

Evaluation of Telehealth Implementation in Improving Healthcare Management

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Abstract The transition towards integrated telehealth and Artificial Intelligence (AI) in healthcare is not just a technological shift but a transformative change, especially significant in the context of infectious disease management. This study examines the competencies required for healthcare managers to lead effectively in this new era, emphasizing digital literacy, strategic adaptability, and proactive policy engagement. With infectious diseases posing continual challenges globally, telehealth offers a unique opportunity to enhance patient outcomes while mitigating the risks associated with in-person consultations. As healthcare evolves, the competencies of leaders must adapt to ensure that the benefits of telehealth and AI are fully realized in controlling infectious disease outbreaks.

Keywords Telehealth, Healthcare Management, Public health, Healthcare administration

1. Introduction

The adoption of telehealth technologies is becoming a transformative force in the healthcare sector, revolutionizing the way healthcare services are delivered and managed. This shift towards digital healthcare delivery methods, including video conferencing, remote monitoring, and mobile health applications, is not only expanding access to care but also introducing new challenges and opportunities in healthcare management. As telehealth continues to evolve, understanding its impact on healthcare management competencies becomes crucial. [1]

This study aims to evaluate the effects of telehealth implementation on the development and enhancement of healthcare management competencies in a specific healthcare setting. By exploring the integration of telehealth and its correlation with managerial practices, this research seeks to uncover insights into how digital health technologies influence the competencies required for effective healthcare administration.

2. Problem Statement and Significance

The rapid integration of telehealth services into healthcare systems presents both opportunities and challenges for healthcare management. While telehealth promises to improve access

to care, reduce costs, and enhance patient satisfaction, its implications for healthcare management competencies remain underexplored. [2] Effective management plays a pivotal role in the successful implementation and sustainability of telehealth programs. Thus, assessing the impact of telehealth on healthcare management competencies is essential for ensuring healthcare leaders are equipped to navigate the complexities of digital healthcare delivery.

This study is significant as it addresses the gap in literature regarding the relationship between telehealth implementation and healthcare management competencies, providing valuable insights for healthcare administrators, policymakers, and educators in the development of training and policy frameworks that support the effective use of telehealth technologies.

3. Study Objectives

This research's main objective is to evaluate the impact of telehealth implementation on healthcare management competencies within a specific healthcare setting. Specifically, the study aims to:

1. Identify essential healthcare management competencies in the telehealth context.
2. Evaluate the influence of telehealth service implementation on these competencies.
3. Examine the implications of changes in competencies for healthcare administration and policy formulation.

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4. Research Methodology

An established research methodology will be used to systematically evaluate the impact of telehealth implementation on healthcare management competencies. This study will employ a program evaluation approach, incorporating a mix of qualitative and quantitative data sources. The methodology will encompass:

Defining the Evaluation Purpose: Clarifying the study's aim to examine the relationship between telehealth implementation and the development or enhancement of healthcare management competencies.

Describing Program Inputs Reviewing existing data on telehealth technologies and practices adopted in healthcare settings.

Specifying Activities: Analyzing documented managerial activities influenced by telehealth, including data management, training, and coordination of services.

Establishing Performance Criteria and Operational Indicators: Utilizing existing research to identify indicators for healthcare management competencies relevant to telehealth.

Conducting Data Analysis: Leveraging secondary data analysis to assess the impact of telehealth on management competencies.

Video Conferencing

Telehealth is garnering substantial attention in the literature, with a focus on convenience and positive impact on various aspects of healthcare. In terms of convenience, telehealth is lauded for its potential to save time, reduce costs, and alleviate stress associated with travel and disruptions to employment. [16] Mixed experiences are reported, with positive feedback being more prevalent than negative for both telehealth and in-person consultations. Interviews reveal thematic alignments with 'patient ability' dimensions, emphasizing convenience, value perceptions, relationships, technology, and the importance of being seen. [16] Future interest in telehealth remains high, with 80% expressing interest in telephone consultations and 69% in video consultations. Qualitative data align with the notion that telehealth supports self-management, emphasizing relationships, convenience, technology fit, and the need for visibility. [16]

Another dimension of telehealth explored in the literature revolves around video consultations. Evidence suggests video consultations are effectively utilized for diagnostics in various clinical fields such as dermatology, psychiatry, neurology, orthopedics, and pediatrics, with reasonably good diagnostic agreement observed compared to face-to-face consultations. [25] Positive outcomes are reported for patients treated via video consultations across different conditions and specialties, particularly in telehealth-assisted chronic disease management, where improvements are noted, especially in diabetes. [25] However, the literature highlights limited evidence of cost-effectiveness for video consultations, with the overall quality of studies described as poor-to-average. Some evidence does suggest cost-effectiveness for home care and specialist consultations by general practitioners

with patients present. [25] Notwithstanding the cost considerations, patient satisfaction with video consultations is notably higher than face-to-face consultations. Patients reported benefits such as reduced waiting times, less need for travel, time savings, and overall convenience. [25]

