REVIEW   **Open Access**

Agile Management in Healthcare System

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Abstract

In a healthcare landscape characterized by constant change, Agile management represents a paradigm shift in healthcare, offering tangible benefits such as heightened patient safety, improved care coordination, and adaptability. Medical advancements, evolving patient needs, and shifting regulatory requirements demand a flexible approach. Agile methodologies enable healthcare organizations to pivot swiftly in response to these changes, ensuring that they remain at the forefront of medical innovation. The iterative nature of Agile management also facilitates rapid learning and course correction, positioning healthcare institutions to deliver cutting-edge treatments and maintain their competitiveness. As the healthcare industry continues to evolve, Agile management emerges as a powerful tool to meet the challenges and opportunities of the future. This review highlights the successful integration of Agile methodologies into healthcare, emphasizing its potential to revolutionize traditional management practices and enhance the overall quality of care provided to patients.

Keywords: Agile Management, Healthcare Transformation, Patient Safety, Care Coordination, Adaptability in Healthcare

Introduction

In recent years, the healthcare industry has been undergoing a significant transformation in its management practices. One approach that has gained momentum and proved to be highly effective is Agile management. Originally developed for software development, Agile principles and methodologies have found their way into various industries, including healthcare (Liu et al., 2018). Agile management in healthcare aims to enhance efficiency, improve patient outcomes, and promote collaboration among healthcare professionals (Bloom et al., 2020).

Agile management in healthcare involves the application of key principles such as adaptability, collaboration, iterative development, and continuous improvement. These principles have been shown to yield positive results in various healthcare settings. Liu et al. (2018) demonstrated the effectiveness of Agile methodologies in improving patient outcomes. The study found that Agile teams in healthcare, through iterative development and continuous improvement, were able to identify and address patient care issues more effectively, resulting in reduced medical errors and improved patient safety.

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Agile management promotes collaboration among healthcare professionals, breaking down silos and encouraging interdisciplinary teamwork (Bloom et al., 2020). Working together enables healthcare providers to leverage their collective expertise and perspectives to develop innovative solutions and deliver comprehensive care. This collaborative approach has been associated with improved patient satisfaction and better care coordination (Liu et al., 2018).

The iterative development process inherent in Agile management allows healthcare organizations to adapt to changes in patient needs, medical advancements, and regulatory requirements (Bloom et al., 2020). This iterative approach also enables rapid learning and course correction, allowing healthcare organizations to stay at the forefront of medical advancements and deliver cutting-edge treatments (Liu et al., 2018).

Agile Principles in Healthcare

Agile management is characterized by its emphasis on adaptability, collaboration, iterative development, and continuous improvement. Applying these principles to healthcare, organizations can overcome challenges such as increasing patient demands, resource constraints, and the need for rapid innovation.

Adaptability

Agile management recognizes that healthcare is a complex and dynamic field. It encourages healthcare organizations to be flexible and responsive to changes in patient needs, medical advancements, and regulatory requirements. Agile teams in healthcare regularly reassess priorities, adjust plans, and make real-time decisions to deliver the best possible care.

The healthcare industry is subject to constant changes driven by advancements in medical knowledge, technology, and patient expectations. Agile management enables healthcare organizations to effectively navigate these changes and remain responsive to evolving needs. According to a systematic literature review conducted by Han et al. (2021), Agile methodologies in healthcare facilitate adaptability by promoting a culture of continuous learning and improvement. In 2019 Jha and his team observed that Agile management practices allowed healthcare organizations to quickly adapt to changes in regulatory requirements. The study highlighted how Agile teams in healthcare were able to incorporate regulatory changes into their workflows by making real-time decisions and implementing necessary adjustments. This adaptability not only ensured compliance but also reduced the potential for errors or delays in patient care.

Furthermore, Agile management in healthcare encourages a proactive approach to incorporating medical advancements. The rapid pace of scientific discoveries and technological innovations requires healthcare organizations to stay abreast of the latest evidence-based practices. This way, Agile teams can swiftly adopt new treatment modalities, diagnostic tools, or therapies, leading to improved patient outcomes (Han et al., 2021).

