



IMPLEMENTATION OF LEAN MANAGEMENT PRINCIPLES IN HEALTHCARE ORGANIZATIONS

Mohammed Hamad Alhrbi
Abdullah Hamad Hamadan Almutairi
Mohammad Abdullah Mubarak Almarwan
Yasir sammar almutairi
Abdulrahman Abdullah Alghamdi
Abdullah Ahmed Alghamdi
Shaya Murayki Alruwaili
Badr AED Alotaibi
Alanazi Hamad Ghathith
Abdullah Mushi Rashed Aldawsari
Ksa, ministry of health

Abstract

The primary objective of this paper was twofold: firstly, to develop a collaborative methodology that enables the implementation of lean management in healthcare using the action research approach; secondly, to demonstrate the effectiveness of this approach through implementing it to the sleep section of an academic medical center . This technique suggests the adoption of lean management in its most comprehensive form, including the incorporation of lean concepts and selected practical tools or practices to attain a competitive edge. When implementing lean management, modifications were introduced by considering the whole service value chain. This implementation entailed training and engaging staff in the endeavor (staff pillar), identifying and analyzing inefficiencies in value chain procedures (processes pillar), and implementing control and evaluation mechanisms aligned with objectives (key indicators of success pillar) while implementing improvement actions to attain these objectives. The use of this technique resulted in enhanced management of flow of patients in regards to efficiency, effectiveness, and quality, as well as an internal shift towards a lean culture.

Keywords: lean management, lean healthcare, employee involvement

1. Introduction

In recent years, significant transformations have taken place in the healthcare industry, resulting in a substantial influence on society. Efforts have been made to prioritize the patient. Various management approaches, such as telemedicine, electronic clinical history, and the



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Health 4.0 phenomenon, have been progressively used to establish a more direct connection with patients [1]. In addition, regulatory measures are being implemented to address a shrinking economy and an aging population, which is leading to a continuous rise in the number of individuals with chronic illnesses. The objective of these steps is to maintain the standard of service while avoiding any unexpected expenses.

The shifting environment poses a danger to hospitals and other health care providers, as they face growing expectations from patients while dealing with shrinking funds. Simultaneously, they encounter the task of satisfying the requirements of multiple stakeholders, including governments, healthcare professional bodies, healthcare product and service suppliers, and insurance companies. Additionally, they must address the needs of society as a whole, especially during crises like the COVID-19 pandemic, which assess the durability of global health systems.

Service providers must address issues by analyzing ways to enhance their chances of survival via attaining a competitive edge, particularly if they are part of public health services [2]. During times of crisis, organizations typically see the need of allocating resources and exerting effort towards innovation in management. Consequently, an increasing number of hospitals have restructured their internal management in terms of procedures, resources, and goals, aiming to achieve more efficient and effective management, ultimately improving the quality of service. Academic literature demonstrates instances where hospitals have successfully implemented management strategies derived from industrial sectors. These approaches, which vary slightly from one another, aim to enhance the efficiency and effectiveness of processes and productive systems [3,4,5,6,7,8,9,10,11,12,13].

Some of these approaches include continuous improvement, kaizen, total quality management (TQM), just in time (JIT), six sigma, and notably, lean management. An essential factor for achieving success in implementing these techniques is the active involvement of the staff members who are impacted by them [14,15,16,17]. These techniques are considered innovative in the healthcare field, since they bring about a significant transformation in the traditional methods used so far. According to Walley [18], there is a general perception that the service industry, including healthcare, is falling behind in terms of implementing new management innovations and advances when compared to the industrial sector. Traditionally, professional medical knowledge was seen enough for guaranteeing the quality and safety of healthcare services.

Nevertheless, modern healthcare delivery systems are intricate, necessitating heightened organizational awareness to ensure the provision of suitable medical treatment across the whole patient journey, while avoiding additional expenses and promoting savings. Hence, the issues plaguing healthcare in the present are not only clinical in nature, but rather stem from organizational challenges. Considering the intricate nature of healthcare and its surroundings, it is essential for all individuals involved to contribute to the examination, identification, and restructuring of the procedures for providing a service. This should be done with the goal of

managing the existing resources in a straightforward, productive, and efficient manner, while also meeting the needs of patients and fulfilling the expectations of stakeholders.

2. Applying Lean Principles in Healthcare

Figure 1 illustrates the process of developing the conceptual model suggested in this phase. The rationale behind this paradigm is elucidated in further depth below.

