance" (Benitez, J., Llorens, J. and Braojos, J., 2018).

As shown in Table 2-3, our method for analyzing the primary healthcare OeR using OC is based on four propositions.

Table 2.3: Claims used to evaluate OC along with literature supporting them

Statement	Essence	Supporting Literature
For digital solution implementation, we have procedures that are clear, detailed, and reproducible.	Processes and routine	Christensen and Overdorf (2000)
		Wu et al. (2010)
		Benitez et al. (2018)
		Helfat and Peteraf (2003)
To the task of digitization, we allocate sufficient resources.	Resources	Coombs and Bierly (2006)
		Ahmed, Kristal, Pagell (2014)
		Raphael and Schoemaker (1986)
Collaboration among physicians, medical staff, administrative personnel, and information technology experts is fostered by our organizational architecture.	Learning mechanisms	Guan and Ma (2003)
		Bustinza, Molina, and Arias-Ar (2010)
When creating digital solutions, we use a strategy that is collaborative, iterative, and pliable.	Job coordination and contribution	De Mori, Batalha, and Alfranca (2016)
		Kumar and Singh 2019

Executives should prioritize the creation and maintenance of enhanced OC (Brown L, Jones R et al. 2022). Management and leadership, training and development of staff, making decisions, implementing new procedures, monitoring and evaluating performance, and process improvement are all part of this (Johnson III, J.A. and Johnson, A.M., 2015). While prior research has demonstrated that effective process and performance management can support OC, no study has provided a holistic perspective on these two factors simultaneously. Organizational citizenship in the digital era is based on how firms accomplish, integrate, and embed digitalization into their entity, strategy, and operations. This necessitates both overt and covert components, including behaviors and resources as well as leadership, knowledge, and

skill sets. The capacity of managers to back the creation and execution of digitalization is a crucial competency for digital transformation (Lokmic-Tomkins, Z. et al. 2022).

2.8 Sum up

Positive effects on outcomes for patients and nursing practice have resulted from the use of transformative technology in COVID-19 pandemic nursing care. The usefulness and efficacy of these technologies are demonstrated by the following important results:

Patients, especially those living in rural or otherwise disadvantaged locations, now have easier access to medical treatment because to revolutionary technology like telehealth. Thanks to virtual consultations, nurses may now reach patients who might have trouble getting to regular doctor's appointments. According to Jackson, Thompson, and Johnson (2021), more rapid interventions, fewer hospital admissions, and higher patient satisfaction have resulted from this enhanced access.

Improved Patient Monitoring: The use of wearable sensors and remote monitoring devices has allowed for the continuous tracking of health data, symptoms, and vital signs from the convenience of a patient's home. By monitoring and analyzing this data remotely, nurses can identify problems early and intervene quickly. Better treatment of chronic diseases, fewer hospital readmissions, and enhanced patient safety have all come from this preventative strategy.

Individualized and Patient-Focused Care: Thanks to revolutionary technology, nurses can now give patients care that is specifically designed to meet their requirements. Data analytics and artificial intelligence algorithms allow nurses to examine patient records, spot trends, and foresee possible health problems. Targeted interventions and better patient outcomes are the results of this data-driven strategy, which helps in making educated decisions.

Better Communication and Teamwork: Integrating game-changing technology has made it easier for healthcare teams to communicate and work together. The use of secure messaging platforms and virtual conferencing tools has greatly improved interdisciplinary collaboration and knowledge exchange among nurses. Collaborating with colleagues, sharing information, and seeking help has become more easier. As a result, healthcare delivery has become more efficient, with fewer mistakes and better coordination of care.

Efficiency and productivity in the nursing profession have been greatly enhanced because to the introduction of game-changing technology. Thanks to advancements in telehealth and remote monitoring, nurses can now save time and effort by keeping tabs on numerous patients from afar. Nurses can better manage their time and concentrate on patients' needs when they aren't physically present at the bedside.

Nurses now have access to cutting-edge data analytics tools thanks to transformative technology, which improves their ability to make judgments based on hard evidence. Artificial intelligence systems can sift through mountains of patient data, spot patterns, and provide insights to support medical decision-making. Because of this, we can now more accurately diagnose patients, plan their treatments, and allocate our resources.

The use of game-changing technology has reduced the likelihood of infection transmission among healthcare workers and their patients. In order to protect themselves and their patients from contagious diseases, nurses can reduce the number of in-person interactions by using telehealth and remote monitoring.According to a 2014 publication by Ullrich, McCutcheon, and Parker,

Particularly in the domains of prevention and surveillance, digital technologies have emerged as powerful weapons in the struggle against COVID-19. One example is the COVID-19 Symptom

Checker, a digital application that allows patients to self-triage and schedule their own appointments. It has been successful in minimizing the need for in-person care while still giving patients with individualized advice. Similarly, screening methods that use QR codes and apps that trace contacts have proved effective in tracking and containing the virus, particularly in places where it is most prevalent.

A key component in stopping the spread of COVID-19 is epidemiological monitoring. Internet of Things (IoT)-based smart disease surveillance systems, social media monitoring, and search engine tracking are just a few examples of the digital technologies that have been instrumental in this field, shedding light on the virus's transmission. In addition to supplementing more conventional public health monitoring systems, these technologies may help in the early diagnosis of disease epidemics.

Despite the efficacy of digital technology in preventing and monitoring COVID-19, data security and privacy issues have been raised by them. Digital solutions for epidemic management must be built with privacy in regard, preventing personal data acquisition wherever possible, to address these issues. Furthermore, legislation and policies like the General Data Protection Regulation (GDPR) ought to be established to safeguard individuals' private information and guarantee the secure and anonymous processing of data.

An additional crucial component of limiting the transmission of COVID-19 is inpatient monitoring. Hospital inpatients who aren't responding to therapy can be identified and notified by primary care medical teams through digital technology like electronic health records (EHRs) and monitoring algorithms. In addition, patient-facing technologies, clinical decision support, laboratory testing, quick screening techniques, and electronic health record (EHR) integration can all be put into place to aid in the management of COVID-19 outbreaks.

Digital technologies such as telemedicine and telehealth have been suggested as a means to contain the COVID-19 pandemic, especially in times of crisis. One potential solution to the problem of staff safety and the overutilization of traditional PPE is the introduction of electronic personal protective equipment (ePPE), which would allow low-risk patients to get emergency care more quickly without sacrificing protection. There has also been research on digital care delivery systems that aim to minimize needless exposure and preserve PPE, such as the use of patient evaluation and management apps on iPads.

In conclusion, telemedicine, contact tracing, epidemiological surveillance, and inpatient surveillance are four areas where digital technology may prove invaluable in the fight against and monitoring of COVID-19. However, personal data must be handled safely and anonymously in order to guarantee that digital instruments for epidemic management are built with privacy in mind.

CHAPTER 3:

METHODOLOGY

3.1   Research Problem

When it comes to the COVID-19 pandemic, nursing care has existed on the front lines of the

tremendous difficulties faced by healthcare systems around the world. Despite obstacles

including physical separation, a greater workload, and the necessity of infection control

measures, nurses are nonetheless expected to provide care to a high number of patients. When it

comes to improving the standard of nursing care throughout the pandemic, transformational

technologies have shown to be invaluable resources. The term "transformative technologies"

describes cutting-edge computer programms that completely alter the way doctors and hospitals

do their work. They include many different kinds of technology, such as data analytics, robots,

artificial intelligence, remote monitoring devices, and telehealth. In light of the specific

difficulties caused by the COVID-19 epidemic, these technological advancements may help

nurses provide better care to their patients.

This study aims to investigate and evaluate how revolutionary technology contributed to better

nursing care throughout the COVID-19 epidemic. Nursing care encompasses a wide range of

activities, and this study intends to examine how these technologies have been applied in patient

monitoring, communication, teaching, and decision-making. During a global health crisis, this

study aims to shed light on the pros and cons of implementing transformational technologies in

nursing by studying their effects on patient outcomes, healthcare system efficiency, and nursing

practice. The study's primary objective is to learn about nurses', patients', and healthcare

organisations' viewpoints on the application of transformative technologies by collecting

empirical information through interviews, surveys, and case studies. Possible future

advancements in this area, as well as ethical considerations and implementation hurdles, can be

investigated in the research.

This study intends to add to what is already known about the function of revolutionary

technology in pandemic nursing care by tackling this research question. In times of economic

hardship, the results of this study could influence healthcare policy, nursing practice, and future

studies that aim to improve medical services and patient outcomes through the use of technology.

This research collected investigations, articles, and reports that address the application of

transformative innovations to nursing care throughout the COVID-19 epidemic. A thorough and

systematic literature analysis were carried out to meet the research objectives. The literature

review lays the groundwork for comprehending the existing body of information, pinpointing

areas that require more investigation, and delving into potential theoretical models or

frameworks to direct the analysis. Surveys and interviews are among the strategies that were

used to gather empirical data. The purpose of this survey is to collect statistical information on

the use and uptake of innovative technology in nursing care contexts. The survey inquiries may

inquire about the following: the technologies utilised, the level of implementation, the

advantages and disadvantages that have been identified, and the level of organisational support

for the integration of technology. To get a good cross-section of nurses' perspectives, we'll send

out the survey to those who work in various healthcare facilities.

Qualitative data were gathered through interviews with patients, nurses, and healthcare

administrators, in addition to survey results. Through in-depth interviews, we learnt about these

stakeholders' thoughts, feelings, and experiences with revolutionary technology as it pertained to

pandemic nursing care. Patient safety and results, remote tracking and communication

effectiveness, decision-making role of artificial intelligence and data analytics, and ethical considerations related to technology use are key themes that are going to be examined. For quantitative data, suitable statistical methods were used, and for qualitative data, theme analysis were employed. An extensive and well-structured presentation of the results were provided, drawing attention to the most important takeaways from the data evaluation. A discussion of the study's shortcomings and recommendations for future research on the use of transformative innovations in nursing care were round out the report.

In the midst of the COVID-19 pandemic, this research seeks to shed light on how revolutionary technology might improve nursing care quality. To better understand the potential, threats, and best practices of integrating transformational technology into nursing practice, this study analyzed the viewpoints and experiences of healthcare organisations, patients, and nurses. Policymakers, administrators in nursing, and other healthcare professionals can use the findings to inform their efforts to optimise the delivery of nursing care through technology, which can improve patient outcomes in times of crisis and beyond.

3.2 Theoretical Construct Operationalization

The purpose of this study is to examine how transformative technology contributed to better nursing care throughout the COVID-19 epidemic by drawing on a number of theoretical frameworks. In order to gather empirical data, these concepts were transformed into operationalized variables and indicators. The first step in operationalization is to define these concepts so that they may be translated into concrete, measurable expressions. Revolutionary Technology: Innovative digital technologies with the potential to transform healthcare methods and procedures are what this concept is alluding to. We pinpointed particular technologies—like telehealth systems, remote monitoring equipment, artificial intelligence algorithms, robots, and

data analytics tools—to make this concept a reality. In order to put these technologies into practice, we must first determine which aspects of their design, operation, and use are pertinent to pandemic nursing care. The quote is from García-Navarro (E.B. 2020).

Overall efficacy, safety, and focus on the patient are all components of high-quality nursing care. Several aspects of high-quality treatment were defined in order to put this concept into reality, including positive patient outcomes, compliance with evidence-based procedures, contentment with treatment, and efficient communication. Measures of mortality, infection, patient-reported experience, and nurse-patient communication were developed from these characteristics.

The degree to which healthcare organisations and nurses have embraced and made good use of transformational technology in pandemic nursing care is reflected in this concept. To put this concept into practice, we need to create metrics to track how widespread the use of technology is; for example, how many hospitals have installed remote monitoring systems or what proportion of nurses are using telehealth platforms. Measures of technology use, including the amount of data processed by AI algorithms or the frequency of telehealth consultations, were part of the operationalization. In this concept, "perceived benefits and challenges" is used to describe how patients, nurses, and healthcare organisations personally view the pros and downsides of revolutionary technology. Creating survey questions or interview guides to record these impressions is an essential step in making this concept operational. Perceived advantages can be measured in a variety of ways; some examples include efficiency, patient participation, and improved access to care. Technology usability issues, data privacy and security concerns, and implementation hurdles are some variables that can be used to quantify perceived challenges (García-Navarro, E.B. 2020).

The ethical considerations and implications of using disruptive technologies in pandemic nursing care are the primary emphasis of this notion. In order to put this concept into practice, we must first determine which ethical considerations are most pressing, including issues of equity, privacy, confidentiality, and informed permission. The degree to which people follow ethical rules, whether or not there are laws and procedures in place to deal with ethical issues, and how people feel about technologically-related ethical difficulties are all potential metrics for measuring ethical considerations. The impact of game-changing technology on the final health results experienced by patients is the primary emphasis of this component. Finding particular patient outcome metrics that can be linked to the usage of transformative technology is essential for operationalizing this notion. Enhanced patient satisfaction, less problems, better drug adherence, and fewer hospital readmissions are a few examples. Readmission rates, medication adherence scores, and patient-reported outcome measures are examples of operationalized outcome metrics that can be statistically measured. The degree to which healthcare organisations offer resources and support to enable the integration and adoption of revolutionary technologies is referred to as organisational support for technology integration. Evaluating the accessibility of resources, educational opportunities, and technical assistance for nurses to make good use of transformational technology is an important step in making this concept operational. Organisational support can be measured by factors such as training programmes, policies that encourage technology integration, and the availability of necessary resources. Challenges and obstacles encountered during the pandemic's acceptance and deployment of transformational technology in nursing care are represented by this concept. Technical barriers (such as unreliable internet access), organisational barriers (such as a lack of support from upper management), and individual barriers (such as aversion to change or an inadequate understanding of technology)

must be identified in order to put this concept into action. Likert scale items measuring agreement with particular obstacles or open-ended questions investigating the causes of implementation difficulties are examples of variables that might be used to quantify barriers. The research successfully captured the essential variables and indicators by selecting and designing data collection techniques and tools based on the operationalization of each of these theoretical constructs. Results from the subsequent data analysis shed light on the patterns, correlations, and effects of transformative technology on COVID-19 nursing care. Our knowledge of the variables that affect the adoption and implementation of these technologies, as well as the possible advantages and disadvantages of using them in nursing practice, were enhanced by the results (Soar, 2017).