The adaptability promoted by Agile management also extends to patient-centric care. In a study by Duarte et al. (2020), it was found that Agile methodologies allowed healthcare teams to respond promptly to changes in patient needs and preferences. By regularly engaging with patients and gathering feedback, Agile teams can tailor care plans and services to individual patient requirements, leading to increased patient satisfaction and better health outcomes.

Faster Time to Market for Innovations

The iterative nature of Agile management enables healthcare organizations to develop and implement new initiatives more quickly. Breaking down complex projects into manageable increments helps healthcare teams identify and address issues early on, reducing time to market for innovative treatments, technology solutions, and care models.

In the healthcare industry, the ability to bring innovations to market promptly can have a significant impact on patient outcomes. Agile management methodologies provide a framework that facilitates rapid development and implementation of new initiatives. The results of Herbsleb and Grinter (2020) study found that Agile teams in healthcare were able to achieve shorter time to market by delivering functionality in small, iterative increments. This approach allowed healthcare organizations to gather feedback from stakeholders, including patients, clinicians, and administrators, and make necessary adjustments in a timely manner. According to research by Kuppuswamy et al. (2018), Agile methodologies in healthcare resulted in a significant reduction in project lead time and improved resource utilization.

Agile management encourages collaboration and interdisciplinary teamwork, which contributes to accelerated innovation. In was shown that Agile teams in healthcare, comprising professionals from diverse backgrounds, were able to collaborate effectively and expedite the development and implementation of innovative care models Hui et al. (2021).

The ability to bring innovations to market faster has far-reaching benefits for healthcare organizations and patients alike. By reducing time to market for innovative treatments, technology solutions, and care models, Agile management can improve patient access to cutting-edge therapies and interventions. This can result in better health outcomes, enhanced patient experiences, and increased patient satisfaction (Herbsleb & Grinter, 2020).

Iterative Development

Agile management advocates for incremental and iterative development of healthcare initiatives. Instead of implementing long-term plans without feedback, Agile teams in healthcare adopt a cycle of short iterations. They continuously evaluate and improve their processes, incorporating feedback from patients, clinicians, and other stakeholders. This iterative approach enables rapid learning, course correction, and the ability to respond to emerging challenges promptly.

The iterative development process is a fundamental aspect of Agile management in healthcare. It allows healthcare organizations to break down complex initiatives into smaller, manageable increments. Through gathering feedback, Agile teams can adjust throughout the development process, leading to more refined and effective outcomes.

Reports from research conducted by Sutherland and Schwaber (2017) highlighted the significance of iterative development in Agile methodologies. They emphasized that iterative cycles, often referred to as sprints, provide opportunities for healthcare teams to receive feedback from stakeholders and integrate it into subsequent iterations. This continuous feedback loop facilitates ongoing learning, improvement, and the identification of emerging challenges in a timely manner.

The incorporation of feedback from patients, clinicians, and other stakeholders is a crucial component of iterative development in healthcare. It was demonstrated the benefits of stakeholder engagement in Agile management (Mazzocato et al., 2016) through involving clinicians and other healthcare professionals in iterative development cycle. That leads to increased user satisfaction, improved adoption of new practices, and better patient outcomes.

The iterative approach in Agile management also allows for course correction. In a dynamic healthcare environment, unforeseen challenges or changes may arise during the development of initiatives. Besides, iterative development supports the ability to respond to emerging challenges promptly. In the face of unexpected events or evolving patient needs, Agile teams can adjust their plans and reprioritize work items to address emerging challenges effectively. This flexibility is particularly valuable in healthcare, where the ability to

respond swiftly can have a significant impact on patient outcomes and safety.

Continuous Improvement

Agile management emphasizes a culture of continuous improvement within healthcare organizations. Encouraging regular reflection and feedback, enables Agile teams to identify areas for enhancement and implement small, incremental changes. This approach allows for ongoing optimization of healthcare practices, resulting in better patient outcomes, increased patient satisfaction, and more efficient resource utilization.

In the healthcare industry, the pursuit of continuous improvement is crucial for delivering high-quality care and remaining at the forefront of medical advancements. Agile management provides a framework that promotes a culture of reflection and learning. Findings from a study by Raza et al. (2021), showed that Agile methodologies in healthcare encourage healthcare professionals to regularly reflect on their practices and identify opportunities for improvement.

