

Original Research Article

Impact of Change Management on Digital Health Performance: Evidence from the Eastern Health Cluster, Saudi Arabia

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Abstract

Digital health change has now become a strategic priority in the world health care system, but it has been indicated that investing in technology does not guarantee a better outcome in healthcare. Efforts that are made at the organisational and managerial levels are critical determinants of whether the digital health initiatives will deliver anything significant. The purpose of this research was to investigate how a change management affects the work of digital healthcare on the example of a knowledge transfer mediator, and the evidence accessible and applicable in large healthcare systems, i. e. Saudi Arabia was considered. A qualitative systematic review approach was chosen with the help of the Preferred Reporting Items Systematic reviews and meta-analyses (PRISMA) framework. The systematic search through five academic databases revealed 200 records out of which 20 qualitative and mixed-method studies that were peer-reviewed were incorporated in the eventual synthesis. The results demonstrate that the core of the successful use of digital health implementation relates to the transformational leadership and organized change management practices. Nevertheless, they have a significant indirect effect on the digital healthcare performance, and this effect happens due to effective knowledge transfer mechanisms. Knowledge transfer can assist healthcare professionals to gain, exchange and implement digital competencies which creates a process of embedding digital tools into common clinical and organisational practice. This review finds that digital healthcare performance is the product of the synergy between leadership, change management, and knowledge transfer instead of technology. The implications that these findings could have on healthcare leaders and policymakers are significant, and the change management and organizational learning institutionalization must be put into place with the digital health strategies in ingrained in order to create sustainability in improvement of performance.

Keywords: Digital Health, Transformational Leadership, Change Management, Knowledge Transfer, Healthcare Performance, Saudi Arabia.

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INTRODUCTION

Digital transformation has become a central pillar of contemporary healthcare reform, driven by rapid advances in information technologies, increasing patient expectations, and persistent pressures to improve efficiency, quality, and accessibility of care. Digital health is the term that covers the idea of a wide range of technologies and practices which include, but are not limited to, electronic health records, telemedicine, mobile health applications, clinical decision-support systems, and artificial intelligence-based analytics. All along, these innovations have the potential to revolutionize healthcare delivery by enhancing clinical decision-making, raising the level of patient engagement,

minimizing operational inefficiencies, and offering population health management. However, the fact that digital technologies are in place does not guarantee improved healthcare outcomes (Creswell & Creswell, 2017). The issue in the digital health initiatives of healthcare systems is that to achieve the performance of an organization requires the organizational readiness, management of complex change process, and leadership ability in overseeing the digital health initiators. Most healthcare centers do not produce the performance outcome that was to be achieved by the digital health initiatives due to resistance to changes, the lack of coherent implementation, poor utilization of personnel, and inability to align technology with the organizational

strategy. Healthcare organizations are multifaceted and, they are characterized by professional hierarchies, strict regulatory environments and innumerable levels of unpredictability that lie in the areas of patient safety and ethical responsibility (Dash & Paul, 2021). Those characteristics bring about challenges to the digital transformation particularly in contrast to the other industries.

This has given rise to a growing recognition of the fact that technological investments must be forwarded with appropriate leadership and planned change management programs to convert digital innovation into real gains in the healthcare performance (Farnese *et al.*, 2019). Transformational leadership has emerged as a highly critical leadership style in which there are continuous changes and inventions. Transformational leaders are vocal about vision; they motivate and mobilize employees, ignite intellectually and personally give people personalized instructions to contribute to their growth, and the organization, growth (Hair *et al.*, 2021). Transformational leadership is most effectively applied within the context of the digital healthcare as it promotes the culture of innovation, establishes trust as well as persuades the healthcare professionals towards new working patterns. Digital health efforts and leadership will reach a conclusive result due to change management. Change management refers to activities and processes utilized in preparing, motivating and guiding individuals and organizations in the transformation. Digital healthcare change management Resistance Digital healthcare change management is also considering the communication, stakeholder engagement, and training as well as resistance management, but not just technical implementation (Erku *et al.*, 2023). Effective change management is one of the guarantees that medical workers know the purpose of the digital transformation, that they feel motivated in the process of transition, and are educated about the skills they should have to implement digital solutions both in clinical and administrative work. The knowledge transfer refers to exchange of, dissemination and utilization of knowledge, skills and expertise among individuals, groups and units within organisation.