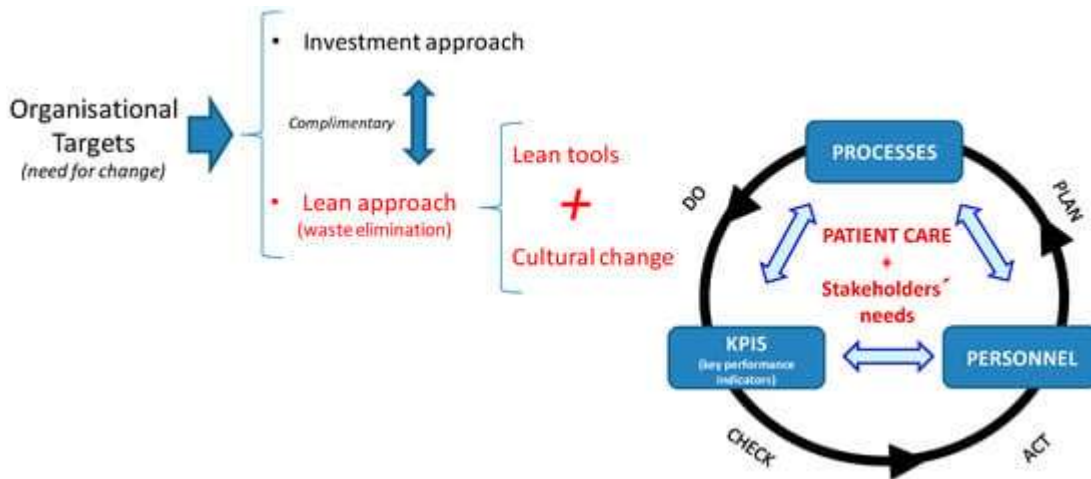


Figure 1. Lean principles in healthcare.

Companies and organizations are today facing the challenge of continuous innovation in their goods and services, as well as the pressure to provide cheaper pricing and higher standards in terms of deadlines, safety, flexibility, and sustainability. This phenomenon is occurring in markets that are becoming more unstable and unpredictable, especially in rapidly changing technological landscapes. As a result, many organizations are compelled to enhance their management practices or restructure their processes to align with their strategic goals and gain a competitive edge.

The exploration of design alternatives may be driven by investments in technology, equipment, or radical breakthroughs, as well as by incremental changes that steadily enhance process performance. These two paths should be seen as complimentary rather than mutually exclusive. While acknowledging the significant influence of the radical approach, it is vital to note that it has some disadvantages, especially in terms of securing money for purchase or implementation. The second choice, which involves less investment and focuses on making tiny adjustments, serves as the foundation for the several methods, techniques, or philosophies stated earlier, with lean management being particularly notable among them. Historically, in the industrial sector, the methodical exploration for options to redesign and enhance processes without significant investment in technology or equipment has been the focus of all these techniques [19].

According to Hellström et al. [20], there is a widespread belief that the service industry, especially healthcare, lags behind the manufacturing or industrial sector in terms of adopting innovative management concepts [21]. For a long time, it has been believed that having professional expertise alone is enough to guarantee quality and safety in the provision of healthcare services. Healthcare delivery systems today are intricate, necessitating increased organizational awareness to ensure proper medical care throughout the patient's journey. This includes achieving cost savings while also enhancing standards of quality, flexibility, and safety. Hence, the primary issue with healthcare in the present day mostly pertains to its organizational aspects rather than only focusing on clinical matters.

In the present circumstances, considering the intricacy of healthcare's nature and surroundings, it is essential for managers and personnel to scrutinize, devise, and execute enhancement procedures in order to attain efficiency and enhance the quality of the service provided. To accomplish this goal, one effective approach is implementing a management system based on lean principles. This will result in enhanced performance of hospitals and other healthcare facilities. The word "Lean" was first used by Womack, Jones, and Roos [22] to refer to the Toyota Production System (TPS) and its methodology of consistently improving the efficiency and effectiveness of a system by eliminating waste. The five principles of lean implementation are created based on the notion that organizations consist of processes.

These principles dictate that an organization must first determine what its consumers consider valuable in order to fulfill their demands. Once the organization has a clear understanding, it can begin identifying value streams to eliminate non-value-adding steps or waste. This involves creating a seamless flow for customers in the remaining value-adding processes. Additionally, implementing pull systems allows customers to request services from the firm, ensuring that services are only provided when requested. The organization should continuously strive for perfection by setting ambitious and realistic improvement targets. It is also important to implement mechanisms for process control and continuous improvement. Ohno established the criteria for identifying waste in industrial operations [21].

The individual established a comprehensive set of seven waste categories, which include overproduction (making excessive quantities too soon), waiting, long-distance transportation of people or materials, duplication or rework, mistakes and blunders, unneeded stock, and non-ergonomic work settings. Shah and Ward [23] propose that the notion of lean management may be understood from two distinct perspectives. One of these perspectives is the philosophical or cultural viewpoint that pertains to core principles and overall aims, such as the five principles described by Womack and Jones. The second viewpoint is a pragmatic one, focusing on techniques or tools that have immediate applicability.

Some of the practices or tools that can be used in the service sector include the PDCA cycle (plan, do, check, act), the DMAIC cycle (define, measure, analyze, improve and control), 5Ss,

VSM (value stream mapping), standardization, root cause analysis, ABC classification, Ishikawa diagram, and visual management activities [24]. The combined impact of implementing these practices and tools focused on lean principles leads to the creation of a high-quality system that delivers tailored goods or services to meet customer requirements, while minimizing or eliminating waste. Using these techniques or processes without proper alignment with the overall goals might result in failure or excessive organizational effort.