Moreover, the clinical perspective on telehealth, as assessed in a study involving clinicians, indicates a positive outlook. Clinicians judged telehealth as equivalent to or better than home visits in 71.6% of cases, and the overall experience of conducting telehealth sessions is rated positively in 90.3% of the sessions. [28] These findings underscore the potential of telehealth to not only match but surpass traditional in-person healthcare delivery in terms of effectiveness and overall experience, as perceived by clinicians. [28]

Remote Monitoring

The integration of technology within healthcare, particularly through health informatics, is catalyzing a paradigm shift in patient care, notably through remote monitoring systems. Health informatics, an interdisciplinary field that converges information systems, computer science, and healthcare using information and communication technologies (ICTs), serves the fundamental purpose of acquiring, storing, managing, retrieving, and utilizing biomedical information. [28] Remote monitoring systems, a key facet of health informatics, is revolutionizing patient care by enabling the real-time collection, dissemination, and analysis of medical data from remote locations, particularly for managing chronic conditions and detecting health emergencies. [7] This advancement is bolstered by the integration of smart wearable mobile devices and cloud computing within public healthcare systems, which aim to better manage patient populations, especially those residing in remote areas far from healthcare service providers. [7]

Moreover, within specialized domains such as Artificial Pancreas (AP) systems, remote monitoring plays a pivotal role in optimizing patient outcomes. Reliable measures of psychosocial impact are deemed crucial for regulatory approval processes and reimbursement decisions for AP systems, ensuring robust consideration of psychosocial factors during regulatory approval and reimbursement determinations by government and private payers. [20] By maximizing benefits for individuals with diabetes in terms of glycemic control and quality of life while minimizing the overall burden of diabetes in everyday life, remote monitoring through AP systems underscores the transformative potential of technology in healthcare. [20]

In parallel, telehealth, another manifestation of remote monitoring, underscores the significance of patient-provider communication in enhancing satisfaction levels. Positive communication experiences facilitated by telehealth enable patients to feel heard, have their concerns addressed, participate in decision-making, and maintain confidentiality, thereby contributing to overall patient satisfaction. [23] However, challenges such as the absence of physical examinations and preferences for local healthcare provider presence persist

among some patients, highlighting the ongoing need for refinement and adaptation of remote monitoring technologies to meet diverse patient needs. [23] Overall, remote monitoring systems, encompassing various technological advancements and applications such as telehealth and AP systems, hold immense promise in optimizing patient care, enhancing healthcare accessibility, and improving health outcomes across diverse patient populations.

Telemedicine Applications

The landscape of telehealth is experiencing a significant upsurge in interest and utilization, largely propelled by the anticipated implementation of the Affordable Care Act and the continual advancements across various telehealth services. These services, ranging from gap coverage to urgent care provisions and the facilitation of video-enabled multisite group chart rounds, reflect the dynamic and evolving nature of telehealth in meeting the diverse healthcare needs of patients and providers alike. [21] Within this landscape, critical success factors are emerging, underscoring the importance of establishing a well-defined business plan with sustainable revenue streams. Notably, programs offering gap service coverage, such as teleradiology, are demonstrating a higher likelihood of success, suggesting the significance of strategic service offerings in telemedicine initiatives. [21] However, despite the evident advantages, barriers to telemedicine success persist, particularly in the realm of reimbursement challenges that necessitate governmental or regulatory intervention. Issues such as disparities between Medicare and Medicaid reimbursement rates in certain states and complexities surrounding interstate medical licensure rules continue to pose significant hurdles to widespread telemedicine adoption. [21]

Furthermore, the advent of mobile health (mHealth) represents a disruptive force within the healthcare landscape, marked by its rapid growth and transformative potential driven by the ubiquitous presence of smartphones. Leveraging networking systems, application software, and advanced devices, mHealth applications offer diverse functionalities for remote healthcare delivery, including user-friendly design, enhanced accessibility, and adaptability to varying user needs and preferences. [11] These applications not only facilitate healthcare accessibility and affordability through features like video medical appointments and electronic prescription delivery but also serve as valuable tools for linking clinicians with patients, fostering long-term engagement and supporting lifestyle changes conducive to improved health outcomes. [11] Moreover, by eliminating distance limitations and facilitating electronic communication between doctors and patients, mHealth applications hold promise for expanding healthcare access and bridging gaps in healthcare delivery, particularly in underserved or remote areas. Through enhanced information exchange and collaboration, these technologies can elevate the quality of healthcare facilities and services across geographically disparate regions. [11]

Additionally, the transition from traditional paper-based medical records to electronic health records (eHR) facilitated by telemedicine applications represents a significant advancement in healthcare information management. This transition empowers healthcare providers with access to comprehensive and up-to-date medical information, thereby enhancing their ability to make well-informed management decisions and deliver personalized care to patients. [8] Furthermore, the proliferation of health apps and wearable devices is revolutionizing health monitoring and management, enabling individuals to track various health parameters, manage chronic conditions, and adhere to treatment regimens with greater ease and precision. The integration of these technologies allows for seamless data synchronization and analysis, providing clinicians and patients alike with valuable insights into health trends and facilitating informed decision-making. [8] Collectively, these developments underscore the transformative potential of telehealth and mHealth in revolutionizing healthcare delivery, improving patient outcomes, and advancing the quality and accessibility of healthcare services.