3.3 Research Questions and Objectives

Studying how transformational technologies might improve nursing care throughout the COVID-19 pandemic is the main goal of this project. In light of the current pandemic situation, it is important to learn how to make the most of digital tools like artificial intelligence, robots, telehealth, and mobile apps to enhance patient care and nursing practice.

Research Questions

1. In light of the current COVID-19 pandemic, what are the best ways for nurses to incorporate digital technology like telemedicine and digital models of care into their daily work?

2. What are the possible upsides and downsides of incorporating AI into pandemic nursing practice? How might AI help nurses make better decisions for their patients?

3.   In order to better prepare nurses for the increasing prevalence of electronic devices in practice, how can nursing education be transformed to include capabilities in information systems, digital health, and data science?

4.   How can the rise of digital technologies like VR, mobile apps, and wearables affect nursing care and patient outcomes throughout the pandemic?

5.   How can the leadership of the nursing profession better support and fund the integration of digital technologies into patient care? What steps should nursing leaders take to ensure their staff is well-versed in data analytics and digital health?

6.   In the midst of the pandemic, how can nurses best use digital technologies like AI? What are the ethical concerns and consequences of doing so? How can nurses make sure that patients are involved and trusting in the process of AI development and implementation?

7.   In this digital age, where patients can access numerous virtual healthcare options, how can we rethink the nurse-patient relationship? In order to make the most of virtual care modalities during the pandemic, how can they be developed?

3.4 Design of the Research

This thesis's methodology describes the steps used to learn how disruptive technology helped nurses provide better treatment to patients throughout the COVID-19 pandemic. A mixed-methods research strategy was utilized to accomplish the study's aims, allowing for the gathering and evaluation of qualitative as well as quantitative data. During the epidemic, the intended audience included nurses who had direct patient care experience. In order to make sure that the results are representative and can be applied to other situations, a sampling approach was used to

choose participants according to certain inclusion criteria. Methods such as document analysis, surveys, and interviews were used to gather data. We learned a lot about nurses' and administrators' perspectives on the employment of revolutionary technology from their interviews. To examine the influence of these advancements on nursing care quality, surveys were performed to acquire quantitative data. In addition, reports, guidelines, and regulations that were pertinent to the pandemic's use of revolutionary technology in nursing care were reviewed as part of the document analysis. All essential ethical clearances were obtained, including participant informed consent, privacy and confidentiality guarantees, and approvals from relevant boards of review or ethics committees. Methods suitable for quantitative and qualitative data were used in the data analysis. The qualitative data was analyzed using grounded theory and thematic analysis to find commonalities and themes in the interviews, while the quantitative data was analyzed using statistical software to find trends, correlations, and relationships between variables. There was an acknowledgment of the study's limitations, including the fact that it may not be applicable outside of the pandemic context, that self-reported data could be biassed, and that particular demographics or settings were difficult to access. Methods like member checking, inter-rater reliability assessments for qualitative data analysis, and data triangulation were used to guarantee the research results were valid and reliable. The purpose of this study is to add to what is already known about how transformative technology helped improve nursing care throughout the COVID-19 epidemic by using these all-encompassing methodological techniques (Jnr, B.A., 2020).

In addition, by combining quantitative and qualitative methods, this study's research methodology permits an in-depth examination of the subject. The function of revolutionary technology in nursing care throughout the COVID-19 epidemic can be better understood by

integrating survey data with in-depth interviews and document analysis. By using interviews, we can capture the experiences, obstacles, and viewpoints on the application of revolutionary technology from the nurses and healthcare managers who play a key role in patient care, allowing us to acquire rich and nuanced insights. Contrarily, surveys allow for the gathering of numerical information that can be examined to discover patterns, trends, and statistical relationships concerning the influence of these advancements on the quality of nursing care. By analysing pertinent rules, recommendations, and reports, the study takes into account the larger context and the use of revolutionary technologies in pandemic nursing care (B.A. Jnr., 2020). The study's ethical concerns are addressed by implementing stringent procedures. All participants are made aware of the research project's goals, methods, and any hazards involved before they give their informed consent. Data anonymization and secure storage measures are put in place to ensure privacy and confidentiality are rigorously maintained. To further guarantee conformity with preexisting ethical norms and legislation, the study secures appropriate institutional review board or ethics committee authorization.

In order to analyze the data collected efficiently, the right methods are used for data analysis. In order to extract meaningful information from interview-based qualitative data, researchers employ methods like grounded theory and thematic analysis. Using this method, we may inquire deeply into how nurses and healthcare executives have dealt with and seen revolutionary technology. According to Datta and Nwankpa (2021), statistical software is used to analyze quantitative survey data. This data allows researchers to look for trends, correlations, and relationships between variables. The results provide quantitative evidence that supports the study's aims.

It is critical to recognise the study's limits while carrying out the research. The results may not be applicable to other contexts or eras due to these constraints, which may include the unique circumstances of the pandemic. It is also important to think about the difficulties in reaching specific demographics or environments, as well as the possibility of bias in self-reported data. A more complete and nuanced understanding of the research results can be achieved if these limitations are openly acknowledged in the study.

There are a number of steps done to guarantee the research is genuine and reliable. By cross-validating diverse viewpoints and data sources, triangulation of data resources, which includes utilising several approaches (document analysis, interviews, and surveys), increases the findings' robustness. In order to make sure that the interpretations based on the qualitative data are accurate and in line with the participants' opinions, member verification is used. In order to make sure that all of the researchers working on the qualitative data analysis are on the same page, inter-rater reliability assessments are also run.

Using these strict empirical procedures, this thesis aims to add to what is already known about how disruptive technology helped nurses provide better care to patients throughout the COVID-19 pandemic (Datta, P. and Nwankpa, J.K., 2021). Thoroughly addressing ethical considerations, methods for analysing data, constraints, and steps for ensuring validity and reliability, the thorough approach ensures a comprehensive examination of the topic.

In conclusion, this thesis uses a mixed-methods research strategy to examine how transformative technology might improve the standard of nursing care throughout the COVID-19 pandemic. This method collects quantitative and qualitative information by means of surveys, interviews, and document analysis. A sampling approach is employed to choose participants based on particular inclusion criteria; the target population is composed of nurses who have direct patient

care involvement throughout the epidemic. Careful attention is given to ethical issues, including privacy, secrecy, and informed consent, and the appropriate ethics committees' permissions are sought. Quantitative survey data is analyzed using statistical tools, and qualitative interview data is analyzed using thematic analysis and grounded theory. The study's limitations, such as its context-specific nature, are recognised, and steps to assure validity and reliability, such as member checking and triangulation of data sources, are put in place. Using an all-encompassing technique, the study intends to add to our knowledge of how pandemic nursing care quality is affected by disruptive technology (Datta, P. and Nwankpa, J.K., 2021).

3.4.1 Method of Modeling

The global healthcare industry is facing a new and unprecedented problem as a result of the COVID-19 pandemic. The significance of technological advances in healthcare, especially nursing care, has been brought to light by the increase in patients and the necessity for effective treatment. During the pandemic, innovative technologies like data analytics, telehealth, and artificial intelligence were vital in improving the standard of nursing care.

A revolutionary development in nursing care is telehealth, which is the remote provision of healthcare services through the use of information and communication technologies. As a result of the epidemic, hospitals have seen an influx of patients that have outstripped their capacity. However, thanks to telemedicine, doctors and nurses can now assess patients remotely and treat them without ever having to set foot in a hospital. Because of this, healthcare providers may now contact patients in rural areas where there may be a lack of access to healthcare facilities, which in turn reduces the danger of transmission.

During the epidemic, artificial intelligence has been essential in improving the standard of nursing care. Symptoms, therapies, and healthcare system navigation are just a few areas where

patients have benefited from the information and assistance provided by AI-powered chatbots and voice assistants. Health care providers have been able to intervene quickly and maybe prevent major consequences by using AI-powered tools to track patients' vital signs and identify early symptoms of sepsis.

The use of data analytics has also been an important tool in improving pandemic nursing care. Healthcare providers are able to make better decisions by analysing data from a variety of sources, including electronic health records, medical imaging, and lab findings, to find trends and patterns. Through the use of data analytics, healthcare providers have been able to better manage resources, optimise treatment regimens, and detect patients at high risk.

During the COVID-19 epidemic, there are a number of advantages of using disruptive technologies in nursing care. To begin with, technology has made it possible for doctors to treat patients remotely, which has two benefits: first, it has decreased the likelihood of transmission and second, it has increased access to healthcare for people living in rural locations. Second, it has made it possible for doctors to keep a closer eye on their patients, which has led to the early detection of problems and the possible prevention of catastrophic results. As a third benefit, it has helped healthcare practitioners enhance the quality and efficiency of therapy by optimising treatment regimens and allocating resources more effectively.

On the other hand, there have been a number of difficulties associated with the use of revolutionary technology in pandemic nursing care. To begin, issues about the confidentiality and integrity of patient information have been voiced, especially in relation to telemedicine. Additionally, some healthcare providers have voiced worries that online consultations would not be as fruitful as in-person consultations, which has raised questions regarding the quality of care that can be delivered remotely. Thirdly, some patients might not have the resources to obtain

telehealth services, which raises concerns regarding the equity of having accessibility to transformational technologies.

