

Applying Lean Management Principles for Enhanced Outpatient Waiting Times

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ARTICLE INFO

Received: 📅 August 29, 2023

Published: 📅 September 05, 2023

Citation: Muhammad Usman Hassan Siddiqui and Faisal Majeed. Applying Lean Management Principles for Enhanced Outpatient Waiting Times. Biomed J Sci & Tech Res 52(4)-2023. BJSTR. MS.ID.008290.

ABSTRACT

The escalation in patient numbers, complications in patient management, and limitations imposed by healthcare schemes have led to extended queues in patient wait times. This has resulted in diminished service quality, decreased patient satisfaction, and financial strain in outpatient departments worldwide. A strategic approach centered on the zero-waste philosophy has been adopted to achieve optimal resource utilization. The implementation of Lean management techniques aims to streamline healthcare delivery expenses. Another avenue involves waste reduction through continuous process enhancements, focusing on enhancing patient satisfaction and care outcomes while curbing non-value-added expenses. This study delves into the impact of Lean healthcare, a methodology dedicated to eradicating waste and eliminating non-value-adding elements in patient care. Through a direct survey of individuals seeking care at outpatient clinics, their entire journey, including vulnerabilities, was comprehensively assessed. The core objective of this research is to introduce Lean practices into outpatient clinics. The study also proposes a customized conceptual framework tailored to the specific requirements of My Clinic International in Jeddah, Saudi Arabia, addressing the organization's healthcare objectives.

Keywords: Saudi Arabia; Patient; Lean Management; Healthcare; Improvement Tools; Outpatient Clinic

Introduction

Deploying lean healthcare presents a significant challenge for administrators and service providers. Their task involves enhancing patient satisfaction while maintaining profitability, all within a patient-centric framework. Patient contentment and dissatisfaction, as well as health status and personal perspectives, are directly linked to patient expectations and experiences, which in turn are influenced by healthcare system attributes [1]. As a barometer of healthcare quality, patient satisfaction has gained prominence, as evidenced by outcome measures and surveys that gauge the effectiveness of care delivery within hospital settings [2]. Unlike conventional healthcare improvement approaches, Lean Management prioritizes eliminating waste to enhance the flexibility of resources and address fluctuations in customer demands, rather than solely focusing on healthcare enhancements [3]. The outpatient department (OPD) serves as the

frontline interface between patients and hospitals, offering a window into available healthcare services for the community. The quality of services provided in OPDs, often seen as indicative of overall hospital services, is closely tied to patient satisfaction [4]. While Lean management principles have gained substantial traction in hospital settings, their effects on staff members have not been comprehensively synthesized.

This study explores how Lean Management practices impact frontline healthcare professionals by considering customer needs, employee involvement, and the principle of continuous improvement. While continuous improvement methodologies are well-established in manufacturing, their extension to the healthcare sector, through Lean principles, is becoming increasingly essential in light of the sector's rapid globalization [4,5]. The foundational tenet of Lean Management traces back to its origins in the automotive industry. It

posits that ongoing enhancements focused on eliminating waste and maximizing value-added activities lead to heightened efficiency [5,6]. Within the outpatient context, improving patient experience pertains to the alignment of health services with the population’s well-being, fostering trust in the healthcare system, and staying updated with prevailing executive knowledge. In 2014, the CDC and the Office of Population Affairs of the U.S. Department of Health and Human Services (HHS) put forth guidelines to define Quality Family Clinical Services. These guidelines aimed to specify the services expected during a family clinical visit and offer insights into elevating patient experience quality [7]. Healthcare providers have subsequently refined their practices to boost patient satisfaction, enhance equipment utilization, and ensure timely service provision. Evaluating patient satisfaction serves as a vital metric in the healthcare industry and necessitates regular assessment [8].