Remote Health Education

The integration of telemedicine into medical education is emerging as a promising avenue for enhancing clinical training and educational engagement among medical students. Remote clinical roles utilizing telemedicine platforms offer teaching hospitals an innovative means to involve medical students in outpatient care, enabling them to participate in various clinical activities such as patient history-taking, education delivery, and documentation of visits. This approach not only provides students with early exposure to clinical practice but also facilitates the development of communication skills essential for effective patient interaction. [32]

Additionally, collaborative learning initiatives, including partnerships with other medical institutions for shared online education activities, and online mentoring programs, which utilize telecommunication for mentorship and portfolio updates, are shown to enhance educational engagement and facilitate mutual learning opportunities. [18]

Moreover, leveraging online platforms for organizing competitions in arts and humanities and providing uninterrupted access to digital library resources contribute to fostering positive attributes and meaningful learning experiences among medical students. [32] Considering the COVID-19 crisis, leveraging online platforms to encourage student reflection, narrative writing, and proposal of innovative ideas for combating the pandemic is emerging as a valuable educational approach. Such strategies not only promote active learning but also foster resilience and adaptability in the face of disruptive circumstances. [32]

Overall, indicators for effective online engagement encompass observational and application-based learning behaviors, with strategies aimed at incentivizing teacher-learner participation and ensuring continuous involvement in the

learning process. By adopting these approaches, medical educators can effectively navigate the challenges posed by the COVID-19 pandemic while fostering meaningful learning experiences and enhancing educational outcomes among medical students. [32]

Store and Forward Technology

Store-and-forward telemedicine is emerging as a vital component in providing medical care in resource-limited settings, especially in specialties reliant on image-based diagnostics, although there is a notable scarcity of quality measurement reports within this field. [31] In response to this need, Médecins Sans Frontières (MSF) took the initiative in 2010 to establish a store-and-forward telemedicine network, which is managing over 1000 cases spanning 40 countries, demonstrating its potential to bridge healthcare gaps across diverse geographic regions. [31] A proposed method for assessing the quality of telemedicine services involves a panel of observers evaluating process and outcome quality through a questionnaire administered on a randomly chosen past case, with feasibility successfully demonstrated over a 9-month trial period. [31]

Furthermore, the utility of store-and-forward telemedicine extends beyond resource-limited settings, with its significance highlighted in extreme environments such as Antarctica, where geographical isolation poses unique challenges to accessing specialized medical care. [32] In a study conducted in this remote region, telemedicine via email proved to be a crucial tool for obtaining specialist advice, particularly in cases where physical access to healthcare professionals is impractical. The study revealed that a store-and-forward telemedicine system, when employed by NGOs with trained specialist teams and automatic message-handling systems, was efficient and reliable in providing well-argued and adapted advice tailored to the specific needs of patients in remote areas. However, limitations used to identify in other methods, such as contacting personal acquaintances, underscores the importance of structured telemedicine systems in ensuring effective healthcare delivery. [32]

Moreover, the integration of telemedicine into mainstream medical practice is yielding significant benefits, as evidenced by combined user feedback and patient follow-up data indicating high response rates and the perceived usefulness of teleconsultation advice for both referring doctors and patients. [31] Over 90% of referrers found teleconsultation advice to be educationally beneficial, underscoring its positive impact on medical practitioners' knowledge and decision-making processes. [31]

Additionally, teleconsultations led to cost savings in approximately 20% of cases, reflecting the financial advantages of store-and-forward telemedicine applications for patients, families, and healthcare institutions. [31]

In summary, the evolution and widespread adoption of store-and-forward telemedicine holds promise for improving healthcare accessibility, quality, and cost-effectiveness across diverse healthcare settings.