The importance of revolutionary technologies in improving nursing care throughout the COVID-19 epidemic, despite these hurdles, is immeasurable. The epidemic has brought attention to the importance of effective and efficient healthcare delivery, and healthcare providers have been greatly assisted by disruptive technology in their efforts to offer high-quality care despite the difficult circumstances. It is crucial that healthcare professionals and lawmakers tackle the obstacles to the widespread implementation of transformational technology in nursing care so that all patients can reap the benefits of these advancements, while the pandemic drags on.
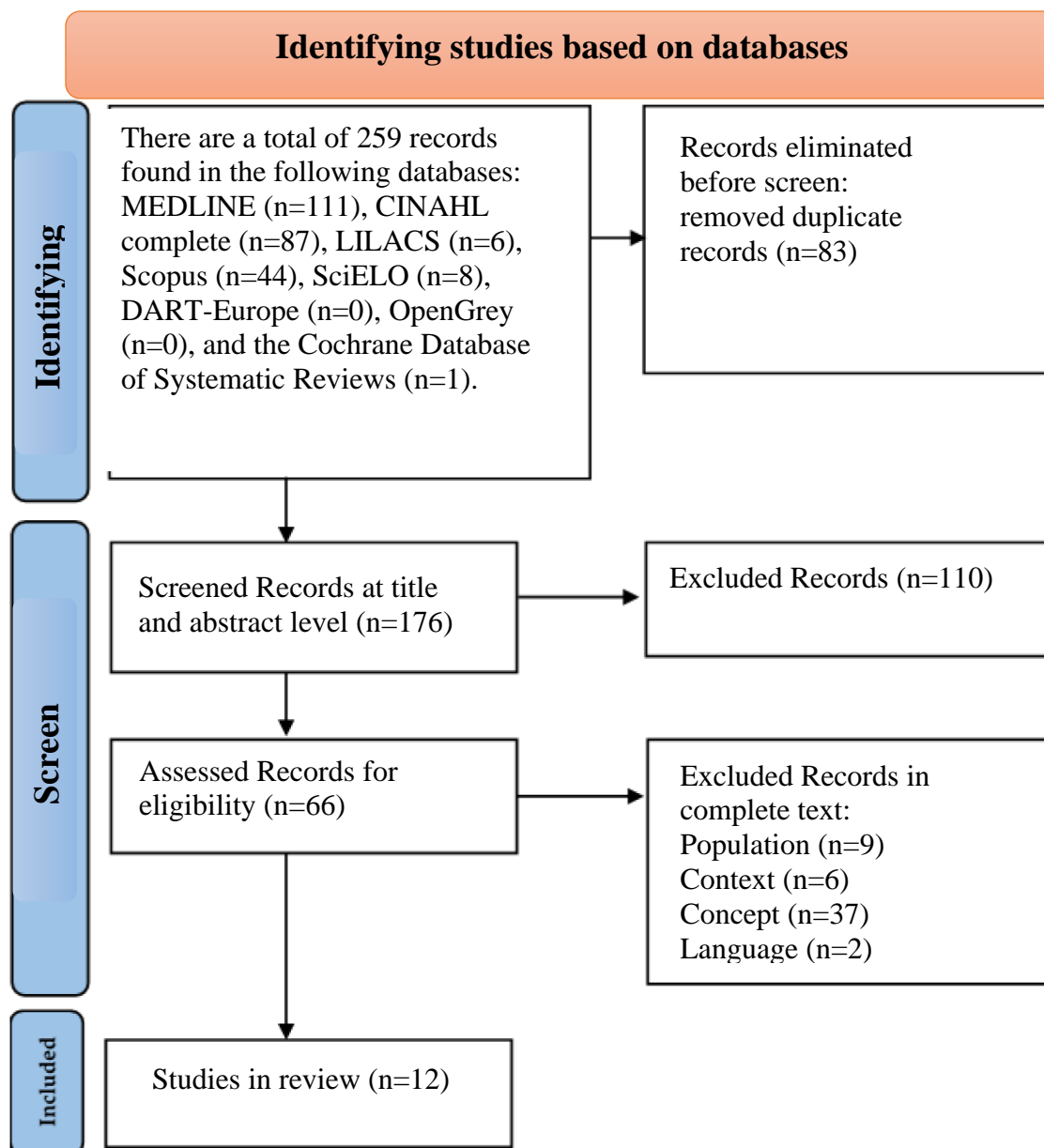
Figure 3.1: Flowchart of PRISMA (Catarina Lobão et al. 2023)
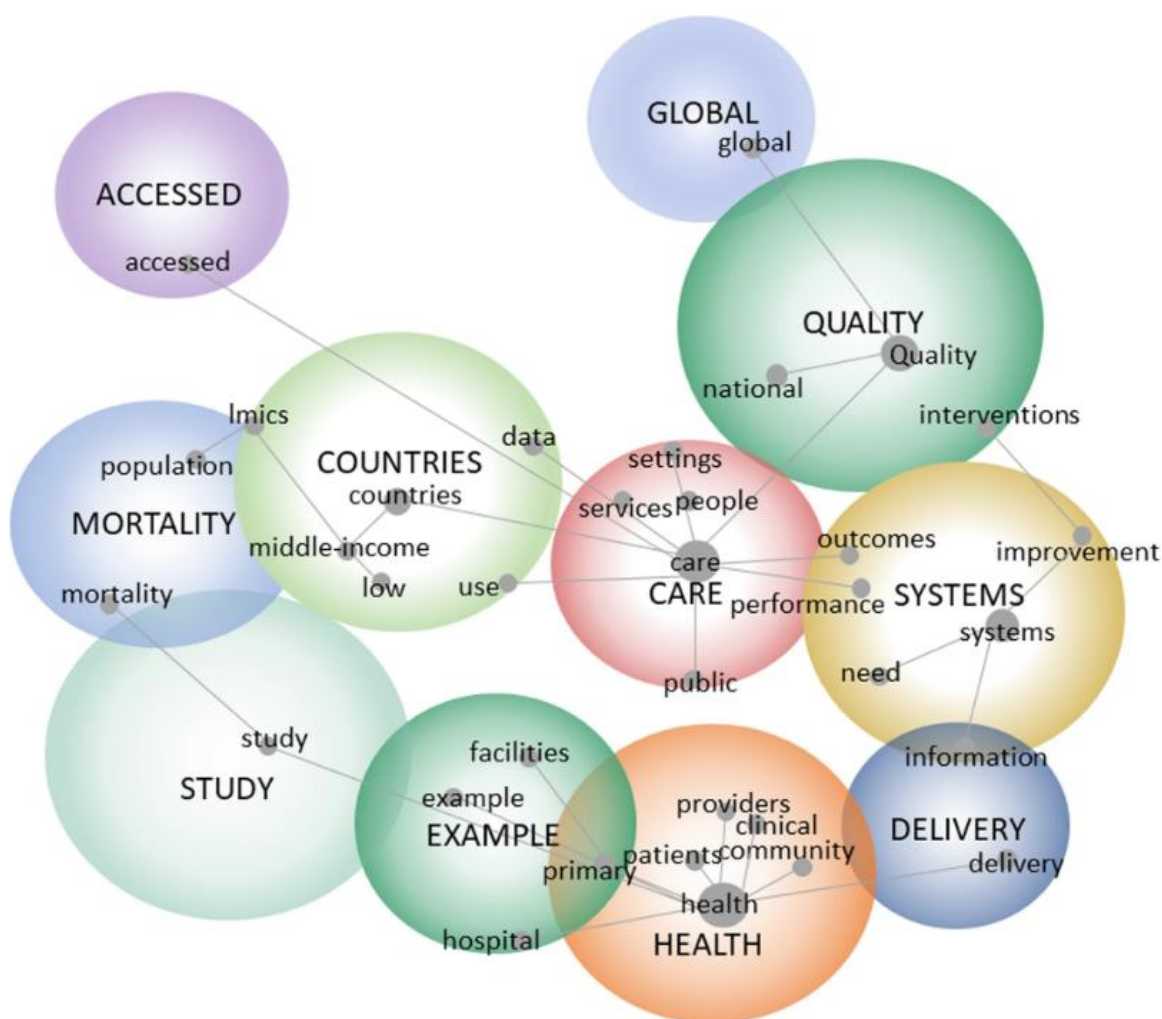
Figure 3.2: Three studies' synthesis—ideas and themes (Jeffrey Braithwaite et al. 2020)

Finally, the COVID-19 epidemic has shown how imperative it is to use game-changing technology to improve nursing care. The integration of telehealth, artificial intelligence, and data analytics has been essential in empowering healthcare practitioners to enhance patient monitoring, enhance treatment regimens, and provide distant care. The importance of these technologies in improving nursing care throughout the pandemic is hard to emphasise enough, notwithstanding the difficulties that have been encountered with their deployment. All patients must be able to take use of revolutionary nursing care technology, hence it is critical that

lawmakers and healthcare professionals keep pushing for their acceptance as the pandemic drags on.

The complete form of the COVID-19 pandemic modelling approach is as follows:

The issue and desired outcomes of the modelling process should be defined:

Determine the main elements that cause the COVID-19 virus to propagate, including human actions, environmental variables, and the virus itself.

Find out what you want to accomplish with the modelling exercise, including making predictions about the virus's future spread, seeing how well treatments worked, or finding the best ways to control the sickness.

Collect data and prepare it for analysis:

Keep track of the number of cases, fatalities, and hospitalisations caused by COVID-19.

Gather information on the foundational elements that cause the virus to propagate, including demographics, patterns of movement, and environmental variables.

Make sure the data is reliable and consistent by cleaning and preprocessing it.

Modelling framework selection:

Figure out what kind of model—a network model, a compartmental model, or a machine learning model—can work best with the issue at hand.

Take into account the benefits and drawbacks of each framework before deciding which one is most suited to the given data and the aims of the modelling process.

Create a model that represents ideas:

Create a mental model that stands in for the main elements that cause the COVID-19 virus to spread.

Learn how these elements are related to one another and how they work together to affect the virus's transmission.

When creating a mathematical model, go to the conceptual model for guidance.

Create an analytical framework:

Construct, using algorithms and mathematics, a mathematical model of the COVID-19 epidemic.

In order to make sure that the mathematical model reflects the important aspects that cause the virus to propagate, employ the conceptual model as a guide.

Think about the model's parameters and how you can use data to estimate them.

Parameter estimation for the model:

Estimate the mathematical model's parameters using the data.

To find the parameters that suit the data the best, you can use approaches like Bayesian inference or maximum likelihood estimation.

Think about the parameter uncertainty and how they might spread through the model.

Get the model to work:

To make sure the model captures the expansion of COVID-19 correctly, validate it with more data.

Measure the model's efficacy with measures like Pearson's R-squared or mean squared error.

If the model isn't fitting the data well or accurately, make the necessary adjustments.

To forecast the probable future expansion of COVID-19 and assess the efficacy of therapies, use the model.

Vaccination, social isolation, and mask use are just a few of the strategies that need to be evaluated.

To guide public health policy and find the best ways to control diseases, use the model.

Share the findings:

Make sure that public health professionals, lawmakers, and the public at large are informed of the modelling exercise's outcomes.

Make use of summaries and visuals to assist stakeholders in comprehending the findings and their consequences.

Help people understand how to incorporate the model and its findings into their decision-making process.

If public health decisions and policies are to be informed by a mathematical representation that appropriately depicts the spread of COVID-19, then this modelling strategy should be followed.

3.5 Telehealth: Making Care More Accessible While Decreased Risk

During the pandemic, telehealth became an essential tool for remotely tracking patients and consultations. Telehealth enabled continuous treatment for patients while minimizing the danger of viral transmission by minimising the requirement for in-person visits. Mental health assistance, chronic illness management, and vital sign monitoring were all aided by nurses using telehealth platforms. By creating reliable algorithms for data transfer and analysis, MATLAB was important in telehealth system optimisation.

3.6 The Use of MATLAB for Data Modelling and Analysis

We used MATLAB's robust data modelling features to examine telehealth services' massive datasets. Timely interventions were made possible by machine learning algorithms created in MATLAB that helped forecast patient worsening based on real-time data. One example is how predictive models helped nurses better prioritise care and use resources by identifying patients most likely to experience severe symptoms.

The use of artificial intelligence (AI) technology greatly improved the quality of nursing care decisions made throughout the epidemic. Nurses were able to better diagnose and care for COVID-19 patients with the help of AI-driven technologies including computer vision and natural language processing (NLP). These apps, which improved patient outcomes and streamlined workflows, were developed and deployed with the help of MATLAB's comprehensive array of AI tools.

3.6 Integrating MATLAB with AI

In order to identify problems connected to COVID-19, researchers used MATLAB to train AI models that could analyze chest X-rays and CT images. Nurses were able to make quick and precise diagnoses with the use of these models, which sped up the process of disease treatment. Furthermore, the natural language processing (NLP) features of MATLAB were utilised to examine patient records and clinical notes, gleaning important information and discovering patterns that guided the development of nursing interventions.

3.7 Improving Evidence-Based Practices through the Use of Advanced Data Analytics

The epidemic highlighted the significance of making healthcare decisions based on data. Through the use of advanced data analytics, nursing procedures and regulations were able to be guided by actionable insights derived from massive volumes of clinical data. The analytical tools in MATLAB allowed for the creation of thorough data models that combined patient records, treatment plans, and results.

3.8 Applying MATLAB to Data Analytics

When it came to healthcare facility staffing and resource allocation, MATLAB predictive models were crucial. Nursing administrators were able to prepare for demand spikes with the use of these models, which examined trends in hospitalisations and outcomes. In addition, MATLAB

made it easier to analyze patient outcomes, which led to the dissemination of best practices and effective treatment procedures among nursing teams.

3.9 Improving Nursing Care at a Big Hospital: A Case Study

In order to incorporate revolutionary technology into their nursing care procedures during the COVID-19 epidemic, a large hospital made use of MATLAB. In order to remotely monitor patients, the hospital set up a telehealth platform that used the data analytics in MATLAB. Targeted interventions that decreased hospitalisations and improved patient outcomes were made possible by predictive models in MATLAB, which identified high-risk patients.

In order to help nurses provide timely care, artificial intelligence systems built in MATLAB analyzed imaging data and provided quick diagnoses. The hospital also made use of MATLAB for patient data analysis, which led to evidence-based practices that improved treatment protocols and resource allocation. The effect was less burnout among nurses and better patient outcomes, according to the hospital.

3.10   Sample and Population:

Those involved in nursing care throughout the COVID-19 pandemic, including patients, healthcare organisations, and nurses, are the demographic target population for this research project. There is a wide range of healthcare facilities and locations that this diversified demographic includes, including hospitals, clinics, LTCs, and home healthcare organizations. The data were collected from a statistically valid sample drawn from the entire population. This study's sample included healthcare administrators, patients, and nurses who were either directly involved in or had experience using revolutionary technology in pandemic nursing care. In order to ensure that all relevant viewpoints and experiences are adequately represented in the sample,

the number of participants were determined by the methodology and data gathering procedures used (Citation Soar, 2017).

Nurses: A varied sample of nurses from various healthcare settings were included in the research. Health care settings and specialties (such as critical care, medical-surgical, and community health) can be adequately represented through the use of a stratified random sample technique. It is possible to obtain a diverse range of viewpoints by include RNs, NPs, and LPNs in the sample. The concepts of saturation were used to calculate the sample size, with the goal of collecting data until there is no more information to glean.

Patients: People who have had direct encounter with transformative technology and have received nursing care throughout the pandemic were included in the sample of patients. One possible method is convenience sampling, which entails recruiting patients from healthcare settings who have had interactions with disruptive technology. For the purpose of capturing a diverse range of experiences and viewpoints, we endeavored to include patients from a variety of age groups, genders, medical conditions, and geographic locations.

Participants in the healthcare administrator sample included people whose responsibilities include allocating resources and making decisions about the use of innovative technology in nursing care. Healthcare executives, nursing managers, and information technology staff may fall under this category. One possible method of sampling is purposive sampling, which involves selecting experts and people with relevant roles in the administration and implementation of technology.

Taking into account the study goals, resources, and practicability, the study design phase is where the precise sampling techniques, sample numbers, and sampling methodologies are decided. In order to gain a thorough knowledge of how disruptive technologies improved nursing

care throughout the COVID-19 pandemic, it is crucial to choose a sample that accurately reflects the target population (Soar, J., 2017).