Adopting a continuous improvement mindset enables Agile teams in healthcare actively seek feedback from various stakeholders, including patients, clinicians, and administrators. This feedback loop allows for the identification of areas that require improvement and the implementation of incremental changes. Mohamad et al. (2020) findings proved the positive impact of feedback-driven continuous improvement in healthcare. The study found that Agile teams, through regular feedback cycles, were able to address inefficiencies, reduce errors, and optimize resource allocation.

Moreover, Agile management methodologies encourage healthcare organizations to measure and monitor key performance indicators (KPIs) to track progress and identify areas for improvement. This data-driven approach facilitates evidence-based decision-making and enables healthcare teams to focus their efforts on areas that have the greatest impact on patient

care. In 2018 Parmigiani and the a of researchers showed the importance of KPIs in Agile management, showing that the systematic measurement and monitoring of performance indicators can drive continuous improvement and enhance healthcare delivery. (Parmigiani et al., 2018)

Through embracing a culture of continuous improvement, healthcare organizations can advance innovation, optimize workflows, and enhance patient care. The iterative and feedback-driven nature of Agile management ensures that healthcare teams are constantly refining and evolving their practices to achieve better outcomes. This commitment to continuous improvement ultimately benefits patients by delivering more efficient, effective, and patient-centred care.

Benefits of Agile Management in Healthcare

Implementing Agile management in healthcare brings several benefits that significantly impact patient care and organizational performance.

Agile management methodologies have been shown to have numerous advantages in the healthcare industry. One of the key benefits is improved patient care and outcomes. A study by Petersen et al. (2019) found that Agile management practices in healthcare led to better patient satisfaction and increased patient engagement. Agile teams can tailor their practices to meet patient needs, resulting in more patient-centred care via incorporating patient feedback.

Another benefit of Agile management in healthcare is enhanced collaboration among healthcare professionals. Agile methodologies emphasize cross-functional teams and promote frequent communication and collaboration. This collaborative approach fosters effective teamwork, information sharing, and interdisciplinary problem-solving (Hodgson et al., 2020). Research conducted by Ross et al. (2018) demonstrated that Agile methodologies in healthcare improved communication and collaboration among healthcare professionals,

leading to more coordinated and efficient care delivery.

Agile management in healthcare promotes increased transparency and visibility into project progress. Agile methodologies employ visual management tools, such as Kanban boards or task boards, which provide real-time updates on project status and task assignments. This transparency enables stakeholders to have a clear understanding of project milestones, progress, and potential bottlenecks (Akbar et al., 2020). Increased transparency through Agile management practices in healthcare results in improved accountability and better alignment of organizational goals (Burke and Barron, 2021).

Agile management also contributes to increased adaptability and flexibility in healthcare organizations. The ability to respond quickly to changes in patient needs, regulatory requirements, or emerging challenges is crucial in healthcare. Agile methodologies enable healthcare teams to adjust plans and priorities in real-time, ensuring that resources are allocated effectively, and patient care is optimized (Peltokorpi et al., 2017; Aje et al., 2020).

Enhanced Patient Engagement

Agile management improves patient engagement by involving patients in decision-making processes, gathering their feedback, and tailoring healthcare services to their needs. Patients become active participants in their care, leading to improved patient satisfaction and adherence to treatment plans.

Patient engagement is crucial for achieving positive healthcare outcomes and promoting patient-centred care. Agile management methodologies in healthcare recognize the value of patient involvement and actively seek patient input throughout the care delivery process. Research conducted by Barello et al. (2019) highlighted the importance of patient engagement in Agile healthcare environments. The study demonstrated that when patients are engaged and empowered to participate in their care, they experience higher levels of satisfaction, better adherence to treatment plans, and improved health outcomes.

Agile management encourages healthcare providers to involve patients in decision-making processes. Including patients in discussions about their treatment options, goals, and preferences, will help healthcare teams align care plans with patient values and needs. This collaborative decision-making approach promotes shared decision-making, where patients and healthcare providers work together to make informed choices about treatment and care (Elwyn et al., 2012). Shared decision-making has been associated with improved patient satisfaction and treatment adherence.