Digital Health Platforms

Digital Health Platforms (DHPs) are garnering widespread acceptance and satisfaction among users, with studies indicating a positive attitude toward their adoption and usage. Users often express elevated levels of satisfaction, with rates reaching 9 out of 10, citing the speed and accessibility of digital healthcare as key factors contributing to their positive perceptions. Compared to traditional healthcare settings, DHPs offer users the convenience of avoiding queues and the flexibility to manage recurring healthcare needs efficiently. However, there remain challenges in ensuring widespread adoption, particularly among elderly users. To address this, managerial implications for DHP developers include focusing on streamlining adoption processes, enhancing platform intuitiveness for elderly users, conducting test panels with elderly demographics, and implementing tailored information campaigns to boost awareness and address any negative attitudes. [10]

Considering the Covid-19 pandemic, the importance of health informatics tools is underscored, particularly in mitigating pressure on healthcare systems and enhancing accessibility for consumers. Various health IT solutions are developed globally, with a specific focus on initiatives in Saudi Arabia. Facilitating conditions and trust emerge as crucial factors influencing consumers' intention to use digital healthcare platforms. Integrated tools and solutions that address trust and privacy concerns are highlighted as essential for fostering user acceptance and utilization of digital healthcare services, especially in regions like Saudi Arabia. [4]

First-generation digital health applications are demonstrating substantial efficacy across diverse medical conditions, ranging from the detection of atrial fibrillation and epilepsy seizures to enhancing cancer diagnosis and predicting outcomes of gastrointestinal bleeding. These applications are revolutionizing healthcare delivery by enabling early identification and intervention, thereby improving patient outcomes and quality of life. Moreover, they play a critical role in disease prediction, management, and personalized treatment approaches, significantly impacting healthcare decision-making and patient empowerment. Additionally, the integration of digital health tools for self-monitoring of blood glucose exemplifies the democratization of medicine, providing individuals with enhanced control over their health outcomes and reducing the burden of diabetes-related complications. [15]

Tele stroke Services

The landscape of public healthcare is undergoing a profound transformation in the 21st century, driven by technological advancements that are reshaping the way medical services, particularly stroke care, are delivered. Among these innovations, tele stroke networks are emerging as a cornerstone, revolutionizing access to acute stroke therapies irrespective of geographical barriers. These networks leverage telecommunication technologies to enable remote consultations between stroke specialists and healthcare providers in underserved areas, facilitating timely diagnosis

and treatment decisions. The outcomes of tele stroke interventions are demonstrating remarkable diversity, yet they consistently yield reproducible results, underscoring the efficacy and reliability of this approach.

Moreover, the financial sustainability of tele stroke initiatives further bolsters their significance in enhancing acute stroke care delivery. However, as telemedicine continues to evolve and expand its scope beyond acute stroke management, the establishment of robust infrastructure, comprehensive policies, standardized protocols, and sustainable financial reimbursement models becomes imperative to ensure the continued success and scalability of tele stroke networks. [6]

Despite the promising potential of tele stroke in transforming acute stroke care, several challenges persist, necessitating further research and development efforts. Rigorously designed studies are urgently needed to validate the accuracy, reliability, and clinical utility of telemedicine in stroke management. This imperative is underscored by the urgent need for evidence-based practices to guide the integration of tele stroke into routine clinical workflows effectively.

Additionally, recent legislative changes, such as the approval of reimbursement for telemedicine consultations in rural Health Personnel Shortage Areas, signal a growing recognition of tele stroke's value in addressing disparities in access to acute stroke care. By harnessing the power of telemedicine, healthcare providers can leverage innovative technologies to overcome geographical barriers, enhance diagnostic accuracy, and optimize treatment outcomes for stroke patients.

Thus, while tele stroke holds great promise for advancing acute stroke care, ongoing research, collaboration, and policy support are essential to unlock its full potential and ensure equitable access to high-quality stroke care for all individuals. [19]

Tele mental Health Services

Tele mental health is emerging as a significant area of growth within the healthcare sector, with estimations indicating that up to 50% of all healthcare services will be conducted electronically by 2020. [3] Despite this rapid expansion, scientific research in the field is struggling to keep pace, which is hindering the ability to provide robust recommendations, particularly regarding the substitution of online platforms for traditional care methods. However, existing literature on tele mental health underscores its potential in diagnosing and managing various psychiatric conditions. Notable advantages include increased access to care, improved efficiency, reduced stigma associated with visiting mental health clinics, and the ability to overcome diagnosis-specific treatment obstacles. Specifically, computerized cognitive-behavioral therapy (cCBT) and Internet-based cognitive-behavioral therapy (iCBT) demonstrate efficacy, while emerging options such as virtual reality exposure therapy (VRET) and mobile therapy (mTherapy) show promise. [3]

Nonetheless, challenges such as the requirement for specific computer skills, concerns about therapeutic alliance, and patient attrition remain significant considerations for the widespread implementation of tele mental health services. Further research is needed to explore the efficacy, advantages, and limitations of technology-enabled interventions and to expand the scope of online psychotherapeutic and psychopharmacological modalities. [3]

The transition from in-person to telehealth services during the COVID-19 pandemic demonstrated notable positive outcomes in mental health care delivery. Increased attendance rates are observed, attributed to the flexibility, and reduced logistical barriers associated with telehealth. [17]

Additionally, fewer canceled appointments and unchanged no-show appointments indicate improved appointment adherence, effectively addressing logistical challenges. Participants undergoing the transition to telehealth are reporting a decrease in symptom severity and improvement in mental health symptoms, underscoring the potential of telehealth to yield positive outcomes. [17] Despite its limitations, telehealth emerges as a promising option for providing integrated mental health services, particularly benefiting low-income individuals, racial/ethnic minorities, adults, and children.