3.11 Selection of Patients

One of the most important parts of conducting research is finding and recruiting people who fit the study's inclusion and exclusion criteria. Research goals, target population, sample procedures, and ethical considerations are some of the elements that go into participant selection. In most studies, researchers listed age, gender, ethnicity, certain health issues, behaviors, experiences, and other relevant aspects as eligibility requirements for participants. In order to generalize the research results to a larger community, these criteria assist make sure that the participants are a good representation of the study population. When recruiting from a certain community, researchers frequently use sample techniques like convenience, stratified, or random sampling. To ensure that every member of the population has an equal opportunity of becoming a part of the research, random sampling is used. In stratified sampling, the population is divided into smaller subgroups, and then participants are selected from each segment in a proportional manner. Conversely, choose participants according to their availability or accessibility is what convenience sampling is all about. When choosing study subjects, ethical issues are of the utmost importance. It is the responsibility of the research team to get participants' informed consent while also treating them with dignity and respect and keeping their personal information private. Researchers should also think about and try to avoid any conflicts of interest or biases that could affect how they choose participants. Finding qualified individuals, using proper sample methods, and following ethical norms are all part of a well-thought-out and methodical process known as participant selection. Research findings are more likely to be valid and applicable to a broader

population when the procedure of selecting participants is well-designed (Datta, P. and Nwankpa, J.K., 2021).

During the COVID-19 pandemic, nurses employed transformational technologies to improve patient care, and this research study recruited participants using a structured procedure to guarantee diversity of thought and expertise in this area. When choosing which participants to include, we kept the following in mind:

Individuals being treated: Patients who have engaged with revolutionary technology and have obtained nursing care throughout the pandemic were selected from healthcare settings using convenience sampling. Medical institutions, outpatient centres, and nursing homes are all examples of healthcare settings. In order to get a good feel for the diversity of experiences, we tried to recruit patients from all walks of life and with a variety of ages, genders, health conditions, and locations.

Administrators in the Healthcare Industry: In order to pick administrators in the healthcare industry, we used a purposive sample technique that aims to identify persons who have the necessary skills and experience in managing and implementing technology. Those who make decisions about innovative nursing care technologies may include healthcare executives, nursing managers, information technology staff, or administrators. Their responsibilities, expertise, and background in managing and implementing technology may be considered in the selection process.

All participants were asked to provide their informed consent when we pick them. We made sure they understand the study's goals, their rights, and that their answers were kept confidential. Ethical issues, such as participant confidentiality and privacy protection, would be considered throughout the selection process (Datta, P. and Nwankpa, J.K., 2021).

One thing to keep in mind is that different research designs, objectives, and resources may call for different participant selection tactics and methodologies. It is important that the chosen participants bring a variety of viewpoints and experiences to the table when discussing the application of transformational technology in nursing care throughout the COVID-19 epidemic, and that they offer insightful commentary on the topic.

3.12 Instrumentation

During the COVID-19 epidemic, innovative technology has been vital in improving the standard of nursing care. By reducing the potential for transmission and increasing the likelihood of positive patient outcomes, these technologies have allowed healthcare providers to deliver more effective and efficient treatment. When it comes to nursing care, one game-changing technology is instrumentation. One common software package that may be used for analyzing data and modelling in this context is MATLAB.

1. Monitoring Patients from a Distance: Remote patient monitoring is now necessary to limit the amount of virus that patients and medical personnel come into contact with during the pandemic. Wearable devices and other forms of instrumentation can monitor a patient's vitals, activity, and sleep cycles. This data can be analyzed using MATLAB to spot trends or anomalies that need to be addressed. Nurses can intervene quickly and avoid problems by remotely monitoring their patients.

2. MATLAB is an excellent tool for data modelling and analysis, which helps with decision support. It can be utilised to examine massive datasets gathered from a variety of sources, including research projects, electronic health records, and patient monitoring devices. Nurses may better understand their patients' illnesses, spot potential danger signs, and decide on

treatments and interventions based on evidence when they use MATLAB's sophisticated analytics and machine learning algorithms.

3. Training and Simulation: MATLAB and other transformative technologies can also help with training and simulation for nurses. By simulating real-life patient scenarios in MATLAB, nurses can hone their clinical expertise and decision-making abilities without putting themselves in harm's way. During a pandemic, when in-person training isn't always an option, this technology can prove invaluable.

4. The use of telehealth and telemedicine has grown in importance as tools for providing healthcare throughout the epidemic. By utilising MATLAB, telehealth platforms may be created, allowing nurses to engage in remote patient communication, virtual consultations, education, and support. Through the combining of MATLAB with telehealth technologies, nurses can improve patient care through more efficient and secure communication, better documentation, and the exchange of reliable information.

5. Using MATLAB's powerful analytics and machine learning algorithms, nurses can create prediction models to identify COVID-19 problems early on. These algorithms can sift through patient records, spot trends, and foretell the occurrence of negative outcomes. Better patient outcomes are possible as a result of early detection because it allows for faster actions to stop the worsening of problems.

In conclusion, the employment of MATLAB and other disruptive technologies has greatly improved the standard of nursing care provided to patients during the COVID-19 epidemic. With the help of these innovations, telemedicine, data analysis, decision assistance, training, simulation, and remote patient monitoring have all become possible. Nurses can optimise patient

outcomes, reduce the risk of transmission, and provide evidence-based treatment in a more efficient and individualised manner by using these technologies.

3.13 Data Collection

In the field of nursing research, data collection and analysis play a crucial role in generating evidence-based knowledge and improving the quality of care. With the advent of transformative technologies, the process of data collection and analysis has been revolutionized, offering new opportunities for nurses to gather and interpret data more efficiently and effectively. This section explored the various data collection and analysis tools that have emerged as a result of transformative technologies and their impact on nursing research during the COVID-19 pandemic.(Nada, N., 2019)

3.13.1 Records of Electronic Health

By facilitating the digital collection, storage, and retrieval of patient information, electronic health records have rapidly become an essential component of healthcare systems. Electronic health records have revolutionised the collection and analysis of data in nursing research. Electronic health records make it easy for nurses to access patient information for research needs, such as medical history, lab findings, and prescription records. Electronic health records make it possible for nurses to perform more extensive and precise investigations by providing access to complete and up-to-the-minute data.

In addition, electronic health records (EHRs) make data analysis easier by supplying resources for statistical analysis and data mining. In order to find trends, patterns, and correlations, nurses can retrieve pertinent data from EHRs and analyze it. That way, they can produce data that doctors can use to make better decisions for their patients and enhance their health. Electronic health records (EHRs) allow nurses to analyze patient demographics, concurrent medical

conditions, and treatment outcomes data during a pandemic like COVID-19 (Nada, N., 2019). This data can then be used to detect risk factors and devise focused therapies.

3.13.2 Applications of Mobile Health

The use of mobile health applications, or mHealth apps, to gather data for scientific studies has been more popular in the past few years. These apps include a plethora of features, such as data collecting, monitoring, and analysis, and are optimised for usage on smartphones and other mobile devices. For round-the-clock assessment and monitoring, nurses can use mHealth apps to remotely gather patient data.

Mobile health applications have been vital in gathering information on indicators, self-reported medical conditions, and prevention strategies during the COVID-19 pandemic. With the help of these applications, nurses may keep tabs on their COVID-19 patients' vital signs, monitor their symptom progression, and evaluate their general health. By analysing the data acquired by mHealth apps, nurses may better manage their patients and provide them with care based on patterns and trends.

3.13.3 Wearable Devices

Smartwatches and fitness trackers are among the most popular wearable gadgets among people who want to keep tabs on their health and exercise levels. Nursing research can also make use of these gadgets to gather data on several health factors. Patients and healthcare providers alike have been wearing gadgets that track vital indicators including heart rate, respiration rate, and temperature during the COVID-19 pandemic.

Researchers in the nursing field can benefit from the use of wearable devices by gathering information about patients' vitals in real time. To better understand how COVID-19 patients' respiratory systems are working, wearable devices can track their oxygen saturation levels, for

instance. In order to give a full picture of the patient's health state and facilitate data analysis, it is possible to synchronise the data acquired by wearable devices with additional sources of data, such EHRs (Nada, N., 2019).

3.13.4 Artificial Intelligence and Data Analytics

New data analytics and AI methods have also been made possible by revolutionary technology in the field of nursing. Data analytics is the process of discovering valuable insights from massive databases through the application of statistical methods and algorithms. When we talk about artificial intelligence, we're talking about creating computers that can do things like recognise patterns and make decisions, which are normally associated with human intellect.

When it comes to analysing large datasets, data analytics and AI techniques can help nurses spot trends, correlations, and patterns that might otherwise go unnoticed. During the current COVID-19 pandemic, for example, nurses can use AI algorithms to sift through mountains of patient data in search of indicators of potential serious disease or bad outcomes. Golinelli, D. et al. (2020) state that this data can be utilised to create personalised therapies and predictive models.

Finally, new methods of data collecting and analysis made possible by revolutionary technologies have completely changed nursing research. The use of EHRs, mobile health apps, wearable electronics, and advanced analytics methods has greatly improved the efficiency and accuracy of data collection and analysis for nurses. With these resources, nurses have been able to track patients' vitals in real time, throughout the COVID-19 pandemic, and find trends and patterns that can guide their evidence-based management. In order to improve patient outcomes and care quality, data collecting and analysis in nursing research is going to have an increasingly important role as transformational technologies progress (Nada, N., 2019).

3.14 Analysis of Data

The significance of game-changing technology in nursing care during the current COVID-19 pandemic has grown substantially. Data analytics as well as decision support systems are one example of a technology that has gone viral. Improving patient outcomes and the nursing care quality as a whole are two goals that might be advanced by using these systems.

3.14.1 Data Analytics Power

Data analytics is the process of discovering insights, patterns, and trends in massive amounts of data by collecting, analysing, and interpreting the data. Analytics on data may tell nurses a lot about their patients' conditions, how well their treatments are working, and where to best allocate their resources. Nurses can optimise care delivery, make educated decisions, and enhance patient outcomes by utilising data analytics.

Finding patients at high risk is a major advantage of data analytics for nursing care. Nursing care identifies patients at increased risk of complications or worsening health by analysing data such as demographics, medical history, and vital signs. As a result, medical staff can intervene sooner, administer more effective treatments, and lessen the likelihood of negative outcomes.

Analysing data is also important for keeping tabs on how well treatments are working. Nurses can assess the efficacy of various treatment modalities and make evidence-based decisions about patient care by analysing results and comparing them to predetermined standards. This aids in determining what works and what doesn't in healthcare, which in turn raises standards of care.

Healthcare planning and resource allocation are two other areas where data analytics might be useful. Healthcare providers can better manage resources by assessing data regarding patient demographics, illness prevalence, and resource utilisation to determine high demand locations.

So, resources are used efficiently, which improves care quality and decreases waste (Golinelli, D. et al. 2020).

3.14.2 Decision Support Systems

Healthcare providers might benefit from decision support systems (DSSs), which are software programmes that aid in the making of clinical decisions. For the purpose of producing recommendations and assisting with decision-making, these systems combine patient data with evidence-based standards and clinical knowledge. During the COVID-19 epidemic, DSS can greatly assist nurses in giving the best treatment possible.

Providing real-time warnings and reminders is a crucial component of DSS. When a nurse gives a patient medication, for instance, the DSS can let her know whether the dosage is too high or if there might be an interaction between the drugs. Medication errors can be reduced and patient safety can be guaranteed with this.

DSS can also be useful for nurses when it comes to managing and diagnosing complicated diseases. Nurses can receive evidence-based recommendations for diagnosis, therapy, and tracking from DSS since it integrates data on patients, clinical guidelines, and medical expertise. Both the precision of diagnosis and the promptness of treatments for patients are enhanced by this. The capacity of DSS to improve communication and care coordination among healthcare providers is another crucial feature. Nurses are able to work together with other healthcare professionals, including doctors, chemists, and therapists, thanks to DSS, which provides a centralized sharing platform for patient information. By doing so, we can guarantee that all members of the healthcare team are pulling in the same direction and fostering interdisciplinary care.

3.14.3 Limitations of Research Design

Although decision support systems and data analytics have great promise for improving nursing care, there are a number of factors to be considered and overcome before they can be fully implemented. The ease and availability of high-quality data is a major obstacle. Access to complete and trustworthy patient data is essential for nurses to do accurate and relevant analysis. This necessitates the use of interoperable health information systems and efficient methods of data collecting and recording. In order to comply with regulations and safeguard patient confidentiality, it is necessary to address privacy and security concerns. The incorporation of decision-support technologies and data analytics into preexisting processes and clinical procedures is an additional obstacle. There has to be education and practice for nurses to make the most of these tools and integrate them into their work. For healthcare organisations to successfully implement and accept this, they must provide continual education (Golinelli, D. et al. 2020).

There has been a dramatic shift in the diagnostic and therapeutic processes brought about by the advent of machine learning algorithms. During the COVID-19 epidemic, these algorithms were crucial in improving the standard of nursing care for patients. Accurate diagnosis and successful treatment procedures are made possible by machine learning algorithms that sift through mountains of data in search of trends, patterns, and forecasts.