Prolonged wait times in clinics not only lead to patient frustration but also have a negative impact on patient experience scores in surveys [9-11]. This study addresses challenges within the outpatient clinical

journey, analyzing them through the lens of budget constraints and customer feedback. To achieve the goal of zero waste, a thorough understanding of quantitative losses, which can be eliminated through improvements and modifications, is imperative. This study introduces the concept of zero losses across various aspects (such as gaps, accidents, breakdowns, quality defects, customer complaints, and environmental waste) as a central element in achieving the target of zero waste. Additionally, patient satisfaction evaluations are integrated to enhance health services in alignment with predefined objectives. This approach not only enhances patient experiences by optimizing service capacity but also contributes to cost containment, a crucial consideration in the context of escalating healthcare delivery expenses [12]. The Kingdom of Saudi Arabia has witnessed a continuous rise in healthcare demand, evident from increasing healthcare budgets and investments over the past decade (as illustrated in Figure 1). Timely service provision demands innovative industry practices. This study explores the implementation of lean management in healthcare outpatient clinics, focusing on improving waiting times and potential benefits at My Clinic International Ltd. in Jeddah, Saudi Arabia.

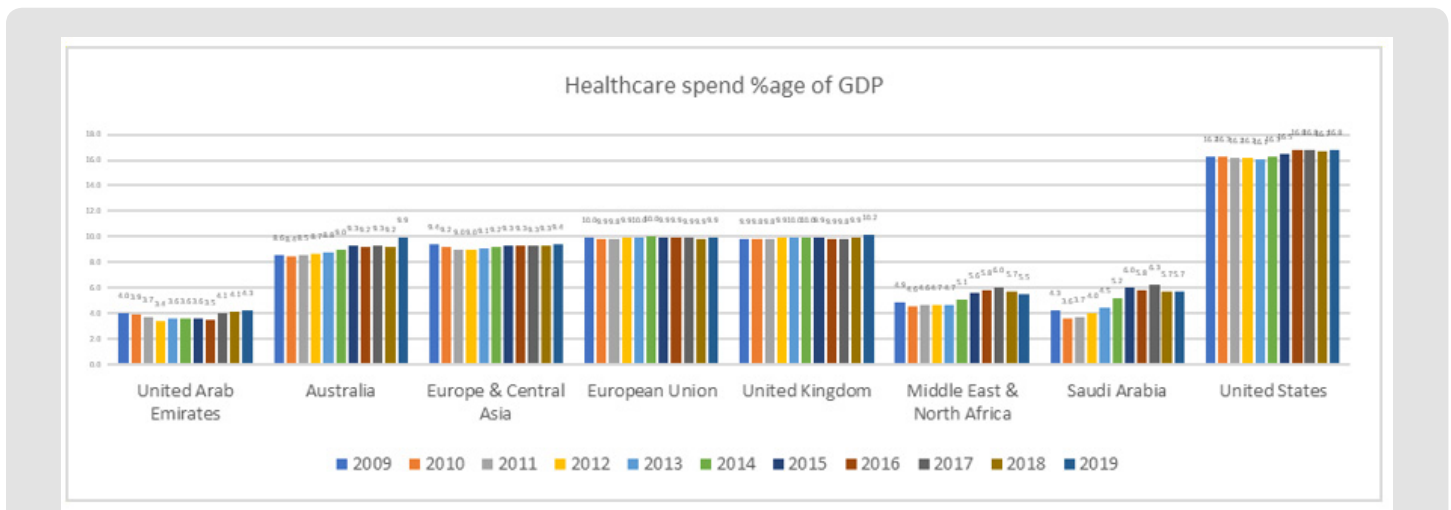


Figure 1: Percentage of GDP spent on healthcare for different regions and its trends [26].

Methodology

The fundamental objective of lean management revolves around generating value for customers by optimizing resource utilization and establishing a streamlined workflow that aligns with actual customer needs. This approach aims to eliminate wastage of time, effort, and financial resources by scrutinizing each step within a healthcare process and either revising or eliminating steps that don’t contribute value. The rationale for adopting this methodology stems from the evolving evidence concerning the impact of Lean Management (LM) on the healthcare workforce [13]. Key contributions of lean management encompass the following:

1. Identifying value from the perspective of the end customer.

2. Minimizing all forms of waste across business processes.
3. Continuously enhancing work processes, objectives, and workforce engagement.
4. Establishing a continuous workflow and traction system.