Essentially, the primary objective of lean philosophy is to pinpoint and minimize inefficiencies inside the organization. Waste, in this context, refers to any human activity that consumes resources without generating any value. In essence, lean refers to the practice of achieving more with less. Due to its origins in manufacturing organizations, it might be claimed that lean thinking may not be as beneficial for the service sector, particularly the healthcare industry. Nevertheless, Womack and Jones [25] endorse the use of lean thinking in the medical system. Advocates assert that the first stage in applying lean thinking to medical care involves prioritizing the patient and including time and comfort as crucial indicators of the system's effectiveness. The focus is placed on encouraging staff engagement via the use of multi-skilled teams responsible for patient care, as well as actively including the patient in the process [26].

The concept of lean healthcare has arisen, signifying a heightened emphasis on efficiency and patient satisfaction in the healthcare industry [27,28], in accordance with the overarching goals of the several parties involved. Although healthcare is unique and not immediately comparable to other industries, there is an increasing belief that healthcare may gain advantages by examining and using the ideas, concepts, and techniques of lean management, which have shown their effectiveness in other sectors. The core principles of the Toyota lean method, as described by Liker [29] in *The Toyota Way*, can be summarized as follows: a focus on long-term philosophy, the belief that the right process leads to the right results, the importance of adding value to the organization through the development of people, and the continuous solving of root problems to drive organizational learning. These principles can be equally applied to the field of health.

Lean management is a universally applicable management technique that focuses on improving processes inside organizations. Every organization, including healthcare organizations, consists of a sequence of processes, or collections of activities designed to provide value for the individuals that use or rely on them (customers/patients) [30]. Nevertheless, the emphasis on processes is not limited to lean management alone. Other management approaches, such as BPM (business process modeling), also aim to model and redesign activities within a process to enhance efficiency. These approaches employ participative methods and visual tools to achieve their objectives [31,32].

According to Dahlgaard et al. [33], lean healthcare is a management philosophy that aims to create a culture within healthcare organizations that prioritizes patient and stakeholder satisfaction. This is achieved through ongoing improvements in processes and activities that

provide value to patients and stakeholders. In lean healthcare, all individuals involved in delivering the service actively participate in identifying and eliminating non-value-adding activities (waste) and promoting the creation of value for the customer/patient throughout the entire patient flow.

In an ideal process, each phase is valued, competent, available, adequate, adaptable or agile, and related to continuous flow. Any failure in these dimensions results in the generation of waste. Within the healthcare domain, this implies that all personnel are considering the concepts of value and flow throughout the patient's journey as a unified entity, rather than a collection of separate and disconnected tasks. This refers to a shift in culture or mindset on how work is approached, moving from a focus on functionality to a focus on processes [34].

To successfully adopt lean management in public services, it is essential to have a clear comprehension of the concepts of lean. This includes grasping the concept of value, emphasizing efficient flow and pull, and minimizing waste. Organizational readiness for implementing lean can be assessed by considering several factors. These factors include understanding the customer's value, having a process view of the value stream, identifying capacity and demand for flow and pull, and linking the improvement activity to strategy while engaging staff in problem-solving. In other words, it involves understanding the value of the process, the nature of the process itself, the types and patterns of demand, and aligning the improvement efforts with the overall strategy while actively involving the staff. This preliminary measure will enable the organization to comprehend the necessity for altering their current practices, ensuring that personnel are fully dedicated to this approach. The objective is to enhance the value provided to clients/patients by minimizing or eliminating inefficiencies and by implementing ongoing enhancements.

Conversely, as previously said, process improvement results in a substantial transformation in culture, requiring robust leadership, evident backing from management, and patience due to its long-term nature. Senior management must demonstrate genuine interest, provide support, and take action based on the presented outcomes to guarantee the long-term viability of the reforms [35,36,37,38].

3. Summary

The internal administration of healthcare is very intricate, including the collection of a substantial amount of data. Currently, it remains challenging to accurately assess a hospital's performance in terms of quality, cost, and service delivery due to a lack of integration between the obtained information and the measurement of process efficiency. Therefore, it is crucial to determine the factors that contribute to the patient's satisfaction and the essential information and actions required to provide maximum value in accordance with lean principles. The participatory technique provides instructions for achieving this goal by emphasizing the creation of additional value for the patient and removing inefficiencies in service delivery. The suggested approach is versatile and may be used by any hospital department, regardless of the hospital or country it is

located. It can also be applied to other health services in other nations. The successful implementation of lean management depends on selecting an appropriate change agent who can facilitate change, effectively managing and coordinating actions related to processes, personnel, and key performance indicators (KPIs), and having a genuine leader in the organization who will oversee the entire change process.

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