The issue of knowledge transfer in the digital healthcare provision is one of the key components in empowering the healthcare as professionals to acquire the new technologies, apply the digital competencies in practice and continuously improve the performance. Conversely, even well-considered products lead to crashes in digital health through the assistance of the weak knowledge transfer mechanisms (Feroz, Khoja, & Saleem, 2021). These dynamics can be considered in the Kingdom of Saudi Arabia, which is an extremely helpful environment. The quality, accessibility, and sustainability of services in Saudi Arabia have been prioritized by the country in its Vision 2030, and digital health is one of the pillars where the country will apply

its reforms. Health information systems, telehealth systems, and national digital health infrastructure have been greatly invested into. The Eastern Health Cluster is among the most strategically important and the biggest healthcare clusters in the Saudi health nature serving a variety of people and acting as a platform, where large scale digital health agendas are tested. However, their performance in various institutions has a large variance, even though the gains are significantly high, which suggests that organizational and managerial conditions are the determinants of the results.

Transformational leadership, change management, and digital healthcare performance have been studied to a significant degree as an individual build, but the interaction of these variables has been studied insufficiently. In particular, the mediating variable between change management and leadership and digital healthcare performance is the knowledge transfer that has not been sufficiently investigated, especially in Saudi Arabian healthcare context. The specified gap needs to be filled to develop a deeper perspective on the way digital health performance can be improved in the context of complex healthcare systems. On that, the present research will analyse the impact of change management on the performance of digital health, and will narrow down on the intermediation of effects by knowledge transfer using the case of the Eastern Health Cluster in Saudi Arabia. This research will be aimed at presenting a detailed description of how the insights into the knowledge about the theory of leadership, literature on change management and research on knowledge management can be used to strengthen the performance of digital healthcare. The findings will offer the theoretical implications on digital health and management literature, as well as practical implications that would inform the health leaders and policymakers on maximizing returns on digital health investments.

METHODS

Study Design and Qualitative Methodological Approach

The paper has employed a qualitative systematic review research design itself to examine how change management contributes to the achievement of digital health in healthcare organisations, and the consequences of knowledge transfer as a mediator of the same. Qualitative approach was chosen since digital health transformation is a socio-organisational transformation process and not the technical one. It entails leadership practice, organisational culture, employee interaction, learning and adaptive behaviors, which can be better analyzed using the interpretive qualitative evidence (Hospodkova *et al.*, 2021). This review was not an attempt to determine quantitative effects but was aimed at creating a comprehensive understanding of the patterns, mechanisms, and relationships reported in the existing studies. The review was done in relation to the Preferred Reporting Items of

systematic reviews and meta-analyses (PRISMA) guidance. PRISMA is also often used in relation to quantitative reviews, but it is increasingly implemented in qualitative systematic reviews to achieve the desire of transparency, methodological consistency, and reproducibility. The screening, eligibility evaluation, and inclusion of studies were identified, assessed, and incorporated in a systematic and traceable way using PRISMA framework.

Review Protocol and Scope

An examination plan was created before the literature review so that they can reduce bias and provide consistency in the review itself. The protocol stipulated the review area, which consisted of qualitative or mixed-method studies that explored the topic of digital health or digital healthcare transformation with references to change management, leadership, organisational learning, and knowledge transfer. The performance indicators on health care were the efficiency of services, quality care, integration of workflow, staff preparedness and organisational improvement. This priority facilitated a fit with large government-based healthcare systems and reform-oriented contexts, and therefore, the findings are especially applicable to health clusters like the Eastern Health Cluster in Saudi Arabia.