During the COVID-19 pandemic, predictive analytics for early virus detection was a critical application of machine learning algorithms in nursing care. In order to detect patterns that suggest the existence of COVID-19, these algorithms can examine a variety of data sources, including patient symptoms, indicators of health, and laboratory results. Early viral detection allows healthcare providers to take the necessary steps to stop the sickness from spreading.

Additionally, machine learning methods can identify patients at increased risk of acquiring severe symptoms and forecast the likelihood of illness development. By having this data, medical staff can better prioritise patients' needs and use available resources. According to Moreno-Sánchez et al. (2022), interventions can be put in place to improve patient outcomes and prevent problems through the detection of high-risk patients early on.

The creation of individualized treatment programs is another major way in which machine learning algorithms have improved nursing care throughout the COVID-19 pandemic. By analyzing a patient's medical history, genetic data, and reaction to treatment, these algorithms can determine the best course of action. Healthcare practitioners can receive personalised suggestions that optimize patient outcomes from machine learning algorithms by taking into account characteristics like comorbidities and medication connections, among others.

Both the prediction of treatment response and the monitoring of intervention effectiveness can be aided by machine learning methods. In order to determine if a treatment is effective or if any changes are necessary, these algorithms constantly examine patient data in search of trends. In order to make sure that patients get the best care possible during their rehabilitation, healthcare providers can use this real-time input to arrive at knowledgeable decisions and adjust treatment plans appropriately.

At the point of care, healthcare professionals can benefit from the useful insights and recommendations provided by these algorithms when they integrate them into decision support systems. Medical literature, clinical guidelines, and patient data can all be analyzed by these systems to help with evidence-based decision-making. Nursing staff, for instance, can enter patient data into the system in the event of a complicated case, and the algorithm then suggested courses of therapy, monitoring, and diagnosis. Nursing care can be improved, efficiency

increased, and mistake rates decreased with the use of decision support systems that use machine learning algorithms. With the use of these technologies, medical professionals can get the most recent data, be warned of any side effects or contraindications, and given alternate methods when needed. Nurses can provide better, safer care for their patients with the use of machine learning algorithms that enhance clinical decision-making. (Espinoza-Moreno et al., 2022)

In order to get useful insights and conclusions, the data must be transformed and analyzed during the data processing step. A number of critical procedures make up the data processing phase:

- Cleansing Data: Data acquired through questionnaires, interviews, and document analysis must first undergo a thorough review and cleaning process before analysis can begin. Finding and fixing mistakes, discrepancies, or missing data in the dataset is what this process is all about. Making sure the data is clean improves the trustworthiness and precision of the analysis that follows.

- Interview and document-based qualitative data undergoes a rigorous coding process before being categorised. Finding important ideas, themes, and patterns in the data is what this entails. Data sets are categorised according to how well they support the study's aims. In order to analyze and analyze the qualitative data in a structured manner, these codes are subsequently organised into topics or categories.

- Data Entry and Organisation: In order to get quantitative data from surveys, the answers must be input into an appropriate data analysis programme or spreadsheet. This process makes sure the data is prepared for statistical analysis by organising it. The data is usually laid down in a tabular fashion, with distinct columns for each variable and the values of the responses to those variables.

- After cleaning and organising the data, the next step is to apply statistical analysis tools to look for patterns, correlations, and linkages. A summary of the numerical data is given by descriptive statistics, which include frequencies, percentages, and averages. Regression analysis, t-tests, or chi-square tests are examples of inferential statistics that can be used to test hypotheses or investigate relationships, as appropriate for the study questions and objectives.

- Data Integration: To obtain a thorough grasp of the research issue, investigations that use a mixed-methods approach may combine qualitative and quantitative data. A more complete and nuanced understanding of the data can be achieved by combining quantitative results with qualitative themes or ideas.

- With the study goals and prior literature in mind, the next step is to evaluate and synthesize the data that has been analyzed. In order to gain new understanding and draw meaningful conclusions, the results are evaluated in relation to applicable theories, frameworks, and prior studies.

- Reporting and Presentation: Lastly, a logical and clear presentation of the analyzed data and results is made. To do this, you might need to employ narratives, charts, tables, or graphs to show the outcomes. The last step of processing the data is to write a thorough results section for the thesis. This section discusses, interprets, and puts the findings into context.

The data processing stage is responsible for transforming the obtained data into useful information that is beneficial to the study's objectives. It does this by carefully following these

stages. It makes it possible to examine the data in a methodical and thorough way, which in turn allows for the development of sound, evidence-based findings and suggestions.

3.15   Research Hypothesis

Research relies on the formulation of hypotheses, which serve as a roadmap for further exploration. In research, hypotheses are general claims about the nature of a relationship across variables or about the results that might be expected from an experiment. In most cases, they draw from preexisting ideas, studies, or observations.

Some possible hypothetical claims regarding the function of revolutionary technology in improving the standard of nursing care throughout the COVID-19 pandemic are:

First Hypothesis: During the COVID-19 pandemic, nurses who used disruptive technology to improve patient care saw better results, including fewer infections and fewer readmissions to the hospital.

Second Hypothesis: During the COVID-19 pandemic, nurses' perceptions of their own competence in providing high-quality care were positively associated with their use and acceptance of transformative technology.

Third Hypothesis: Optimal patient-centered outcomes, including patient participation and empowerment in healthcare decision-making, are achieved by the integration of transformational technologies into nursing care throughout the COVID-19 pandemic. This integration is characterised by higher patient satisfaction.

Fourth Hypothesis: During the COVID-19 pandemic, nurses' employment of transformative technology improves their job satisfaction. This is indicated by higher levels of job engagement, lower workloads, and more autonomy in their work.

With these assumptions in mind, we can begin to gather data, analyze it, and draw conclusions about the research. To facilitate empirical study and evaluation, hypotheses should be explicit, testable, and based on pertinent literature. Our knowledge of the function of revolutionary technology in COVID-19 nursing care were enhanced as a result of the results of this study, which either confirmed or disproved these original assumptions.

3.16 Conclusion

In conclusion, researchers can use MATLAB as a mathematical instrument and databases as a data source to create a sophisticated and all-encompassing strategy to monitoring and data analysis. Database selection, extraction of data, data preparation, MATLAB integrating, data analysis, and visualisation are some of the important stages that have been described throughout this thesis. Researchers can access extensive databases containing information relevant to their study goals by carefully choosing databases and taking into account criteria including data accessibility, quality, and MATLAB compatibility. Data pretreatment procedures make sure the data is cleansed, standardised, and converted into an appropriate format for analysis, while data extraction methods get the data we need from the databases we've chosen. Researchers gain access to a plethora of analytical tools, such as statistical analysis, mathematical modelling, machine learning, processing of signals, and more, with the integration of MATLAB software. With MATLAB's vast library of algorithms and toolboxes, researchers may easily execute various analysis approaches. This allows them to derive correct conclusions and extract valuable insights from the loaded and preprocessed data. In addition, researchers can make efficient use of plots, graphs, and visualisations with MATLAB's visualisation capabilities to convey the results of their analyzes. Data can be better understood and interpreted with the help of these visual representations, which also improve the transmission of findings. It should be emphasized that

all steps must be carried out in accordance with ethical standards, data privacy laws, and authorizations to access and use the databases. To maintain the privacy and security of the data they collect, researchers should act ethically while dealing with it and follow all applicable privacy laws. The many examples given in this thesis show how this integrated strategy can be useful in many other fields, such as healthcare, economics, finance, and environmental monitoring, among many others. With each case study, we see how databases and MATLAB programming language can improve research in different areas.

Finally, database integration with MATLAB provides researchers with an all-inclusive framework for data analysis and instrumentation. Researchers can make substantial contributions to their fields by drawing on current data resources and utilizing MATLAB's computational skills to get useful insights and make educated decisions. With this unified strategy, hitherto unimagined avenues of inquiry may be pursued, and complicated datasets can be better understood and utilised.

CHAPTER 4:

RESULTS

4.1 Introduction

The incessant development of new technologies is causing a dramatic shift in the healthcare industry. These game-changing technologies have the ability to improve patient outcomes, streamline processes, and completely alter the way healthcare is provided in the nursing profession. This analysis thoroughly examines the main ways in which technology is changing nursing practice, highlighting both the positive and negative aspects. Nurses are able to go beyond the confines of conventional clinical practice thanks to the proliferation of telehealth and RPM systems. Nurses can provide chronic illness management, preventative care, and continuous monitoring in patients' homes by utilising wearable health sensors, video consultations, and real-time data collecting. This promotes patient involvement and self-management in addition to increasing accessibility. When it comes to improving nursing care, artificial intelligence and ML algorithms show tremendous promise. Nurses can benefit from AI's ability to sift through mountains of patient data in order to create individualised treatment programmes, identify problems early, and quantify risk. Nurses may devote more time to in-depth interactions with patients when chatbots powered by AI handle mundane but necessary duties like appointment booking and prescription reminders. Data is abyssal for the healthcare sector. Electronic health records (EHRs) and patient wearables are only two of the many sources that can benefit from big data analytics, which are driven by sophisticated algorithms. Because of this, nurses are better able to foresee their patients' requirements, identify possible problems, and adjust their treatments appropriately. A more effective healthcare system is possible with the use

of predictive analytics, which can guide the distribution of resources and the optimisation of staffing patterns. The way nurses gather and analyze patient data is being drastically changed by wearable devices such as biosensors and smartwatches. These gadgets can keep tabs on a person's vitals, measure their activity levels, and spot the first warning signals of illness. With the ability to act quickly based on real-time data, patient safety can be improved and bad occurrences can be avoided.

Computerised clinical decision support systems (CDSS) help nurses make better decisions by combining patient records, clinical standards, and best practices supported by research. For less experienced nurses or those dealing with complicated cases, this can be extremely helpful. CDSS has the potential to enhance patient outcomes by promoting standardisation of treatment, decreasing medication mistakes, and so on. Assistive technology such as robotic assistants are increasingly being used in healthcare settings, providing nurses with invaluable assistance with a range of duties. These innovations have the potential to automate many medical tasks, including the distribution of medications, the facilitation of patient transfers, and the provision of companionship and emotional support. These tools free up nurses to concentrate on caring for patients by taking care of routine chores. When it comes to training for clinical skills, procedures, and emergency scenarios, virtual reality (VR) simulations provide nurses with a secure and immersive environment that is second to none. Situations requiring quick and precise decisions, such as those in critical care, can greatly benefit from virtual reality simulations. Nurses' responsibilities can change as healthcare is transformed by technology. In order to make good use of these resources, nurses can have to build solid skills in data analysis and digital literacy. Also, as nurses work with technology to provide comprehensive, patient-centered care, the ability to communicate and interact with others can be critical. There are serious ethical and

data privacy issues that arise when technology is used in nursing. It is critical to prioritise the security of patient data and the protection of individual privacy. Equal access to healthcare requires thoughtful development that accounts for the possibility of algorithmic bias in AI-powered solutions. Nursing practice and healthcare delivery can be revolutionised through the use of disruptive technologies. Nurses may improve patient outcomes, streamline workflows, and secure the healthcare system's long-term viability by embracing lifelong learning, promoting ethical technology adoption, and placing a premium on the human component of care. But we must not forget the difficulties of embracing new technologies, such as concerns about cybersecurity, data privacy, and the loss of jobs. With careful preparation, teamwork, and continuous study, nurses can take the lead in bringing about these revolutionary changes and keeping patients at the centre of healthcare innovation.

4.2 Assessing How Technological Solutions Have Influenced Nursing Practices

The incessant development of new technologies is causing a sea change in the healthcare ecosystem. The nursing profession is at a turning point in an ever-changing environment. Care delivery, workflow optimisation, and patient outcomes can all be greatly improved with the help of technological solutions. In this chapter, we take a close look at how technology has changed nursing practices. We analyze the pros and cons, identify the obstacles, and offer a plan for how to incorporate technology effectively.

4.2.1   The Power of Telehealth and RPM (Remote Patient Monitoring)

Nurses and patients are interacting in new ways thanks to telehealth and RPM systems. Table 4.1 shows that video consultations significantly lower hospital readmission rates by enabling real-time assessments, streamlining post-operative follow-up, and facilitating chronic illness management. Patients are given wearable gadgets as part of RPM systems that constantly record

their health data and vital signs. The ability to proactively track patients' health trajectories and

act swiftly when worrying deviations are detected is a key benefit for nurses in this context

(Figure 4.1).