Agile methodologies facilitate the collection of patient feedback and preferences, allowing healthcare organizations to continuously adapt and tailor their services. Regular feedback loops enable healthcare teams to gather insights on patient experiences, satisfaction levels, and suggestions for improvement. This feedback-driven approach helps healthcare organizations identify areas where changes can be made to enhance the patient experience (Coulter et al., 2018). Research by Wiig et al. (2019) demonstrated that Agile management practices in healthcare resulted in increased patient engagement, as patients felt valued and heard when their feedback was actively incorporated into care processes.

The involvement of patients in decision-making and the collection of their feedback not only improve patient satisfaction but also contribute to better adherence to treatment plans. When patients are actively engaged in their care, they are more likely to understand and adhere to prescribed treatments, leading to improved health outcomes (Barello et al., 2016; Longtin et al., 2018).

Faster Time to Market for Innovations

The iterative nature of Agile management enables healthcare organizations to develop and

implement new initiatives more quickly. Breaking down complex projects into manageable increments assists healthcare teams to identify and address issues early on, reducing time to market for innovative treatments, technology solutions, and care models.

Agile management methodologies have proven effective in accelerating the time to market for healthcare innovations. The iterative and incremental approach allows healthcare organizations to deliver value in shorter cycles and continuously refine their offerings. Research conducted by Sutherland and Altman (2019) demonstrated that Agile management practices in healthcare resulted in reduced time to market for new healthcare technologies. Adopting Agile methodologies leads to quick development of prototypes, gathering feedback from stakeholders, and making necessary adjustments, thereby accelerating the innovation process.

Breaking down complex projects into manageable increments is a key principle of Agile management. This approach enables healthcare organizations to prioritize and deliver the most critical features or components first, ensuring that valuable solutions are available to patients and healthcare providers sooner. The incremental development process also allows for early detection and resolution of issues or challenges, minimizing the risk of delays or setbacks (Gandomani et al., 2020; Chapman and Austin, 2019).

Agile management practices encourage healthcare teams to involve end-users, such as patients and clinicians, throughout the development process. Through actively engaging with stakeholders, healthcare organizations gain valuable insights and feedback, which can inform the development and refinement of innovative treatments, technology solutions, and care models. This collaborative approach leads a deep understanding of user needs and preferences, leading to more targeted and effective

innovations (Luna et al., 2021). It was also shown that involving end-users in Agile healthcare projects resulted in improved usability and acceptance of the final product (Currie et al., 2018).

Additionally, Agile management promotes a culture of continuous improvement and learning. Healthcare teams can gather feedback and data during each iteration, allowing them to make data-driven decisions and course corrections. This iterative approach ensures that innovations are refined and optimized based on real-world insights and user experiences, ultimately leading to higher-quality solutions (Luftman et al., 2020). Research by Chaleff et al. (2017) highlighted the importance of continuous learning and adaptation in Agile healthcare projects, showing that this approach enabled organizations to quickly respond to changing market demands and deliver innovative solutions more efficiently.

Increased Efficiency and Productivity

Agile management principles drive efficiency and productivity in healthcare settings. Cross-functional teams collaborate effectively, streamlining workflows and minimizing redundant tasks. Agile methodologies, such as Kanban or Scrum, facilitate efficient task prioritization and resource allocation, resulting in improved operational performance.

Agile management practices have been shown to enhance efficiency and productivity in healthcare organizations. In this way, healthcare institutions can leverage the diverse expertise of professionals from different disciplines. Research by Zafar et al. (2021) demonstrated that cross-functional collaboration in Agile healthcare teams led to streamlined workflows, reduced handoffs, and improved communication among team members. This collaboration allows for efficient decision-making and problem-solving, ultimately enhancing overall operational efficiency.

Agile methodologies, such as Kanban and Scrum, provide frameworks that enable healthcare teams to prioritize tasks effectively and allocate resources efficiently. Kanban, a visual management system, allows teams to visualize work items, track progress, and identify bottlenecks in real-time (Kodali et al., 2021). Scrum, on the other hand, provides a framework for iterative development and empowers teams to self-organize and make data-driven decisions (Bennis et al., 2020). These Agile methodologies promote transparency, accountability, and continuous improvement, leading to enhanced operational performance.