Data Sources and Search Strategy

Five major academic databases that included Scopus, Web of Science, PubMed, ScienceDirect, and Google Scholar were used to carry out comprehensive literature search. These databases have been chosen because they have been covering the healthcare management, digital health, information systems, and organisational research extensively. Besides searching databases, they also conducted search of references books in order to determine other related studies mentioned in major review and empirical articles. The search plan incorporated the integration of terminologies in accordance with the fundamentals of the research such as the change management, digital health, digital health care performance, health information technology, knowledge transfer, knowledge sharing, leadership and health organisations. False and true operators and variations of key words were used to maximize the retrieval of literature that was relevant. Only peer-reviewed articles that were published within the past five years (2015-2025) in English were included in the search since it represents the time when digital health efforts have gathered strong worldwide traction.

Eligibility Criteria

The inclusion criteria included studies that aimed at healthcare settings; analyzed digital health or health information technologies, change management, leadership, organisational learning, or knowledge transfer, and utilized qualitative or mixed-methods designs that included large amounts of qualitative analysis. Research was needed to talk about organisational or performance-based results in relation to

the digital health implementation. The studies were also filtered out in case they concentrate on technical system development only and do not include an organisational analysis, they involved non-health sectors, used quantitative data only with no qualitative interpretation or were purely conceptual without any empirical basis. They also excluded editorials, commentaries and conference abstracts so as to uphold academic rigor.

Study Selection Process

It was selected using the PRISMA guideline and consisted of four steps including identification, screening, evaluation of eligibility and inclusion. All the records obtained out of the databases were sorted and the duplicates eliminated. Abstracts and titles were then filtered on relevance to the objectives of the review and hence artificial elimination of studies that did not relate to healthcare contexts, studies that addressed only the technical systems and studies that did not adopt the change management or transfer of knowledge viewpoint. Articles identified with full-text were then evaluated regarding their suitability in terms of the quality of the methods and relevance. The qualitative synthesis of 20 peer-reviewed articles directly related to the topic of the research was found in the end of this process.

At the stage of identification, 184 records were found by searching databases in Scopus, Web of Science, PubMed, ScienceDirect, and Google Scholar. There were also 16 records that were discovered using manual referencing and with this, it added up to 200 records. Following the elimination of duplicates 162 records were left and filtered with the help of title and abstract review. At this level, 108 records were filtered as they did not belong to the healthcare setting, represented only systems technical aspects, and did not have an accent on change management or knowledge transfer. During the eligibility stage, 54 full-text articles will be evaluated. Out of these 34 articles were excluded based on certain criteria: 14 were quantitative-only studies without qualitative interpretation, 9 articles were not about digital health performance, 6 articles were not focused on organisations and managers, and 5 articles were conceptual papers with no empirical background. At the end, 20 studies were taken into the qualitative synthesis.