Furthermore, there is optimism regarding the continued effectiveness of telehealth beyond pandemic conditions. These findings highlight the transformative potential of telehealth in mental health care delivery and emphasize the importance of further research and integration of telehealth services to ensure equitable access and enhanced outcomes for all individuals. [17]

5. Research Methodology - Program Evaluation Approach

Introduction

This chapter presents the research methodology adopted to investigate the impact of telehealth implementation on healthcare management competencies in a specific healthcare setting. Given the expanding role of telehealth in healthcare delivery, it is imperative to understand its influence on management practices and competencies. This study employs a program evaluation approach to systematically assess how telehealth initiatives contribute to the development and enhancement of healthcare management competencies, crucial for effective healthcare administration.

Program Evaluation as Research Methodology

Program evaluation is a systematic method for collecting, analyzing, and using information to answer questions about projects, policies, and programs, particularly about their effectiveness and efficiency. In the context of this study, the program evaluation approach is applied to examine the telehealth implementation process, its activities, outputs, and outcomes related to healthcare management competencies. This method enables the identification of key competencies

affected by telehealth and the assessment of these changes' implications for healthcare administration.

Defining the Evaluation Purpose

This evaluation's main purpose is to determine the impact of telehealth implementation on healthcare management competencies within a specific healthcare setting. This involves exploring how telehealth has influenced the skills, knowledge, and abilities required by healthcare managers to effectively lead and manage healthcare services in a digitally evolving environment.

Describing Program Inputs

Program inputs refer to the resources, technologies, and processes deployed for telehealth implementation. This includes an examination of the telehealth technologies adopted, the training provided to staff, the infrastructural changes made, and the policies developed to support telehealth services. Understanding these inputs is crucial for assessing their contribution to enhancing healthcare management competencies.

Specifying Activities

This segment outlines the activities involved in the telehealth implementation process, such as the development and delivery of telehealth services, the management of telehealth platforms, and the integration of telehealth into existing healthcare workflows. Detailing these activities allows for a clearer understanding of the managerial tasks and challenges associated with telehealth and how they influence management competencies.

Establishing Performance Criteria and Operational Indicators

To evaluate the impact of telehealth on healthcare management competencies, specific performance criteria and operational indicators will be established. These criteria may include measures of efficiency, effectiveness, quality of care, and satisfaction levels among staff and patients. Operational indicators will be defined based on the competencies of interest, such as leadership in digital transformation, strategic decision-making in telehealth deployment, and innovation in healthcare delivery models.

Conducting Data Analysis

Data analysis will involve the systematic examination of data collected through various sources, including internal reports, staff surveys, patient feedback, and performance metrics. The analysis will focus on identifying trends, patterns, and correlations between telehealth implementation and changes in healthcare management competencies. Qualitative data will be analyzed for thematic content related to management practices, while quantitative data will be assessed using statistical methods to evaluate the effectiveness and efficiency of telehealth services.

Conclusions

By employing a program evaluation approach, this

study aims to provide a comprehensive understanding of the impact of telehealth on healthcare management competencies. This methodology facilitates a structured assessment of telehealth initiatives, from inputs and activities to outcomes, enabling a thorough evaluation of their effectiveness in enhancing management practices within healthcare settings. The findings from this evaluation will offer valuable insights for healthcare administrators, policymakers, and educators, informing strategies to optimize telehealth implementation and its contribution to healthcare management excellence.

6. Data Analysis

Introduction

This chapter focuses on presenting the data extracted from selected sources as outlined. By analyzing articles from influential thought leaders and industry experts, this chapter aims to elucidate the current state of telehealth and its implications for healthcare management competencies.

Data Presentation

Following the methodological approach from, the data extracted from the articles were synthesized into a table, providing a clear view of the key findings relevant to the research problem.

Each entry in the table corresponds to specific implications for healthcare management competencies in a telehealth context, linking back to the research problem. Observations and data interpretation will be thoroughly discussed in next Chapter.

Data Analysis

In the process of qualitative thematic analysis, subjective judgment plays a pivotal role in assessing non-quantifiable information, such as opinions, attitudes, and experiences related to the integration of artificial intelligence (AI) in telehealth services [25]. Following the methodology, this analysis aimed to discern patterns and themes emerging from the observations made by participants A and B across the reviewed articles. Two healthcare professionals were asked to review Table 1.2 discoveries and perform a thematic analysis. Everyone received orientation on how to perform a thematic analysis. Their identities are known to the researcher but remain anonymous at their requests to preserve confidentiality.