Mahmoud conducted a literature review to unveil the spectrum of positive and negative effects, highlighting the need for further empirical research on frontline healthcare professionals [14]. Lean management encompasses a critical managerial dimension that ensures optimal working conditions for employees. The incorporation of Lean management principles at My Clinic International Limited results in a more stable production system and heightened overall company performance, yielding several advantages:

1. **Enhanced Staff Focus:** By minimizing wasteful activities, practitioners can concentrate solely on tasks that genuinely contribute value.
2. **Improved Productivity and Efficiency:** Employees engaged in value-generating tasks exhibit higher productivity and efficiency, as unnecessary tasks no longer divert their attention.
3. **Streamlined Processes:** The implementation of a traction system ensures that work is undertaken only when there's actual demand, leading to a more intelligent workflow.
4. **Optimal Resource Utilization:** Through waste avoidance, resources are allocated according to high-demand areas, optimizing resource usage based on production requirements.

The lasting effectiveness of these achievements can be realized in attaining desired performance and efficiency objectives through the gradual implementation of Lean Management (LM) practices [15]. This juncture calls for the allocation of resources and effort towards innovative management within organizations, devoid of unnecessary complexities. This has led numerous hospitals to revamp their internal management approaches concerning processes, resources, and goals. Such transformations aim to enhance the effectiveness and efficiency of management, ultimately improving the quality of service. Research findings highlight instances where hospitals have succeeded in this endeavor by incorporating management techniques from industrial domains. Despite subtle variations, these approaches share a common goal of optimizing processes and production systems [16-22]. In the context of My Clinic, stakeholders have embraced Lean management to elevate their services and effectiveness.

However, the implementation of Lean tools and practices involves a more straightforward approach. The deployment process hinges on five strategic steps:

1. Assembling the Project Team.
2. Identifying the Model Area.
3. Mapping the Value Stream in the Model Area.
4. Formulating Action Plans and Enacting Deployment.
5. Monitoring Outcomes and Extending Success Horizontally.

Step-1 Project Team Selection

Understanding the customer's perspective is paramount in identifying value-added activities. Therefore, every organization strives to comprehend customer needs. In the context of this study, My Clinic International Limited in Jeddah investigates the value contributed by each customer group. These groups can be broadly categorized as external and internal customers. While external customers encompass entities like governments and health insurance companies, this research places special emphasis on internal customers. This approach aims to tailor the project to specific requirements, thus preventing any potential issues. Collaborating with internal customer groups holds significance as it nurtures the hospital's operational unity. To achieve the goal of efficient medical services, a project team is formed. This team involves essential stakeholders from various sectors, including customer service, nursing, medical, system support, and planning. Operating under the sponsorship of the operations director, this team endeavors to ensure seamless medical services. This structure is illustrated in Figure 2.



Figure 2: Percentage of GDP spend on the healthcare of Saudi Arabia [26].

Step 2 - Model Area

Initiating a lean transformation often involves a strategic starting point known as the model area. This method revolves around commencing efforts in a particular zone, collaborating closely with team members, and gradually extending these enhancements across the entire organization. This step-by-step approach is eloquently described by Lean coach Danielle in 2013 [23]. William further supports this concept by highlighting the efficacy of directly applying methodologies and models. He underscores the problem-solving and standardized strategies intrinsic to the successful Toyota Production System Transition, which led to remarkable improvements. This transformation was achieved through the targeted application of the Kaizen method within a specific limited area [24]. My Clinic opted for a Lean management approach by singling out a designated model area. This area was chosen based on input from the customer service team, identifying the most congested waiting area, and focusing on the internal medicine specialty. For the scope of this research, the area of focus spans from the initial reception touchpoint to the conclusion of the consultation process.