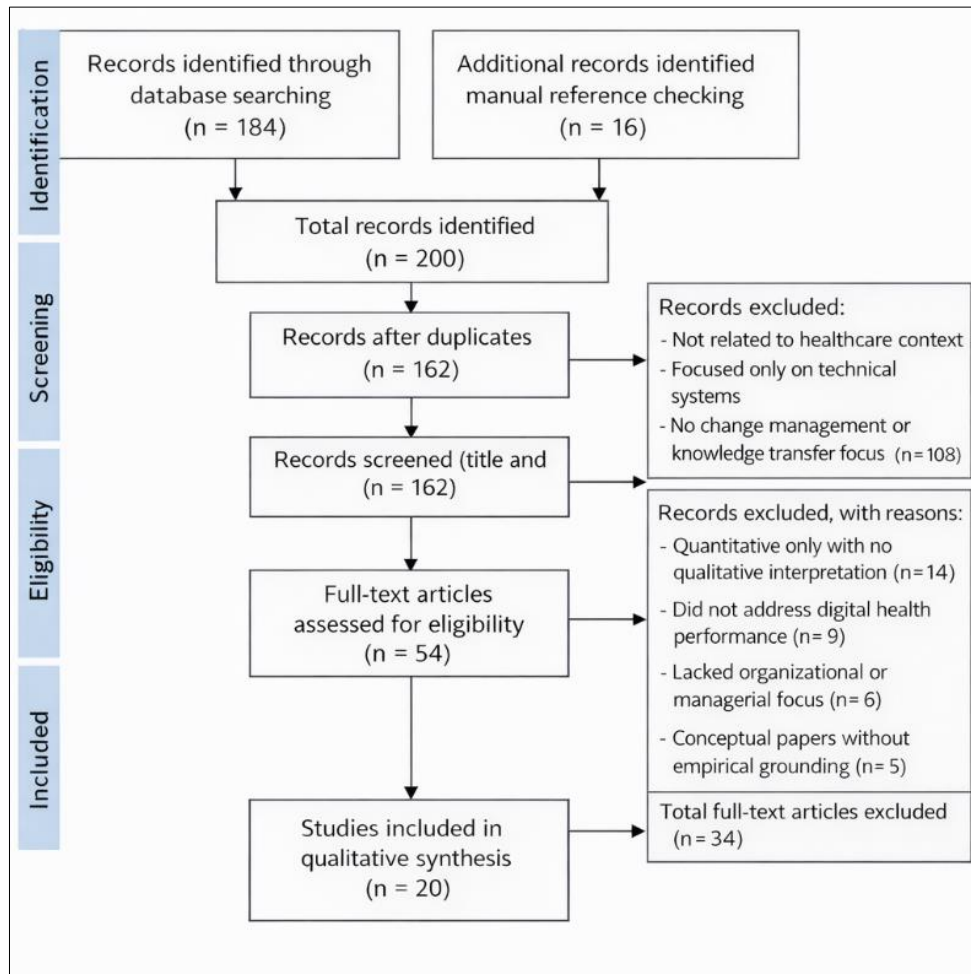
Data Extraction and Qualitative Synthesis

Data extraction was aimed at extracting a contextual and interpretive information available in each of the included studies related to the healthcare setting, research design, conceptualization of change management, the knowledge transfer, and reported digital health performance implications. It was synthesized using the thematic analysis method, this included repeat reading, coding and comparison between the research results. The process has made it possible to identify themes that are repeated many times to explain why change management practices support or inhibit digital health performance and how knowledge transfer works as a mediating process.

Methodological Rigor and Trustworthiness

The rigor of the methods was achieved by adhering to the PRISMA guidelines, clearly reporting the review process, and using selection and exclusion criteria

systematically. Peer-reviewed sources were used to promote trust whereas the thematic synthesis-based interpretations on empirical data, which boosts the reliability and verifiability of the research.



RESULTS

Overview of Included Studies

The qualitative synthesis relied on 20 peer-reviewed articles which addressed intensively the concepts of transformational leadership and change management, knowledge transfer, and digital healthcare performance in healthcare organisations with a particular focus on Saudi Arabia and the similar health systems. The studies included were those that were qualitative research studies, as well as mixed-method research where the qualitative aspects were very rich and systematic or scoping reviews that offered deep meaning. Together, these researches provided a set of evidence on the influence of leadership behaviors and organized change processes on organisational learning and digital health outcomes. In the literature, three common thematic patterns could be identified: the role of transformational leadership in facilitating the digital performance of health, the role of change management in facilitating the implementation of digital healthcare, and the mediating role of knowledge transfer between the

leadership and change initiatives and performance outcomes.

Transformational Leadership and Digital Healthcare Performance

The results were uniform, showing that transformational leadership is a key factor in improving digital healthcare performance through the influences it has on the organisational culture, employee attitude and capability to innovate. Several articles pointed out that the transformational leaders offer healthcare professionals the motivation to adopt digital transformation through a clear vision statement, trust building, and adaptive behaviors (Al Jabri *et al.*, 2021; Bhatti and Alyahya, 2021). Transformational leadership was observed to have a very close relationship with increased employee commitment, organizational citizenship behaviors, and willingness to use digital systems in Saudi healthcare settings (Baroudi, 2022; Abolnasser *et al.*, 2023). The results also showed that transformational leadership has a positive impact on innovation and performance within the digital healthcare

setting in that it facilitates intellectual stimulation and steady enhancement. Empirical research denied in Saudi Arabia revealed that leaders of healthcare organisations fostering creativity and involvement allowed organisations to better meet the technological change (Bhatti & Alyahya, 2021). Transformational leadership was especially vital during times of increased disruption and during the times of the COVID-19 pandemic, maintaining performance among staff and encouraging expedited adaptation to digital health solutions (Chowdhury *et al.*, 2021). These results help to propose that the digital healthcare performance depends on leadership style as one of its foundational determinants, particularly in large systems of publicly owned healthcare where reforming takes place.