The initial themes were derived from a preliminary review of the articles, focusing on significant trends in telehealth and AI's impact on healthcare delivery. Observers A and B's insights were then mapped against these themes to understand their perspectives and to identify areas of agreement or divergence. This approach facilitated a structured examination of the data, ensuring that the analysis remained grounded in the participants' contributions without extrapolating implications beyond the scope of this chapter.

Table 1.1. Key Findings from Analyzed Articles

Article No.	Source	Key Finding
01	(Silberzahn, 2022)	Telehealth is increasingly used as a driver for healthcare innovation, emphasizing the importance of smarter patient engagement strategies.
02	(Lundberg, 2021)	Telemedicine is highlighted as a scalable solution for managing chronic diseases, particularly in aging populations.
03	(Zocdoc CEO, 2020)	A preference among patients for scheduled telehealth appointments with chosen providers underscores the value of continuity of care.
04	(HealthTech Hub Africa, 2023)	The role of AI in predictive care, especially for cardiovascular diseases in Africa, is being recognized for its potential.
05	(Thomas & De León, 2021)	AI and machine learning technologies are expanding telehealth services to meet the growing healthcare needs.
06	(URAC CEO, 2022)	While telehealth helps overcome access barriers, it still faces significant policy challenges that need to be addressed.
07	(How Telepsychiatry Is Optimal for Hospitals and Health Systems, 2022)	Telepsychiatry is identified as playing a crucial role in addressing the shortage of psychiatric resources and enhancing mental healthcare.

Table 1.2. Comparative Thematic Analysis of Observers A and B

Article No.	Theme	Observer A's Observations	Observer B's Observations
01	Digital Patient Engagement	Believes digital patient engagement strategies have significantly improved since COVID.	Argues that digital health needs to be enhanced so that physicians see patients based on the severity of cases.
02	Telehealth as Revolutionary Care	Concurs that telehealth has become a revolutionary form of patient care.	Agrees with Observer A, emphasizing telehealth's revolutionary impact on patient care.
03	Patient Preferences for Telehealth	Disagrees that patients prefer telehealth appointments.	States that the preference for telehealth complicates conducting specific tests due to its virtual nature.
04	Role of AI in Healthcare	Asserts AI will never replace the role of a doctor and might cause patients to doubt their health conditions/treatment plans.	Believes AI is the future of medicine but will not replace doctors; it aids in easier diagnosis of medical conditions.
05	Inevitability of AI in Healthcare	Acknowledges that AI's integration into the medical world is inevitable.	Predicts that consultations will gradually shift to being fully telehealth-based as a preliminary form of patient contact.
06	Telehealth Policy Challenges	Does not perceive any significant policy issues with telehealth.	Believes current telehealth policies are sufficient for their novelty, yet they should adapt and change in the future.
07	Telehealth and Psychiatry	Mentions that telehealth consultations are viable for keeping in contact, but AI cannot be used for psychiatric patients.	Argues that AI's lack of empathy makes it ineffective for integration into mental health services.

The observations by participants A and B provide valuable insights into the evolving landscape of telehealth and the integration of AI in healthcare. Their responses were carefully analyzed to determine whether they align with the initially identified themes, such as the effectiveness of digital patient engagement strategies post-COVID, the scalability of telemedicine for chronic disease management, and the role of AI in augmenting healthcare services.

This table presents the viewpoints of Observers A and B across seven articles, highlighting divergent perspectives on the effectiveness and challenges of digital patient engagement, the revolutionary role of telehealth, patient preferences towards telehealth appointments, the impact and role of AI in medicine, inevitable integration of AI in healthcare, telehealth policy issues, and the use of AI and telehealth in psychiatry. These contrasting insights provide a preliminary understanding of the multifaceted impacts of telehealth and AI on healthcare delivery, patient care, and the future of medical practice.

This table juxtaposes the thematic analyses provided by Observers A and B, offering a rich comparative view of their insights on crucial topics like digital patient engagement, the revolutionary role of telehealth, and the integration of AI in healthcare. The diverse viewpoints captured in this analysis demonstrate the multifaceted impact of technology on the healthcare sector and set the stage for a deeper exploration of these themes.

As we conclude, we've laid a limited foundational understanding of the varying perspectives on telehealth and AI's impact on healthcare through a meticulous analysis of contributions from Observers A and B. This groundwork is crucial for the subsequent discussions, where we will delve into interpreting these findings within the broader context of healthcare management. We aim to synthesize these insights, evaluate their implications for healthcare management competencies, draw conclusions and propose strategic recommendations for integrating telehealth and AI innovations effectively within healthcare delivery systems.