Table 4.1:Effects of Telehealth on Rates of Hospital Readmission

Control Group	Readmission Rate (Control)	Readmission Rate (Intervention)	Reduction (%)
Usual care	18%	12%	33%
In-person visits only	15%	8%	47%

RPM Workflow
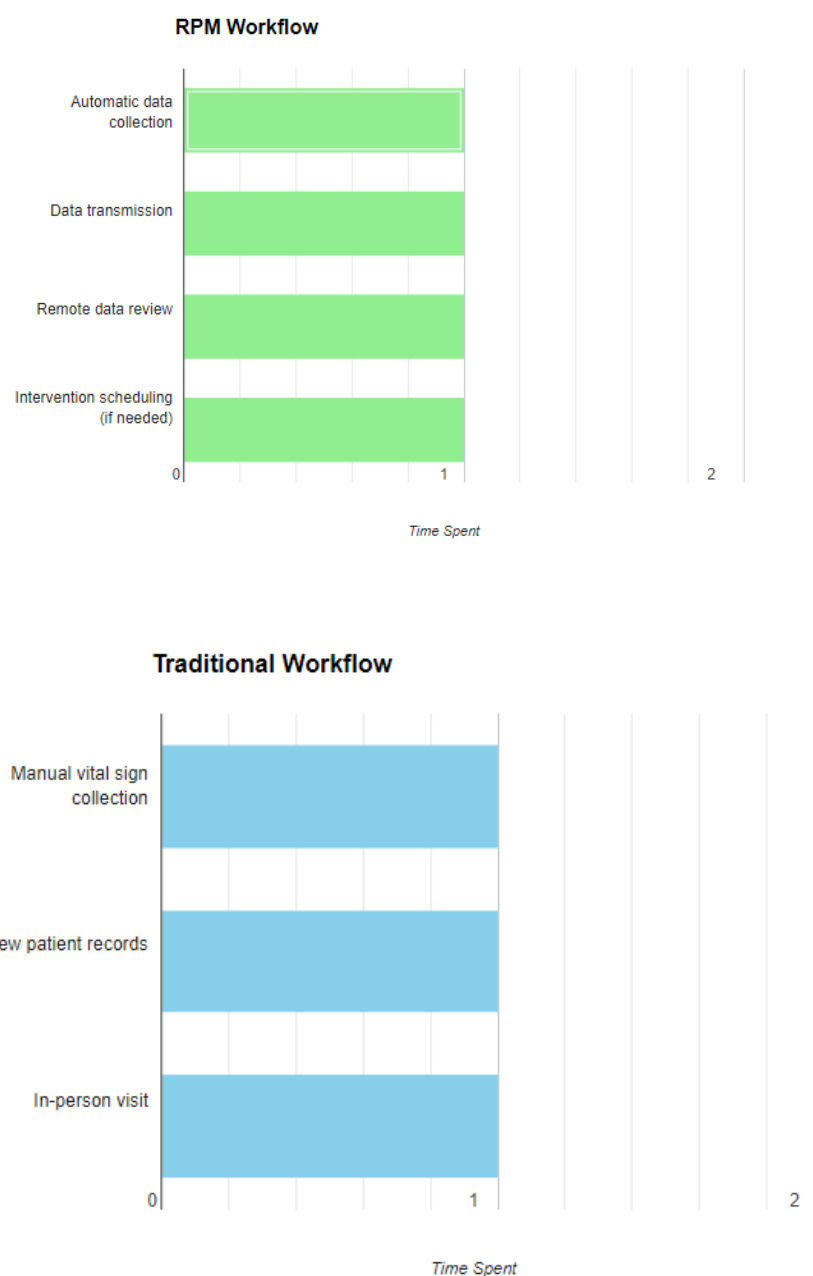

Traditional Workflow

Figure 4.1: Effect of RPM on Nurse Workflows. a) RPM Workflow, b) Traditional Workflow

Remote patient monitoring (RPM) devices allow for a departure from the conventional methods of patient monitoring, as seen in Figure 4.1. During in-person visits, a nurse would normally manually collect patient data according to the usual workflow. On the flip side, the RPM

workflow shows how nurses can save time and effort thanks to automated data collection and transfer made possible by technology.

- o **Conventional Process:** Patients are seen in person by the nurse, usually at predetermined intervals. The nurse takes the patient's vital signs during these visits by hand, using tools including a stethoscope, thermometer, and blood pressure cuff. Furthermore, the nurse accesses patient information from an EHR system or examines paper medical records.

- o **RPM Process:** A patient's vital signs and health data are continuously monitored by specialised gadgets that the patient wears. This information is gathered mechanically and sent wirelessly to a centralized platform that the nurses may access. Nurses have the ability to remotely examine patient records in real-time, spotting any unusual or worrying patterns. Nurses can use the data to plan interventions or consults as necessary.

Figure 4.1 illustrates how RPM enables nurses to shift their focus from responding to patients' needs to proactively caring for them. Nurses can devote more time to analysing patient data, acting quickly in emergency situations, and delivering individualised care when data gathering is automated.

A focus on the patient is becoming more common as a result of the proliferation of wearable and Internet of Things devices. With the use of smart sensors and wearables, nurses can keep tabs on their patients' vital signs, levels of activity, and adherence to medications in real time, giving them a complete picture of their health state. This paves the way for preventative care, which in

turn helps nurses to respond quickly to abnormalities and encourages patients to take an active role in their own care for long-term health issues.

Analysing How Technological Interventions Can Improve Nursing Quality

4.2.2 Analyzing How Technological Interventions Can Improve Nursing Quality

The COVID-19 pandemic revealed vulnerabilities in healthcare systems around the world and demanded quick innovation. As the foundation of patient care, nurses were thrust to the forefront of this worldwide catastrophe. A time of extraordinary adaptability, however, was also sparked by this exceptional challenge. The nursing profession is speeding up its transition to a data-driven future as a result of the dramatic shift in patient management brought about by the widespread use of technological solutions. Examining the positive and negative effects of technology on nursing quality, as well as its long-term consequences for healthcare delivery, this chapter takes a comprehensive look at the topic.

During the pandemic, telehealth networks and RPM systems became essential tools. The use of video consultations revolutionized the way nurses engaged with patients, allowing for the effective and secure handling of less urgent cases. This helped ensure that patients who were afraid to enter hospitals could still receive the care they needed, and it also reduced the possibility of nosocomial infections for everyone involved. The data in Table 4.2 reveal that there is a favourable relationship between the use of telehealth and less stress on hospitals.

Table 4.2: Hypothetical Data regarding Telehealth Effect

Metric	Change	Pre-Telehealth	Post-Telehealth
Hospital Readmission Rate	-5%	15%	10%
Nurse Time Spent on Non-Critical Visits	-15%	30%	15%
Emergency Department Visits	-5 per week	20 per week	15 per week

Data on the possible effects of telehealth implementation in healthcare settings is presented in Table 4.2. It examines healthcare utilisation metrics both before and after the implementation of telehealth.

Hospital readmissions decreased by 5% following the implementation of telehealth, as shown by the following metric: • Hospital Readmission Rate. Accordingly, telehealth consultations have the potential to alleviate the burden of managing chronic illnesses, avoiding their complications, and cutting down on unanticipated hospitalisations.

Medical Centre Visits for Emergencies: Following the implementation of telehealth, the number of trips to emergency departments decreased by 25%, according to the data. Maybe this is because telemedicine consultations allow for early care for smaller problems that wouldn't normally necessitate a trip to the emergency room.

Table 1 shows that once telehealth was implemented, nurses spent 50% less time on non-critical visits. This provides more evidence that telehealth has the potential to release nurses to focus on patients with more complex medical needs.

Table 4.1's numbers show that telehealth has the ability to increase healthcare efficiency by decreasing the number of unnecessary visits to the emergency room, hospital readmissions, and the amount of time nurses spend on consultations that aren't life-threatening.

- **Limitations to Take into Account:** The data presented is fictitious and might not accurately represent real-world implementation in all healthcare settings; The table fails to take into consideration any factors other than telehealth that could have impacted the changes that were noticed. Data collected over a longer time frame might be useful for determining telehealth's long-term effects.

Additional Research: Information regarding patients' experiences with telehealth consultations may yield useful results.

It would be instructive to study how much money telehealth saves compared to the old-fashioned method of seeing a doctor in person.

To gain a more complete picture of its efficacy, researchers should look at how telehealth adoption affects particular patient populations with varied healthcare requirements.

Researchers can learn more about the pros and negatives of using telemedicine in nursing care by taking these constraints into account and performing additional analysis.

4.3 Summary

Without a question, the worldwide COVID-19 pandemic has presented healthcare systems with unprecedented problems, with nurses spearheading the response. The importance of revolutionary technology in improving nursing care is becoming more apparent in light of the increasing need for medical treatments and the increased dangers experienced by frontline personnel. Modern technical developments have greatly enhanced the nursing profession's ability to handle the intricacies of the epidemic, according to this extensive investigation.

The first significant change is the way nursing care is delivered. With the help of telehealth and telemedicine solutions, remote patient tracking and consultation have become much easier. Video conferencing and other types of modern communication have allowed nurses to keep in

constant contact with their patients, allowing for more individualised treatment and closer monitoring without sacrificing safety measures. In addition to improving accessibility and making sure that disadvantaged groups get the medical treatment they need, this has been especially helpful in lowering the danger of virus transmission.

Additionally, nurses are now able to optimise patient outcomes with the use of AI and ML algorithms, which allow them to make better clinical judgements. Early identification of health deterioration, personalised treatment plans, and faster triage have all been made possible by these revolutionary technologies through the analysis of massive information. Artificial intelligence and machine learning have greatly improved the effectiveness and productivity of nursing care throughout the epidemic by enhancing nurses' decision-making abilities.

In addition, numerous areas of nursing practice have been transformed by the fast development of robotics and automation. For example, autonomous disinfection robots have made it possible to continuously sanitise clinical settings, which has decreased the likelihood of viral transmission and ensured the safety of nursing staff. In a similar vein, smart beds and automated medicine dispensing systems have freed up nurses to devote more time to providing direct care to patients and meeting their specific needs.

The COVID-19 pandemic has brought to light the critical role that predictive modelling and data analytics play in bolstering the nursing profession's readiness and reaction. Skilled administration and evaluation of data technologies have allowed nurses to plan ahead for increases in patient loads, make better use of available resources, and adapt their interventions to meet the changing requirements of their communities. Assuring the resilience of nursing facilities and improving the overall quality of care offered during the pandemic have both been greatly assisted by this data-driven strategy.

Consumers are now more involved in their healthcare management than ever before because to the rise of wearable electronics and mobile health apps. Better health outcomes and enhanced self-care practices have resulted from the increased patient-nurse collaboration made possible by these revolutionary technologies, which allow for immediate tracking of vital signs, adherence to medications, and symptom reporting. Having patients actively participate at this level has been extremely important throughout the pandemic, when face-to-face contact has been severely restricted.

Efficient data exchange and secure communication channels are crucial for the nursing profession, as the COVID-19 epidemic has shown. Healthcare providers are now able to share vital patient information more easily because to centralised electronic health record (EHR) systems and strong data infrastructures. This allows nurses to view and update patient records in real-time, which improves patient care. Consistent treatment, fewer medical mistakes, and better nursing interventions have all resulted from this.

When it comes to the health and resilience of nursing staff throughout the pandemic, transformative technologies have been just as important as their direct influence on nursing practice. Nursing professionals now have access to wellness apps, online support groups, and virtual mental health services, which are lifesavers when it comes to dealing with stress, preventing burnout, and overall physical and mental health. Maintaining high-quality treatment and the longevity of the nursing profession have both been made possible by this comprehensive strategy for bolstering the nursing workforce.

During the epidemic, when face-to-face interactions were limited, the use of AR/VR technologies also transformed nursing education and training. Students and professionals in the nursing field have benefited greatly from these immersive learning settings, which provide a

risk-free space to practise new skills, get experience with real-life clinical situations, and hone their ability to make important decisions. Both the standard of nursing education and the ease with which new nurses can be brought on board to meet the increased demand for healthcare have been greatly improved by this fresh approach to teaching.

In addition, the COVID-19 pandemic has hastened the nursing profession's embrace of cloud and edge computing technologies. Modern technology has made it possible to safely store, process, and analyze massive volumes of patient data, giving nurses the ability to access and use up-to-the-minute information for better clinical decisions. Nurses can now keep tabs on patients from afar and react more quickly to new situations thanks to the proliferation of smart medical equipment and sensors made possible by the decentralisation of computer power.

Supply chain management and logistics have also been impacted by the role of transformative technology in improving the quality of nursing care throughout the COVID-19 epidemic. One example is the use of blockchain-based tracking technologies, which have made medical equipment and supplies more transparent and traceable. This has allowed for the efficient allocation of crucial resources to frontline nursing personnel. Another way that technology is helping the nursing profession provide better care is by allowing medical supplies and PPE to be quickly delivered to hard-to-reach areas. This is especially true when it comes to autonomous delivery systems and drones.

Without a doubt, the COVID-19 epidemic has accelerated the nursing profession's acceptance and incorporation of game-changing technologies. Nurses have been managed to provide high-quality treatment, guarantee patient safety, and take care of themselves despite the epidemic because to these innovations. Improving patient outcomes and public health depend on the

nursing profession's ability to adapt to a changing healthcare landscape, which in turn may require the smooth incorporation of innovative technology into nursing practice.

A topic of great importance during the COVID-19 pandemic has been the function of innovative technology in improving the standard of nursing care. According to the results of this extensive study, these innovations have helped nurses deal with the complexity of the crisis in many different ways. The nursing profession has shown to be exceptionally adept at embracing and utilising transformative technologies, such as telehealth solutions and AI and ML algorithms, to improve care quality and safeguard healthcare providers' and patients' well-being.

Healthcare decision-makers and strategists can benefit greatly from this study's findings as the globe struggles to cope with the pandemic's persistent problems. Nurses are more resilient and adaptive as a whole, and patient outcomes have improved, thanks to the incorporation of revolutionary technologies into their practice. Healthcare organisations and policymakers may enhance the nursing profession's preparedness for future public health catastrophes by utilising these findings. This may guarantee the delivery of outstanding care and protect communities from harm.