Change Management and Digital Health Implementation

The second prevailing theme was in regards to the leading role of change management in deciding whether digital healthcare initiatives were successful or not. The studied sources highlighted that digital transformation involves more than technological investment; it presupposes premeditated strategies of dealing with the change in behaviour, culture, and workflow. In Saudi Arabia, it was found that the healthcare institutions with formal change management approaches had a higher rate of digital systems adoption, employee involvement, and integration of services (Alharbi and Almagrabi, 2022; Alfozan, 2024). Such change management practices as effective communication, stakeholder involvement, constant training, and leadership support were constantly cited as enablers of digital healthcare performance (Arif, 2022; Alfozan, 2024). On the other hand, weak change management was also correlated with opposition, disjointed introduction, and insufficient use of digital systems. The research that concentrated on health information technology adoption observed that small changes in performance have remained insignificant, even in case of technically sound systems, due to the inability to manage change at the organisational level (Cresswell *et al.*, 2021; Butcher & Hussain, 2022). Generally, the fact is that the evidence may suggest that change management is a key enabling factor that transforms the digital strategies into functional and clinical performance gains.

Knowledge Transfer as a Mediating Mechanism

One of the key findings among the reviewed literature was that knowledge transfer mediated the relationship between transformational leadership and change management and the digital healthcare performance. Most of the studies proved that leadership and change initiatives also have a significant influence on performance mainly due to their ability to enhance knowledge sharing, learning and development of skills. It was demonstrated that transformational leaders cannot avoid creating the environments that stimulate the knowledge exchange due to the necessity to promote

collaboration, psychological safety, and shared purpose (Al Jabri *et al.*, 2021; Arabi *et al.*, 2022). Knowledge transfer was regarded consistently as one of the key ways on how digital competencies can be integrated within healthcare organisations. Reviews of the scopes and qualitative research revealed that proper transfer of knowledge can make healthcare professionals be able to understand, adapt, and apply digital tools to their clinical practice to foster the quality and efficiency of services (Feroz *et al.*, 2021; Williams *et al.*, 2021). Research on healthcare team found out that formal and informal knowledge-sharing behaviors positively affected coordination, errors, and enhanced digital employment (Lundmark *et al.*, 2023). Notably, a number of researches affirmed that knowledge transmission mediates part of the correlation between transformational and organisational performance. To illustrate the point, a study carried out in the healthcare field and associated organisational context revealed that leadership has an indirect impact on innovation and performance through reinforcing knowledge management and sharing Dynamics (Yousef *et al.*, 2023; Al Jabri *et al.*, 2021). On the same note, change management programs were observed to improve digital healthcare in terms of performance, creating mechanisms that promote persistent exchange of knowledge through training systems, learning platforms, and feedback.

Integrated Effects on Digital Healthcare Performance

Transformational leadership offers strategic guidance and inspirational assistance, change management organises the change process, and knowledge transfer realizes digital capabilities on the individual and organisational levels. The research conducted to assess the effectiveness of digital healthcare also focused on the fact that increases in efficiency, quality of care, and patient outcomes were most likely to be observed in organisations where such aspects were aligned (Butcher & Hussain, 2022; Alateeg, 2024). The evidence so tends to suggest that transformational leadership and change management are especially relevant in the situation of Saudi healthcare because digital health reforms are of the magnitude and speed. Knowledge sharing serves as the bridging factor that facilitates the transfer of digital initiatives into the actual practice and the performance improvement that it fosters (Akinwale and AboAlsamh, 2023; Alsaywid *et al.*, 2023). Altogether, the qualitative synthesis proves that knowledge transfer is an essential mediating force that enhances the effects of change management and leadership on digital healthcare performance.