Table 1.3. Comparative Analysis of Observers A and B with Implications for Healthcare Management

Article No.	Observer A Thematic Analysis	Observer B Thematic Analysis	Implications for Healthcare Management
01	Digital patient engagement strategies are increasingly effective post-COVID.	Digital health should be strengthened, with physicians seeing patients based on case severity.	Healthcare management must prioritize digital engagement while ensuring that care delivery models are adaptable to patient needs and case severities.
02	Telehealth has become a revolutionary form of patient care.	Aligns with Observer A's view on telehealth's revolutionary impact.	Emphasize the integration of telehealth into standard care practices and the need for ongoing training in virtual care delivery.
03	Disagrees with the preference for telehealth appointments.	Notes the difficulty of performing specific tests during virtual consultations.	Develop strategies to balance patient preferences with the limitations of telehealth, especially in diagnostic accuracy and capability.
04	AI will never replace doctors; it may cause doubts about health conditions/treatment plans.	AI is the future of medicine, aiding in diagnosis without replacing doctors.	Healthcare management should navigate the integration of AI cautiously, emphasizing its role as a support tool and managing patient perceptions effectively.
05	AI's entry into the medical world is inevitable.	Consultations will shift to telehealth fully as a preliminary form of patient contact.	Prepare for a digital transformation in healthcare, including full integration of AI and telehealth, ensuring that systems are in place for effective patient engagement.
06	Does not perceive any policy issues with telehealth.	Current policies are sufficient but should evolve with telehealth advancements.	Stay informed on telehealth policy developments and advocate for policies that support sustainable telehealth practices.
07	Telehealth consultations are viable for maintaining doctor-patient contact but not for psychiatric patients with AI.	AI's lack of empathy makes it unsuitable for mental health integration.	Healthcare management should consider the limitations of AI in psychiatric care and explore hybrid models that combine human empathy with technological efficiency.

7. Summary

Introduction

Building upon the comprehensive data analysis conducted before, this chapter seeks to interpret the findings within the broader landscape of healthcare management. It is timely to revisit the research problem and reemphasize the need for this research. Explore the impact of telehealth and AI (Artificial Intelligence) on healthcare management competencies—and the objectives initially set out to achieve a deeper understanding of the implications these technological advancements have for the field.

Data Interpretation

The integration of telehealth and AI into healthcare delivery was accelerated by recent global events, notably the COVID-19 pandemic. This acceleration not only transformed patient care but has also necessitated a reevaluation of healthcare management competencies. From the data, it is evident digital patient engagement and the use of AI in healthcare are no longer futuristic ideals but current realities that require immediate attention and adaptation by healthcare managers.

Observations from the thematic analysis suggest a pivotal shift in healthcare delivery models. Telehealth, once considered a supplementary form of patient care, has emerged as a revolutionary approach, fundamentally altering the patient-provider interaction landscape. This shift underscores the necessity for healthcare managers to possess a robust

understanding of digital health technologies and to develop strategies that effectively integrate these technologies into patient care.

Moreover, the analysis highlights a growing consensus on the importance of AI in enhancing diagnostic processes and personalizing patient care. However, it also brings to light concerns regarding the implementation of AI, including ethical considerations, patient trust, and the potential for AI to supplement rather than replace human medical practitioners.

The insights gathered from Observers A and B further enrich our understanding of these themes, presenting a spectrum of perspectives on the role and implications of telehealth and AI in healthcare. While there is enthusiasm for the potential of these technologies to improve healthcare delivery, there is also caution regarding their integration and the ongoing need for human touch and judgment in healthcare.

In synthesizing these observations, it becomes clear healthcare management is at a crossroads. The field must navigate the challenges and opportunities presented by telehealth and AI, balancing technological innovation with the intrinsic human elements of healthcare.

Regression Output

A linear regression analysis was conducted to examine the relationship between the number of telehealth sessions and healthcare management competency scores. The dataset consisted of 100 hypothetical observations.

Table 1.4. General Statistics Analysis

Dep. Variable:	Management_Competency
Model:	OLS
Method:	Least Squares
Date:	Thu, 29 Aug 2024
Time:	09:23:40
No. Observations:	100
Df Residuals:	98
Df Model:	1
R-squared:	0.001
Adj. R-squared:	-0.009
F-statistic:	0.09453
Prob (F-statistic):	0.759
Log-Likelihood:	-393.18

AIC: 790.4

BIC: 795.6

Covariance Type: nonrobust

Key Findings

- Coefficient of Telehealth Usage: The coefficient is positive but very small (0.0091), indicating a minimal relationship between telehealth usage and management competency scores.
- P-value: The P-value for the telehealth usage coefficient is 0.759, which is not statistically significant.
- R-squared: The R-squared value is 0.001, meaning that only 0.1% of the variability in management competency scores is explained by telehealth usage.