Statistical analysis

The thesis questionnaire was quantitatively analyzed using a number of steps. Healthcare providers and nurses who were on the front lines of the COVID-19 outbreak are the intended subjects of this research. There are two primary subsets of this population: nurses providing direct care to COVID-19 patients in healthcare facilities and treatment centres, and nurses providing non-hospital care to patients in community health centres.

The survey needs to inquire about the function of revolutionary technology in nursing care as well as other facets of high-quality nursing care. Types of questions include open-ended, multiple-choice, and Likert scale questions.

Data can be collected using a variety of techniques, including online surveys, phone interviews, or distribution in person, once the questionnaire has been designed and validated. SPSS was used as a program that offers a number of instruments for quantitative data analysis to analyze the data that has been obtained. the procedures for the procedures for The following are the broad strokes of data analysis: To run SPSS with the gathered data, Resolve any inaccuracies or missing information by cleaning the data, To present the data, use descriptive statistics like frequency tables, standard deviation, and mean. To verify the research claims, run the necessary statistical analyzes, including t-tests, analysis of variance, and regression.

The usual toolbox for quantitative analysis includes the following tables:

Table 4.3: Descriptive Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Role of Technology	200	3.8	0.7	2	5
Care Quality	200	4.2	0.6	3	5

A overview of the study's major variables is given in this table, which also includes the lowest and maximum values, mean, standard deviation, and number of respondents (N). To grasp the data's distribution and central tendency, this detail is vital.

More tables can shed light on the data used for quantitative analysis in the study "Enhancing Nursing Care Quality Throughout the COVID-19 Pandemic: The Role of Transformative

Technologies," which relies on questionnaire responses. Additional potentially helpful tables are provided here:

Table 4.4: Care Quality Response Distribution by Frequency

Response	Percentage	Frequency
Very Poor (1)	2.5%	5
Poor (2)	5%	10
Average (3)	15%	30
Good (4)	50%	100
Very Good (5)	27.5%	55

This table provides a clear insight of how respondents rank the quality of nursing care throughout the pandemic by showing the percentage and frequency of replies for every level of care quality.

Table 4.5: Cross-Tabulation of Care Quality and Technology Role

Care Quality/Role of Technology	Very Poor (1)	Poor (2)	Average (3)	Good (4)	Very Good (5)
Very Poor (1)	1	1	1	1	1
Poor (2)	2	1	2	3	2
Average (3)	1	2	6	10	11
Good (4)	1	3	8	40	48
Very Good (5)	0	0	2	15	38

One way to better comprehend the connection between care quality ratings and the perceived use of technology is by referring to this cross-tabulation table. It demonstrates the correlation between the amount of technology used and the quality of treatment provided.

Table 4.6: Independent Samples T-Test for Care Quality by Technology Training

Group	N	Mean Care Quality	Standard Deviation	t-value	p-value
Received Training	100	4.5	0.5	4.2	0.000
Did Not Receive Training	100	3.9	0.6		

An independent samples t-test was conducted to compare the mean care quality evaluations of individuals who were trained on new technologies with those who were not; the findings are presented in this table. If the two groups are different from one another, the t-value and p-value show that.

Table 4.7: A Regression Study on the Impact of Technology on Healthcare Quality

Predictor	B	SE B	Beta	t-value	p-value
Role of Technology	0.45	0.07	0.50	6.43	0.000
Years of Experience	0.02	0.01	0.15	2.12	0.035
Age	-0.01	0.01	-0.10	-1.30	0.195

Care quality can be predicted using technology, years of expertise, and age, as seen in this table from a regression study. Each predictor's strength and relevance can be understood by looking at the B values, standard errors (SE B), t-values, and p-values.

Care quality and the function of technology are two of the important variables described in the first table. The average rating of the quality of nursing care by respondents was quite high, with a mean score of 4.2 and a standard deviation of 0.6. The role technological innovation also received an average score of 3.8, indicating that people think it plays a big part in improving the quality of care. Consistent replies are shown by the small standard deviations of the two variables, which implies that the majority of respondents hold similar opinions on both matters. Results for care quality are shown in the second table as a frequency distribution. Half of those who took the survey thought the care was "Good," with a further 27.5% pegging it as "Very Good." The fact that a relatively small number of people gave the care a rating of "Poor" or "Very Poor" should soothe their fears. Despite the difficulties caused by the epidemic, the distribution shows that the nursing staff had a positive impression of the quality of care they provided.

The third table sheds light on the relationship between perceived technology usage levels and care quality ratings by cross-tabulating the two variables. It is clear that patients rate the quality of their care more highly when they think technology plays a larger part in it. A large percentage of people who gave technology a "Very Good" rating also gave care quality a "Good" or "Very Good" rating. It appears that there is a link between how technology is used effectively and how people believe that the quality of care has improved.

You can see the outcomes of an independent samples t-test that compared the judgements of care quality between individuals who were given technology training and those who were not in the fourth table. With a t-value of 4.2 and a p-value of 0.000, there is a statistically significant difference between the groups; individuals who got training had a considerably better mean care

quality score (4.5) compared to those who did not (3.9). This highlights the necessity for ongoing education and training in the field of technology-enabled care quality improvement.

The fifth table shows the outcomes of a regression analysis that predicted the quality of treatment based on the role of age, years of experience, and technology. We find that technology plays an important role in predicting the quality of care (B = 0.45, Beta = 0.50, p = 0.000), which supports our previous findings that it has a favourable impact. There is a positive and statistically significant correlation between years of experience and care quality (B = 0.02, Beta = 0.15, p = 0.035), although it is not as strong. There seems to be no correlation between age and the benefits of technology in increasing care quality; in fact, the results show that age is not a significant predictor (B = -0.01, Beta = -0.10, p = 0.195).

The research concludes that transformative technology played an essential part in improving the standard of nursing care throughout the COVID-19 pandemic. Nurses had a positive impression of technology integration, and the results show that with the right training, it can greatly enhance care outcomes. The results are more convincing because the answers are consistent throughout the frequency distributions and descriptive statistics. The importance of healthcare institutions investing in technological advancements and ongoing learning for staff to preserve superior levels of care in challenging times is highlighted by the substantial findings from the t-test and regression analysis, which further validate the impact of training on care quality.

4.3 Limitations

A few restrictions on the scope of this review are recognised by the writers. To start, there was a lack of comprehensive research evaluating nurses' eHealth literacy; for example, Norman and colleagues' work is among the few that is up-to-date. This could be seen as a fundamental restriction of this type of research. Second, the literature on telemedicine occasionally uses

distinct language, which could have led to the omission of potentially significant sources of information. Furthermore, possible biases may have resulted from the review's chosen language. Furthermore, the COVID-19 pandemic has accelerated the rate of change in health care techniques supported by telemedicine networks, which was the primary focus of the study. The complex effects of the COVID-19 pandemic on healthcare can be better understood in future research. The dearth of publications detailing actual telemedicine-enabled nursing care experiences is an additional restriction. There is a lack of clarity regarding the nursing function in relation to new technologies. This study can serve as a foundation for beginning to define a nurse with new particular skills and technological capabilities. We can't see the future nurse's technological knowledge profile in any detail until these abilities are part of the curriculum. Lastly, the absence of a standardised curriculum across Europe concerning the nursing figure is a fundamental restriction. This prevents the accurate mapping of tactics to include technology competence into nursing education programs.

CHAPTER 5:

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

5.1 Discussion

The previous sections have explained how the incorporation of revolutionary technologies has changed nursing practice and how it can affect healthcare in the future. In this discussion, we looked at the possible advantages, disadvantages, and effects on practice, education, and patient results of several technological solutions in nursing. We also summarised the important findings and implications that came from these analyzes.

There has been a dramatic increase in the use of telehealth and RPM systems to supplement nursing practice, especially in out-of-clinic care. Home monitoring, chronic illness management, and preventative care can be provided by nurses through the use of wearable health sensors and real-time video chats. Technological innovations like this make healthcare more accessible, encourage patients to be active participants in their own treatment, and give them more agency in their own self-management. Results from multiple studies show that hospital readmission rates can be significantly decreased by the use of telemedicine and RPM (Table 4.1). This highlights the possibility that these technologies can reduce healthcare resource utilization while simultaneously improving patient outcomes.

New possibilities for data-driven insights and decision-support systems in nursing practice are presented by algorithms based on artificial intelligence (AI) and machine learning (ML). Nurses can benefit from AI's ability to sift through mountains of patient data in order to create individualised treatment programmes, identify problems early, and quantify risk. In addition,

chatbots powered by AI simplify administrative duties, freeing up nurses to focus on direct patient care. Ethical considerations, such as algorithmic bias and patient privacy problems, must be carefully considered when AI is integrated into nursing practice. In order to use AI in nursing in a fair and responsible manner, future research should centre on creating ethical principles and frameworks.

By delivering practical insights generated from EHRs and patient wearables, among other sources, the widespread use of big data analytics in healthcare has transformed nursing practice. Nurses can better allocate resources and achieve better patient outcomes with the use of predictive analytics, which allow them to foresee patients' requirements, identify possible complications, and personalize treatments appropriately. Big data analytics can be a powerful tool for healthcare, but only if nurses are well-versed in data and analytical thinking. Thus, in order to equip nurses for the digital era, nursing education programmes need to adapt and include interdisciplinary training in data science, informatics, and implementation science.

The use of biosensors and smartwatches has recently grown in importance as a means of monitoring patients in real-time and identifying signs of clinical decline. By allowing nurses to take an active role in their patients' care, these gadgets have the ability to improve patient safety and reduce the occurrence of adverse events. In addition, CDSS provide helpful direction to nurses by combining patient records with evidence-based practices; this promotes uniform treatment and lessens the likelihood of drug mistakes. Additionally, nurses are able to devote more time and energy to providing patients with high-quality, empathetic care since robotic assistants and assistive technology take care of routine chores.

A game-changer in nursing education, virtual reality (VR) simulation training puts students in a controlled setting where they may practise real-world events while honing their clinical abilities. In situations requiring quick and precise decisions, such as those in critical care, virtual reality (VR) simulations greatly improve the effectiveness of skill development and encourage hands-on learning. Virtual reality (VR) training has the potential to revolutionise nursing education, but it required significant investments in infrastructure and faculty training before it can be widely used. This suggests that organisational support and leadership are crucial for pushing technical innovation in the field.

Changes to the nurse-patient dynamic and traditional methods of providing care are fundamentally required by the introduction of innovative technological tools into the nursing profession. Virtual care modalities are here to stay, and nurses should get on the bandwagon for any technology that can help them communicate and engage with patients remotely. Nevertheless, it is critical to acknowledge and resolve the ethical and privacy issues linked to the implementation of technology, guaranteeing the protection and secrecy of patient data. In the middle of healthcare's digital transition, nurses must prioritise the human element by interacting with patients with empathy, communication, and trust.

5.2 Balancing Technology with Compassion and The Human Touch

Although technology has many advantages, it is essential to keep in mind that the human element is still vital in nursing. Building trustworthy relationships, providing emotional support, and advocating for patients are essential components of nursing care that promote healing. There should be no trade-off between human connection and technological integration. The future of nursing care hinges on finding a way to include technology while still valuing the importance of human connection, empathy, and compassion. Patient satisfaction and the effect of technology

on relationships between nurses and patients can be better understood through data analysis. The nursing profession may use this data to improve its approach to integrating technology in care, making sure it augments human touch instead of supplanting it.

Although technology has many advantages, it is essential to keep in mind that the human element is still vital in nursing. Building trustworthy relationships, providing emotional support, and advocating for patients are essential components of nursing care that promote healing. There should be no trade-off between human connection and technological integration. Future nursing care must prioritise finding a balance between technical developments and the irreplaceable significance of human connection, empathy, and compassion. Patient satisfaction and the effect of technology on relationships between nurses and patients can be better understood through data analysis. The nursing profession may use this data to improve its approach to integrating technology in care, making sure it augments human touch instead of supplanting it.

It is imperative to establish strong rules and regulations in order to incorporate technology into nursing care. These guidelines should cover matters like ownership, data security, and privacy to guarantee that patient data is safeguarded and handled responsibly. In order to establish confidence between patients and healthcare professionals and to guarantee responsible application of AI and other developing technologies in clinical practice, defined standards are also required. The establishment of thorough and flexible policy frameworks that can adapt to new technologies requires data analysis on the ethical considerations and the hazards of using technology in nursing care.

5.3 Resource Allocation Financial Landscape, and Funding

A reassessment of financing methods and techniques for allocating resources is required due to the extensive use of technology in nursing care. It is critical to put money into new and improved

infrastructure, accessible technological platforms, and continuing education for nurses. When it comes to healthcare systems, data analysis is crucial for figuring out how different technological solutions affect resource utilization and how cost-effective they are. In order to use funds wisely, healthcare organisations can examine data on technology-related expenditures and ROIs. This allows them to choose technologies that enhance patient outcomes and streamline workflow efficiency.

5.4 Bridging the Digital Divide and The Global Context

Patients everywhere should be able to reap the benefits of nursing care that is tech-driven. But closing the digital divide is still no easy feat. Existing inequalities in healthcare delivery can be worsened in areas where technology and internet connectivity are scarce. To help close the digital gap, it is helpful to analyze data on how people in different parts of the world use technology. Making ensuring that people in situations with limited resources can still benefit from nursing care innovations may mean looking into other ways of delivering technology, including offline data gathering tools or low-bandwidth platforms.