DISCUSSION

Overview of Key Findings

This qualitative systematic review aimed to review the impact of change management on digital healthcare performance with specific consideration of the mediating effects of knowledge transfer, based on the evidence which is applicable to large healthcare systems,

including those in Saudi Arabia. The results reveal that technological investment does not influence digital healthcare performance directly, and instead, it is a product (not the cause) of the synergy between transformational leadership, well-organized change management strategies, and sufficient knowledge sharing processes. In the studies reviewed, leadership and change management were always important in terms of the organisational preparedness and involvement of the staff, and knowledge transfer served as a key channel through which the digital capabilities could be absorbed into the normal practice of healthcare.

Transformational Leadership as a Driver of Digital Performance

The results of the study are a strong indication and support of the role of transformational leadership as a driving force in digital healthcare performance. In both Saudi and global healthcare settings, it was revealed that transformational leaders could affect digital outcomes through defining a clear vision, motivating employees and contributing to a learning and innovative environment (Al Jabri *et al.*, 2021). These leadership behaviors especially applied in digital healthcare environments, where uncertainty, high-technological change and professional resistance are likely barriers to adoption. The analyzed evidence indicates that transformational leadership positively impacts the digital healthcare performance indirectly by improving employee commitment, engagement, and the possibility of using new technologies (Baroudi, 2022; Abolnasser *et al.*, 2023). This is in line with the transformational theory of leadership that focuses on inspirational motivation and intellectual stimulation as factors by which leaders are able to influence the outcome of organisations. The presence of this kind of leadership seems to be necessary in Saudi healthcare organisations that undergo a mass-scale digital transformation to coordinate clinical staff, administrators, and digital health teams to work together towards a common objective of change.

Change Management and Organisational Readiness

The second significant addition to the world of reviews is the definition of change management as a facilitating framework of digital healthcare transformation. The results show that powerful leadership cannot work without formal change management procedures. The consistent findings of the studies revealed enhanced success of promoting digital health initiatives through the support of systematic strategies of communication, training programmes, stakeholder involvement, and feedback mechanisms (Alfozan, 2024). The findings are similar to other existing models of change management in that behavioral and cultural change has to be managed in addition to the technical implementation. Change management in healthcare is challenging due to the complexity of work and patient safety as a priority area; otherwise, uncontrolled change leads to resistance, disjointed adoption, and low performance improvements

(Cresswell *et al.*, 2021; Butcher and Hussain, 2022). The Saudi Arabian experience also indicates that structured management of change is especially relevant to work in the domain of public healthcare systems that are rapidly changed, as the workforce size and variety increase the complexity of implementation (Arif, 2022).

Knowledge Transfer as a Mediating Mechanism

Among the most substantial findings in this review, the fact that knowledge transfer is one of the mediating factors between leadership and change management and digital healthcare performance is validated. The studies considered in this review showed that the impact of transformational leadership and efficient change management on performance is constantly realized through the ability of knowledge sharing, learning, and acquiring skills among medical staff (Al Jabri *et al.*, 2021). Transfer of knowledge proved to be necessary, in order to implement digital strategies to the tangible results. The scoping and qualitative research revealed that medical workers tend to encounter challenges in the transition to the use of digital tools without long-term possibilities to train, learn with cohort peers, and acquire new insight in practice (Williams *et al.*, 2021). Where the processes of knowledge transfer were loose, there was underutilization of digital systems, even though there was too much investment. In contrast to that, organisations which integrated both formal and informal knowledge-sharing cultures documented enhanced coordination, less error rate and enhanced digital performance (Lundmark *et al.*, 2023). The mediation of knowledge transfer helps form the perspectives of both knowledge based as well as the dynamic capabilities in which organisational performance is determined by the capacity to acquire, transfer and use knowledge in response to environmental change. With virtual healthcare, knowledge transfer operationalizes the leader's intention and change strategies as it prepares personnel with skills necessary to transform workflows and clinical practices.