Step 3 - Value Stream Mapping (Diagnostic Tools)

When an organization is in its current or initial state, conducting a diagnosis becomes crucial. Once the existing situation is identified, it's essential to visualize the desired condition to analyze the flow of value. In healthcare settings, Value Stream Mapping proves to be a suitable diagnostic tool. While not the only tool available for this purpose, Value Stream Mapping's visual nature makes it particularly effective in healthcare. This tool helps establish standardized language, ensuring sustainability in social and economic contexts [25-29]. Identifying and understanding internal processes, which can be time-consuming, is a significant aspect. Front-line employees, who possess insights into wasteful practices, play a pivotal role in this. This is in line with the first step, where information is gathered from these employees to shape the work processes as defined by team leaders. Subsequently, Value Stream Mapping is employed, chosen for its numerous benefits

that directly contribute to the satisfaction of both patients and employees. These benefits include:

1. Visualizing the interconnectedness of various parts, processes, people, and systems.
2. Revealing how inefficiency in one area can adversely affect other aspects.
3. Identifying non-value-added activities.

To reach an optimal process state devoid of waste, a specific protocol is followed. Defining the current state necessitates collecting time-stamped data from the system. This data includes the start and end times of each step. The support of the system team is enlisted to create time stamps, which are then exported for further analysis. These time stamps encompass various points such as patient arrival, check-in, Triage start/finish, and consultation start/end times. A visualization of the patient's journey is depicted in Figure 3, outlining the sequential steps that must operate smoothly to ensure an ideal system flow for the patient experience. Each patient is allocated 15 minutes for consultation, and doctor shifts are divided into 4-hour sessions. Within each session, doctors can handle 15 new consultations and 3 follow-up sessions, with 5 minutes allotted for each follow-up as per system requirements. A synchronized patient experience is pivotal for seamless operations. In case of delays at any step, the process chain can be disrupted, leading to an undesirable situation in the entire process. It's crucial that the total duration of all distributed time should not exceed 15 minutes. Based on qualified team experiences, any delay in a step can result in a breakdown of the entire process chain, highlighting the importance of maintaining a smooth progression. The collaborative efforts undertaken to implement value stream mapping within the My Clinic organization are detailed in Figure 4, encompassing the patient identification and treatment process. A study by Mozola on lean management involved interviews conducted both before and after a project with individuals engaged in hospital roles (management and middle-level managers). This investigation highlighted several types of waste, with the most significant being the use of paper documentation in the healthcare system.

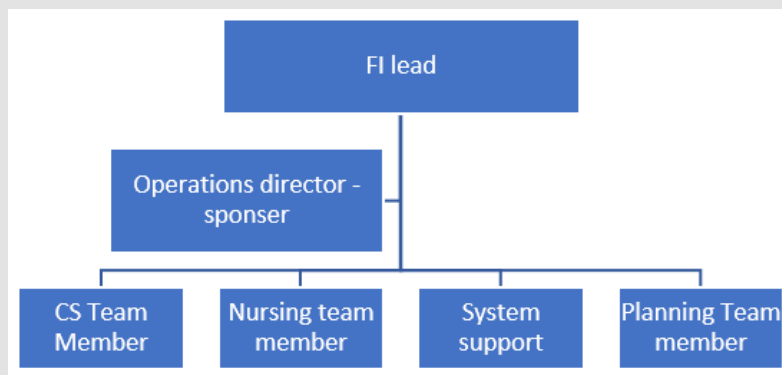


Figure 3: Selection of project team.