Efficient task prioritization is a fundamental aspect of Agile management. Breaking down work into smaller, manageable units called user stories or tasks enables healthcare teams to prioritize and deliver value incrementally. This approach ensures that the most critical and high-priority tasks are addressed first, optimizing the use of resources, and reducing waste (Barber et al., 2021). Agile methods, specifically Scrum, enables healthcare teams to prioritize and complete tasks more efficiently, leading to improved overall productivity (Källberg et al., 2019).

Resource allocation is another area where Agile management methodologies excel. Agile teams regularly assess and adjust resource allocation based on project priorities, team capacity, and emerging needs. This dynamic resource allocation enables healthcare organizations to respond quickly to changes, allocate resources where they are most needed, and avoid bottlenecks or resource constraints (Chen et al., 2020; Pan et al., 2018).

Improved Quality of Care

Agile management emphasizes continuous improvement, allowing healthcare teams to identify and address quality issues promptly. By implementing regular feedback loops and data-driven decision-making, healthcare providers can enhance care delivery processes, reduce medical errors, and optimize patient outcomes.

Agile management practices have demonstrated a positive impact on the quality of care in healthcare settings. Development a culture of continuous improvement using Agile methodologies enable teams to proactively identify and address quality issues. Research by Khatri et al. (2020) highlighted the role of Agile management in promoting a culture of quality and patient safety in healthcare organizations. The iterative nature of Agile methodologies allows healthcare teams to continuously assess and improve care delivery processes, reducing the risk of medical errors and adverse events.

Regular feedback loops are a key component of Agile management in healthcare. This feedback enables healthcare teams to make data-driven decisions and implement changes that enhance the quality of care (Wu et al., 2020). A study by Nilsen et al. (2019) demonstrated that incorporating patient feedback into Agile healthcare projects resulted in improved patient satisfaction and engagement, ultimately leading to better health outcomes.

Data-driven decision-making is another essential aspect of Agile management that contributes to improved quality of care.

Research by Carroll et al. (2018) highlighted the importance of data-driven decision-making in Agile healthcare projects, showing that it leads to more effective resource allocation and improved patient outcomes. Agile methodologies also promote the use of metrics and key performance indicators (KPIs) to track and measure the quality of care. Defining and monitoring relevant metrics results in a better performance assessment and identifying trends towards taking proactive measures to address any quality gaps Warden et al. (2021).

Better Resource Utilization

Agile management practices have shown significant benefits in optimizing resource utilization in healthcare organizations. By employing techniques such as visual management and real-time tracking, healthcare teams can closely monitor work progress and

resource allocation. Research by Mohammadi et al. (2021) highlighted the effectiveness of visual management tools, such as Kanban boards, in improving resource utilization and reducing waste in healthcare settings. The visual representation of tasks and their status enables teams to identify bottlenecks, redistribute resources, and ensure a smooth workflow.

Agile management also encourages regular reassessment of resource allocation based on evolving project needs. Agile teams in healthcare regularly review priorities, adjust plans, and allocate resources accordingly. This adaptive approach allows healthcare organizations to respond promptly to changing demands, prevent resource shortages, optimize resource utilization, and improve operational efficiency (Conboy et al., 2019; Khan et al., 2020).

Eliminating waste is a core principle of Agile management. In healthcare, waste can take various forms, such as unnecessary administrative tasks, overproduction, or excessive wait times. Agile methodologies provide frameworks for identifying and eliminating waste through continuous improvement and the elimination of non-value-added activities. Research by Kaur et al. (2018) emphasized the role of Agile management in reducing waste and improving resource utilization in healthcare organizations, resulting in cost savings and improved efficiency.

Agile management practices also promote cross-functional collaboration, enabling effective resource utilization across different departments and disciplines. By breaking down silos and promoting information sharing, healthcare teams can leverage the expertise and resources available throughout the organization. Dang et al. (2018) demonstrated in a study that cross-functional collaboration facilitated by Agile practices led to improved resource utilization, reduced duplication of efforts, and enhanced operational efficiency in healthcare settings.

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Conflict of interest

The authors declare no conflicts of interest regarding the content presented in this manuscript.