Interdependence of Leadership, Change Management, and Knowledge Transfer

The results show that digital healthcare performance can be conceptualized in the best way as the functioning of the integrated system as opposed to independent managerial measures. Transformational leadership offers a strategic purpose and momentum, change management organizes the transition process, and transfer of knowledge is integrating digital resources into the daily routine. Research studies that considered these factors in combination demonstrated higher and more enduring performance results when compared to those that considered a single factor (Butcher & Hussain, 2022). Such interdependence applies specifically to the case of Saudi healthcare, where the reforms of the Vision 2030 have enabled the digital transformation on a mass scale. The data indicates that the most effective approach to use the digital initiatives led by leaders is to

complement them with formal change management and support them with ongoing knowledge flow within the professional circles. In the absence of this alignment, digital health initiatives will end up being symbolic, instead of transformative.

Implications for Digital Healthcare Performance in Saudi Arabia

The results have significant implications on the healthcare leaders and policymakers of Saudi Arabia especially in large healthcare clusters. The review recommends that to enhance the performance of digital healthcare, an investment is needed not only in technology but also in building leadership capacities, change management ability and systems of organisational learning. The development of transformational leadership must be promoted at various levels: clinical and administrative leadership to help to achieve digital transformation (Bhatti and Alyahya, 2021; Alateeg, 2024). Moreover, change management is supposed to be institutionalized as a core competency of healthcare organisations instead of a project temporary function. Digital health strategies should include knowledge transfer processes, including lifelong learning and development, interdisciplinary teamwork, and learning technologies, in order to provide long-term performance growth (Ibeneme *et al.*, 2020).

Contribution to Theory and Research

Theoretically, this review leads to the further development of knowledge by providing empirical support in the connection between transformational leadership and change management and digital healthcare performance with the mediation of knowledge transfer. It applies preexisting theories of leadership and change management to the field of digital health and emphasizes knowledge transfer as an important explanatory process. The literature up to now has created silences on the relationship between these constructs by synthesizing qualitative evidence which covers gaps that have been already explored in the literature. To conclude, the evidence has shown that digital healthcare performance has a multidimensional outcome that is influenced by leadership behaviors, structured change management, and effective delivery of the knowledge. Digital transformation is generated by transformational leadership and change management, but only knowledge transfer can translate them into performance gains in the long term. This inference offers a strong basis to the final part that summarizes research implications and future research direction.

CONCLUSION

This was a qualitative systematic review to determine the effects of change management on the performance of digital healthcare with specific focus on knowledge transfer as a mediator. Basing their study on the evidence-based research provided by 20 peer-reviewed articles that are closely connected, the authors have come up with results that prove the fact that digital

healthcare performance is not a direct consequence of technological implementation but a process made up of an integrated organisational process, which is organized through leadership behaviors, organized change management practices, and efficient knowledge transfer mechanisms. As the review emphasizes, transformational leadership is a pivotal participant in the digital healthcare performance, especially within complicated healthcare systems that are rapidly having their reform. Transformational leaders attain a digital outcome through engagement, innovation, and change preparedness among their employees.

Nevertheless, the impact of leadership is enhanced considerable with the help of the systematic practices, change management that would lead the organizations through the behavioral, cultural, and workflow changes that follow the digital transformation. The operational framework offered by change management will help decrease resistance, align parties, and maintain digital health technology adoption. Above all, it is the fact that knowledge transfer could be viewed as a mediating variable between leadership and change management and the digital healthcare performance. Knowledge transfer will facilitate healthcare professionals transferring digital strategies into practice by creating competencies, exchange of experiential understanding, and comprising learning with daily work routine. In well-staffed healthcare systems, digital health programs are likely to achieve low utility and minimal improvements without proper knowledge transfer. These findings highlight a comprehensive approach to the digital transformation of the Saudi Arabian context and large healthcare clusters. Digital infrastructure requires investments to be complemented by leadership training, institutionalized change management and effective knowledge transfer systems. Imbalance of these factors can be corrected by balancing them to enable healthcare organisations attain sustainable increases in efficiency, quality of care and patient outcomes. This work also forms part of the digital health literature since it explains how organisational aspects determine the performance of digital healthcare and serves as the basis on which subsequent empirical and policy-based studies can be conducted.

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