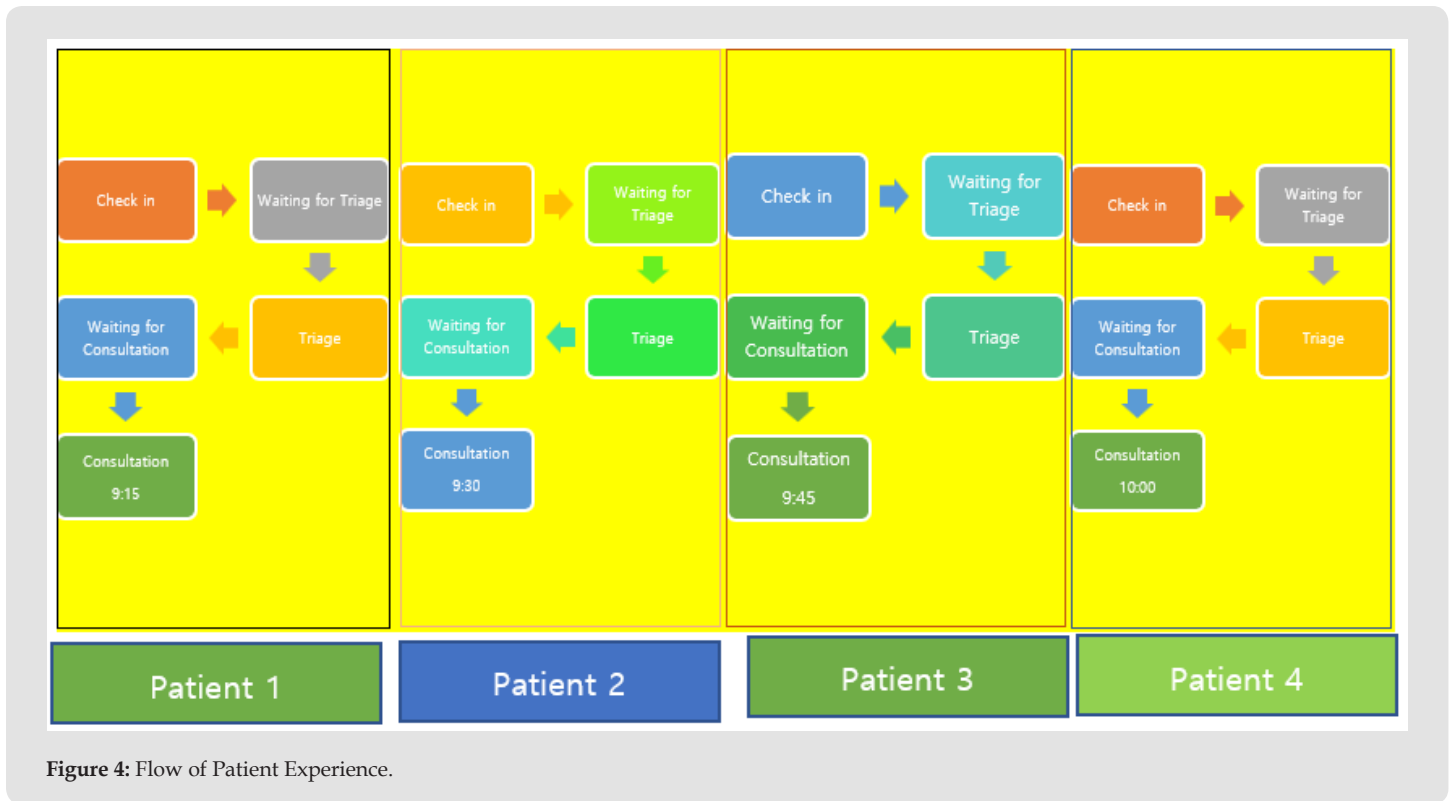


Figure 4: Flow of Patient Experience.

This wasteful practice was subsequently transformed into electronic records [26]. The process involves recognizing areas for optimization, enhancing efficiency, addressing issues, and improving the flow of value within discrete elements. These endeavors are then visualized through the Mapping tool employed in the subsequent phases of the project. This undertaking revolves around the fundamental activities carried out by managerial staff and medical professionals. It encompasses steps taken to admit patients to the hospital and facilitate their transfer to specific departments. Each stage is meticulously identified and monitored to identify instances of waste. Consequently, traditional processes that lack value are identified as non-value-added, while essential steps are deemed value-added. The execution of value stream mapping involves several key components. This includes pinpointing processes that do not contribute value (such as call center operations, booking confirmations, parking procedures, reception times, waiting for triage, and waiting for the doctor—these were recognized as sources of time wastage in this project). The next phase encompasses detailing and describing the current state, including the time required for each step. This meticulous analysis finalizes the characterization of the patient journey in its present state, capturing instances of non-value-added time. The time stamps associated with various stages of the patient’s journey are calculated using specific formulas within the value stream. These calculations help us assess each step’s duration in the journey. Here are the formulas employed for different stages:

1. Check-in Time: Calculated as check-in time minus arrival time.
2. Waiting for Triage: Calculated as check-in time minus triage start time.
3. Triage Time: Calculated as triage finish time minus triage start time.
4. Waiting before Consultation: Calculated as consultation start time minus triage finish time.
5. Consultation Time: Calculated as consultation finish time minus consultation start time.

To determine whether a patient adheres to their appointment timing, their arrival time is compared with the scheduled appointment time. Each step in the patient journey is carefully assessed to ascertain its necessity in terms of value addition. In accordance with established research, a process step is considered valuable if it contributes directly to the patient’s benefit. Consequently, each step in the value stream mapping process is evaluated to discern whether it’s value-added or non-value-added for the patient. Figure 4 offers a concise overview of the value stream mapping exercise applied to the patient journey through various handling process steps. This depiction effectively showcases the presence or absence of value addition and the time taken at each of these steps.

Result Analysis: The entire patient journey, which encompasses the consultation as well, spanned a duration of 71 minutes within the internal medicine department. You can observe the graphical depiction of the time taken at each step and the central focus area in Figures 5 & 6. Through computations involving checked-in time, waiting time for triage, triage time, transition from triage to consultation, and consultation time, the total journey time was calculated to be 76 minutes. The critical areas for improvement are emphasized in Figure 6. This figure underscores three primary aspects that require enhancement,

involving consultation time exceeding twenty minutes, an increase in consultation duration, and a notable 86% occurrence of extended waiting time for triage. Closer analysis of these improvement areas unveiled additional issues. These issues include patients mismanaging their appointment timings, healthcare providers not adhering to patient order, and the flow being disrupted due to unscheduled walk-in patients. Consequently, based on these findings, stakeholders endorsed an action plan aimed at achieving a well-defined standard for outpatient waiting times.