These results suggest that, based on this simulated data, there is no significant relationship between the number of telehealth sessions and the competency scores of healthcare managers.

Coefficients

Variable	Coefficient	Std. Err.	t	P> t	[0.025	0.975]
const	78.4132	3.779	20.751	0.000	70.915	85.912
Telehealth_Usage	0.0091	0.030	0.307	0.759	-0.050	0.068

Additional Tests

Omnibus:	70.295
Prob(Omnibus):	0.000
Skew:	-0.131
Kurtosis:	1.655
Durbin-Watson:	2.174
Jarque-Bera (JB):	7.817
Prob(JB):	0.0201
Cond. No.:	385.

8. Conclusions

The analysis leads to several key conclusions regarding the integration of telehealth and AI in healthcare settings and its implications for healthcare management.

9. Recommendations Based on Conclusions

In response to these conclusions, a series of recommendations are suggested to support healthcare managers in navigating the changing dynamics of healthcare delivery.

Table 2.1. Summary of Conclusions

Article No.	Theme	Conclusion
01	Digital Patient Engagement	Post-COVID, enhanced digital patient engagement strategies are critical for healthcare delivery.
02	Telehealth as Revolutionary Care	Telehealth is transforming patient care, necessitating adaptability and innovation in healthcare management.
03	Patient Preferences for Telehealth	Mixed patient preferences for telehealth highlight the need for flexible, hybrid care models.
04	Role of AI (Artificial Intelligence) in healthcare	AI's supporting role in diagnostics and patient care underscores the importance of technological integration and management.
05	Inevitability of AI (Artificial Intelligence) in healthcare	The inevitable integration of AI (Artificial Intelligence) into healthcare operations requires forward-thinking management strategies.
06	Telehealth Policy Challenges	Evolving telehealth policies demand proactive engagement and adaptation from healthcare managers.
07	Telehealth and Psychiatry	The specific challenges and potentials of telehealth in psychiatry point to the need for specialized management approaches in mental health services.

Table 2.2. Recommendations Based on Conclusions

Theme	Recommendation	Conclusion Theme Addressed
Digital Patient Engagement	Develop and implement comprehensive training for staff on digital engagement platforms and strategies.	The need for healthcare management to adapt to enhanced digital patient engagement strategies.
Telehealth as Revolutionary Care	Strategically incorporate telehealth into existing healthcare services to enhance care delivery and patient satisfaction.	Telehealth's transformation of patient care, requiring adaptability and innovation in healthcare management.
Role of AI (Artificial Intelligence) in healthcare	Facilitate cross-disciplinary teams to explore and integrate AI (Artificial Intelligence) tools effectively into clinical decision-making processes.	AI's supporting role in diagnostics and patient care, emphasizing technological integration and management.
Telehealth Policy Challenges	Develop a task force within healthcare organizations dedicated to monitoring, responding to, and influencing telehealth policies and regulations.	The evolving policy landscape surrounding telehealth calls for proactive managerial engagement in policy adaptation.
Patient Preferences for Telehealth	Embrace a hybrid care model that effectively combines telehealth with traditional in-person care to meet diverse patient needs.	Mixed patient preferences for telehealth, highlighting the necessity for flexible, hybrid care models.
Ethical Considerations and Patient Trust	Implement ethics training and patient engagement initiatives to address concerns related to AI (Artificial Intelligence) and telehealth use.	The importance of ethical considerations, patient trust, and maintaining the human element in healthcare.
AI (Artificial Intelligence) and Human Elements in Healthcare	Promote the development of AI (Artificial Intelligence) applications that support rather than replace human practitioners, focusing on augmentation.	Concerns about AI (Artificial Intelligence) replacing human roles and the ongoing need for human judgment and empathy in healthcare.

10. Limitations

This study's limitations stem from its reliance on selected articles for thematic analysis, potentially introducing bias in the interpretation of themes. Furthermore, the perspectives of Observers A and B may not fully capture the diversity of opinions within the field. The rapidly evolving nature of telehealth and AI technologies also means the findings may quickly become outdated as new advancements and policies emerge.

11. Discussion – Summary

The central problem this study aims to address is the need for healthcare management to evolve in response to the rapid integration of telehealth and AI technologies in healthcare delivery. The goals were to identify the competencies required for effective healthcare administration in this new digital era and to understand the broader implications for healthcare management practices. The identified study problem and supporting goals were successfully addressed, lending further clarity, understanding, insights, and potential management directions.

The findings highlight a clear shift toward more digitally focused healthcare management practices, underscoring the importance of technological competencies, adaptability to policy changes, and the integration of AI and telehealth into patient care strategies. These discoveries reflect a broader trend in healthcare towards more personalized, efficient, and accessible care delivery models, driven by technological innovation.

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