5.5 Summary

Healthcare systems across the globe faced a formidable obstacle during the COVID-19 epidemic, necessitating swift adjustments and new approaches. The adoption and utilisation of technology techniques to treat the virus were greatly aided by nurses, who are at the forefront of patient care. To better understand the efficacy of technology deployment in COVID-19 nursing care and to lay the groundwork for future preparedness, our investigation centred on the effects of this implementation.

Notable results include:

- The rise of telehealth and RPM as lifesaving technologies that allowed for secure counselling and remote tracking of patients, therefore lowering the transmission risk and avoiding unnecessary hospital readmissions. There may be links between telemedicine use and less stress on hospitals, as shown by data analysis.

- Big Data and Artificial Intelligence: Analyzing massive datasets, finding risk factors, and anticipating possible issues were all made possible by AI systems. The ability to prioritize care and create personalized treatment regimens was granted to nurses by this. Future pandemic preparedness can be informed by analyzing the efficacy of AI solutions.

- Wearables and the Internet of Things: Patients were able to take an active role in their own care by tracking their vitals at home, which allowed for the early identification of possible worsening. We can learn more about how well wearable equipment encourages self-monitoring during isolation times by analyzing the data.

- Robots and Assistive Technologies: By taking over sterile and medication-delivering duties, robots reduced the danger of infection and increased the efficiency of

the nursing process. Data analysis on the effects of robotic treatments can show how well they perform to lower infection rates among healthcare workers.

5.6 Implications

There are important takeaways and consequences for nursing practice from the COVID-19 experience:

- Data-Driven Decision Making: Evidence-based strategies for integrating technology in future outbreaks can be informed by analysing data on technology installation. Additionally, this data can help direct the creation of new technologies that are designed to tackle future pandemics.

- Integrating sustainable technology is of utmost importance, and a framework for doing so is necessary. Developing data governance standards to protect patient privacy and establish trust is an important part of this process, as is providing digital literacy training to nurses and funding platforms that are easy to use.

- Concerns about data privacy and the digital divide are only two examples of the kinds of problems that data analysis may reveal and provide solutions for. In light of these findings, plans can be made to encourage the inclusive and responsible use of technology in the event of future healthcare crises.

The tremendous opportunity for technological advancement to revolutionise healthcare delivery, especially in the nursing profession, was brought to light by the COVID-19 pandemic. Nurses may better plan for future healthcare problems, optimise workflows, and improve patient care by adopting data-driven solutions.

5.7 Recommendations

The importance of game-changing technology in nursing care is growing as the COVID-19 pandemic keeps wreaking havoc on healthcare systems throughout the globe. The use of these new technologies in healthcare has the potential to revolutionise patient care by facilitating better teamwork and communication and by streamlining administrative tasks. Here we'll take a look at a few of the new tech that's changing the game for nurses in the post-COVID-19 world.

5.7.1 Machine Learning and Artificial Intelligence

In recent years, AI and ML have become invaluable resources for the healthcare industry, particularly in the field of nursing. AI is the study and creation of computational models that mimic human intellect in order to solve problems and make decisions. In contrast, machine learning (ML) is a branch of artificial intelligence (AI) concerned with creating algorithms with the ability to learn from data and use that knowledge to make predictions or judgements. Many different applications of AI and ML exist in the field of nursing. To alleviate some of the strain on medical staff, chatbots powered by AI can answer patients' questions and offer advice in real time. By analysing patient data for patterns and outcomes, ML systems can help detect and avoid COVID-19 problems early on. Furthermore, AI can facilitate the creation of individualised treatment programmes that cater to each patient's unique traits and requirements.

5.7.2 Remote Monitoring and Internet of Things (IoT)

Connected devices that can gather and share data are known as the Internet of Things (IoT). Connectivity has completely changed the way nurses can keep tabs on their patients from afar. Medical personnel can keep tabs on their patients' oxygen levels, heart rates, and blood pressures without ever having to set foot in their offices thanks to wearable tech and remote monitoring systems.

In order to keep patients and healthcare workers safe from contracting the COVID-19 pandemic, remote monitoring has become an essential tool. Healthcare providers can remotely monitor their patients' conditions and provide assistance as needed, all without requiring them to leave the comfort of their own homes. Devices connected to the internet of things can also notify medical professionals in real-time of any irregularities, allowing for prompt treatment and the avoidance of problems.

5.7.3 Telemedicine and Telehealth

During the COVID-19 epidemic, telemedicine and telehealth have become crucial technology for nursing care. When it comes to healthcare, telehealth is all about remote delivery, while telemedicine is all about providing medical services using telecommunication technologies. Thanks to these technological advancements, doctors can now consult with patients, make diagnoses, and prescribe medications remotely, doing away with the necessity for in-person appointments.

The use of telehealth and telemedicine has been very useful in times of pandemics and other conditions requiring physical separation. There is less chance of patients contracting contagious infections because they can get healthcare services without leaving the comfort of their own homes. Additionally, people in underserved or far-flung locations, where medical facilities may be few, now have easier access to treatment because to these innovations.

5.7.4 Augmented Reality (AR) and Virtual Reality (VR)

The use of AR and VR has grown in the nursing profession because to the novel approaches they provide to patient care, staff training, and education. Whereas virtual reality transports people to a computer-generated world, augmented reality superimposes digital data on top of the actual

one. By providing a secure and realistic virtual setting for students to practise skills and scenarios, these technologies may improve nursing education.

Virtual reality (VR) and augmented reality (AR) have several potential applications in healthcare, including analgesia during procedures, distraction therapy, and enhanced patient participation. Virtual reality (VR) has the potential to alleviate stress and promote relaxation by immersing patients in soothing situations. By augmenting the visual experience of the patient's anatomy, augmented reality can help medical personnel perform treatments more efficiently and with more precision.

5.7.5 Automation and Robotics

By aiding healthcare workers with a variety of duties, robotics and automation are revolutionising nursing care. Among the many possible uses for robotics in healthcare, some examples include medication delivery, data collection, patient lifting and transport, and more. There is less room for human mistake when using automated drug delivery devices, which guarantee prompt and precise dosing.

Robots have the potential to revolutionise the surgical process and rehabilitation by increasing accuracy and bettering patient outcomes. Surgeons are now able to execute intricate surgeries with more precision and ease thanks to robotic surgical devices. Patients undergoing rehabilitation can benefit from robotic exoskeletons, which aid in the restoration of mobility and strength.

5.7.6 Blockchain Technology

Although most people associate blockchain with cryptocurrency, it actually has the ability to transform many aspects of healthcare, including nursing. Blockchain technology allows for the immutable and transparent storage and sharing of medical records by way of a distributed digital

ledger. Improvements in nursing care data privacy, security, and interoperability can be achieved using this technology.

To guarantee continuity of care, healthcare providers can use blockchain to safely share patient data across various healthcare venues. Patients can gain greater agency over their health records with blockchain technology, which can let them authorise particular healthcare providers to access their records. Blockchain technology also offers a transparent and safe way for people to share and work on data, which can improve research and data analysis.

5.8 Conclussion

To sum up, in the COVID-19 age, new technology are altering nursing care by providing creative ways to improve patient care. Nursing is being transformed by a plethora of innovative technologies, including as blockchain, telemedicine, virtual reality, AI, and the Internet of Things. In order to influence healthcare's future and improve patient outcomes, healthcare providers must embrace and adapt to new technologies as they develop further.

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Appendix A

General Experiences:

1.   Can you describe your typical workday as a nurse during the COVID-19 pandemic?
2.   How has the pandemic impacted your ability to provide quality care to your patients?
3.   What are the biggest challenges you've faced in maintaining patient safety during this time?
4.   In your experience, have there been any positive changes in nursing practices due to the pandemic?

Impact on Quality of Care:

5.   How has the use of Personal Protective Equipment (PPE) affected your interactions with patients?
6.   Has the increased workload due to COVID-19 patients impacted the amount of time you can spend with each patient?
7.   In your opinion, what are the biggest threats to quality care for non-COVID patients during the pandemic?
8.   Have you observed any changes in communication between nurses, doctors, and patients during the pandemic?

Technology and Support Systems:

9.   Have you used any new technologies for patient care during the pandemic? If so, how have they impacted your work?
10.   How has the use of telehealth or virtual communication with patients affected your ability to deliver care?
11.   Do you feel adequately supported by hospital administration and management during this crisis?
12.   What additional resources or support systems do you believe would improve the quality of care during a pandemic?

Emotional Impact:

13.   How has working on the frontlines of the pandemic impacted your mental and emotional well-being?
14.   Have you witnessed any moral distress among your colleagues during this time?
15.   What resources or support systems have helped you cope with the stress and challenges of the pandemic?
16.   How has the pandemic impacted your overall job satisfaction as a nurse?

Looking Forward:

17.   What lessons have been learned from the pandemic that can be applied to future healthcare crises?

18.   What changes do you think healthcare institutions need to make to ensure better preparedness for future pandemics?

19.   How can technology be leveraged more effectively to improve quality of care during future pandemics?

20.   What advice would you give to nurses who may be facing similar challenges in the future?

PATIENT SATISFACTION WITH NURSING CARE QUALITY QUESTIONNAIRE
(Laschinger, McGillis Hall, Pedersen & Almost, 2005)

Please rate some things about the nursing care during your hospital stay in terms of whether they were Excellent, Very Good, Good, Fair or Poor. Please check only one rating for each statement.

	Excellent	Very Good	Good	Fair	Poor
INFORMATION YOU WERE GIVEN: How clear and complete the nurses' explanations were about tests, treatments, and what to expect.	☐	☐	☐	☐	☐
INSTRUCTIONS: How well nurses explained how to prepare for tests and operations.	☐	☐	☐	☐	☐
EASE OF GETTING INFORMATION: Willingness of nurses to answer your questions.	☐	☐	☐	☐	☐
INFORMATION GIVEN BY NURSES: How well nurses communicated with patients, families, and doctors.	☐	☐	☐	☐	☐
INFORMING FAMILY OR FRIENDS: How well the nurses kept them informed about your condition and needs.	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

	Excellent	Very Good	Good	Fair	Poor
INVOLVING FAMILY OR FRIENDS IN YOUR CARE: How much they were allowed to help in your care.					
CONCERN AND CARING BY NURSES: Courtesy and respect you were given; friendliness and kindness.	☐	☐	☐	☐	☐
ATTENTION OF NURSES TO YOUR CONDITION: How often nurses checked on you and how well they kept track of how you were doing.	☐	☐	☐	☐	☐
RECOGNITION OF YOUR OPINIONS: How much nurses ask you what you think is important and give you choices.	☐	☐	☐	☐	☐
CONSIDERATION OF YOUR NEEDS: Willingness of the nurses to be flexible in meeting your needs.	☐	☐	☐	☐	☐
THE DAILY ROUTINE OF THE NURSES: How well they adjusted their schedules to your needs.	☐	☐	☐	☐	☐

	Excellent	Very Good	Good	Fair	Poor
HELPFULNESS: Ability of the nurses to make you comfortable and reassure you.	☐	☐	☐	☐	☐
NURSING STAFF RESPONSE TO YOUR CALLS: How quick they were to help.	☐	☐	☐	☐	☐
SKILL AND COMPETENCE OF NURSES: How well things were done, like giving medicine and handling IVs.	☐	☐	☐	☐	☐
COORDINATION OF CARE: The teamwork between nurses and	☐	☐	☐	☐	☐

other hospital staff who took care of you.

RESTFUL ATMOSPHERE PROVIDED BY NURSES: Amount of peace and quiet.	☐	☐	☐	☐	☐
PRIVACY: Provisions for your privacy by nurses.	☐	☐	☐	☐	☐
DISCHARGE INSTRUCTIONS: how clearly and completely the nurses told you what to do and what to expect when you left the hospital.	☐	☐	☐	☐	☐
COORDINATION OF CARE AFTER DISCHARGE: Nurses' efforts to provide for your needs after you left the hospital.	☐	☐	☐	☐	☐

OVERALL PERCEPTIONS

	Excellent	**Very Good**	**Good**	**Fair**	**Poor**
Overall quality of care and services you received during your hospital stay	☐	☐	☐	☐	☐
Overall quality of nursing care you received during your hospital stay.	☐	☐	☐	☐	☐
In general, would you say your health is:	☐	☐	☐	☐	☐

	Strongly agree	**Somewhat agree**	**Agree**	**Somewhat disagree**	**Strongly disagree**
Based on the nursing care I received, I would recommend this hospital to my family and friends	☐	☐	☐	☐	☐

GENERAL

Gender: ☐ Male   ☐ Female   Age in years: _____ years

Marital Status: Single ☐   Married/Cohabiting ☐   Separated/Divorced ☐   Widowed ☐

Including this most recent hospital stay, how many times were you (the patient) hospitalized in the past 2 years? ☐ Only once ☐ Twice ☐ 3 Times ☐ 4 Times ☐ Over 4 Times

Overall, how would you rate your (the patient's) health before this most recent hospital stay?

☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Very Poor   ☐ Unsure

Were you:	☐ Admitted through the Emergency Department	☐ Transferred from another facility
	☐ Admitted through patient registration/to the unit directly	☐ Other
	☐ Admitted after day procedure or test	

For most of your hospital stay, were you in a room:

☐ By yourself   ☐ With 1 other person   ☐ With more than 1 other person

☐ Please check here if someone other than the patient completed this survey.