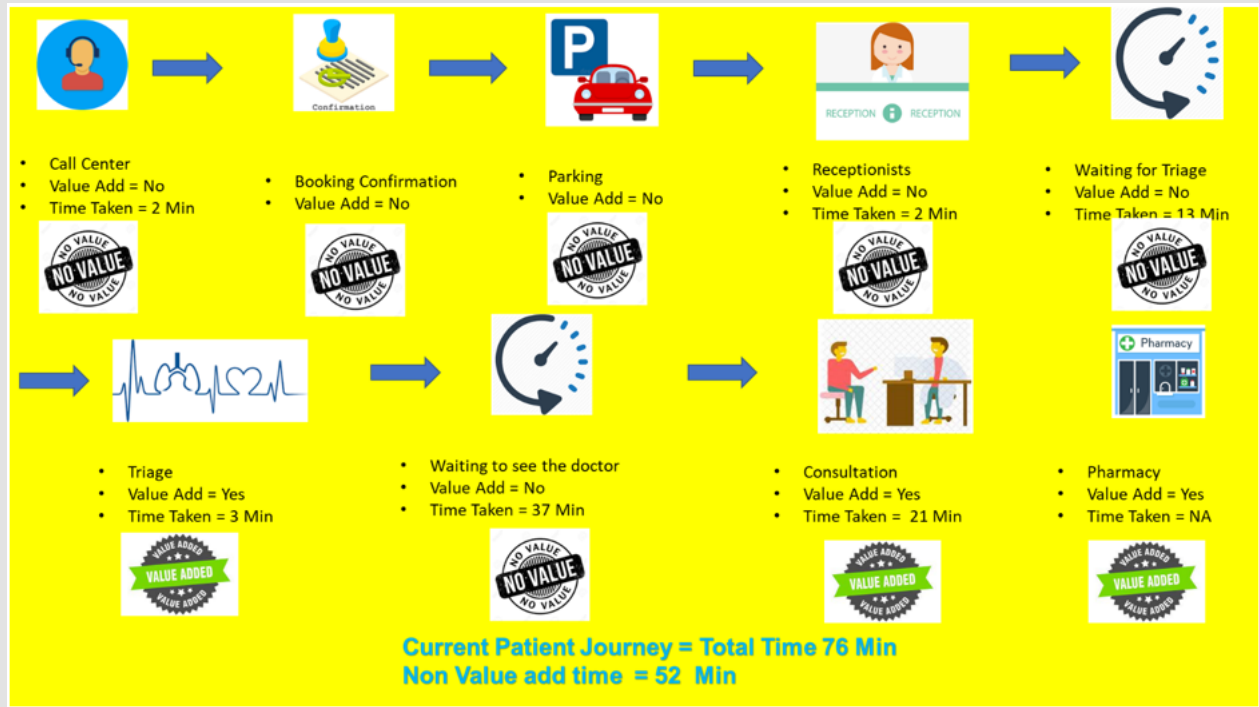


Figure 5: Value stream mapping for Patient Journey.

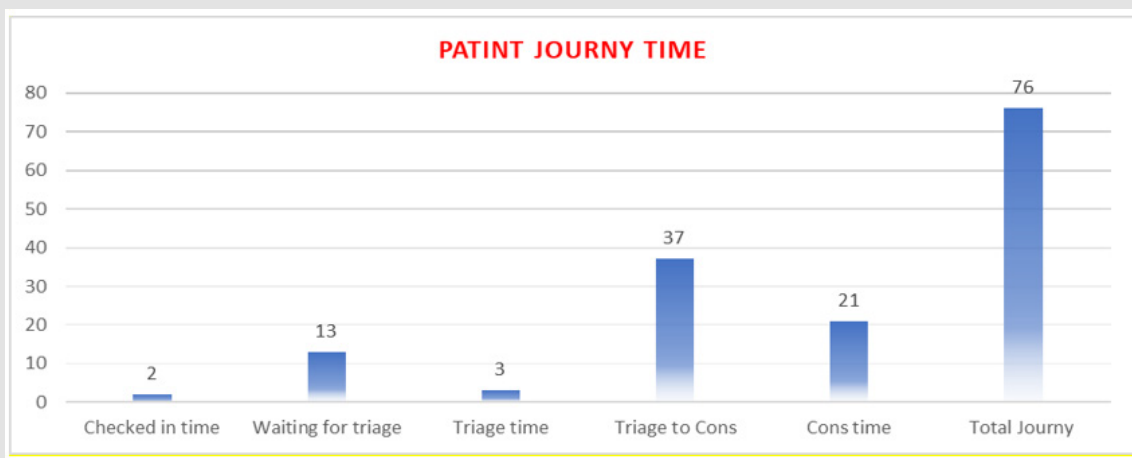


Figure 6: Patient journey time.

Step 4 Development of the Action Plan and Deployment

The series of consecutive tasks with clearly defined start and finish points fulfills a core objective of Lean deployment, as depicted in Figure 7. This illustration showcases the division of the deployment into multiple steps, each requiring a specific strategy to achieve well-defined goals. These steps are further broken down into sub-steps, meticulously formulated and organized by stakeholders. These sub-steps are designed to map the project delivery process, ensuring its coherence and alignment with established plans that promote continuous improvement. The formulation of an action plan encompasses four distinct phases: booking, check-in, vital sign as-

essment, and consultation. These phases involve interactions at four key touchpoints: the call center, reception, triage, and consultation areas. This strategic arrangement guarantees the accountability of each process. Furthermore, this approach highlights existing issues that warrant targeted actions to enhance the efficiency and effectiveness of the Lean methodology. This action plan also outlines the timeline for implementation throughout the entire year, recognizing that new information and challenges may emerge as the plan progresses. It is imperative that the plan includes the necessary resources for its successful execution. This could entail specialized training for executing actions and monitoring their progress, ensuring a high level of precision within the system.

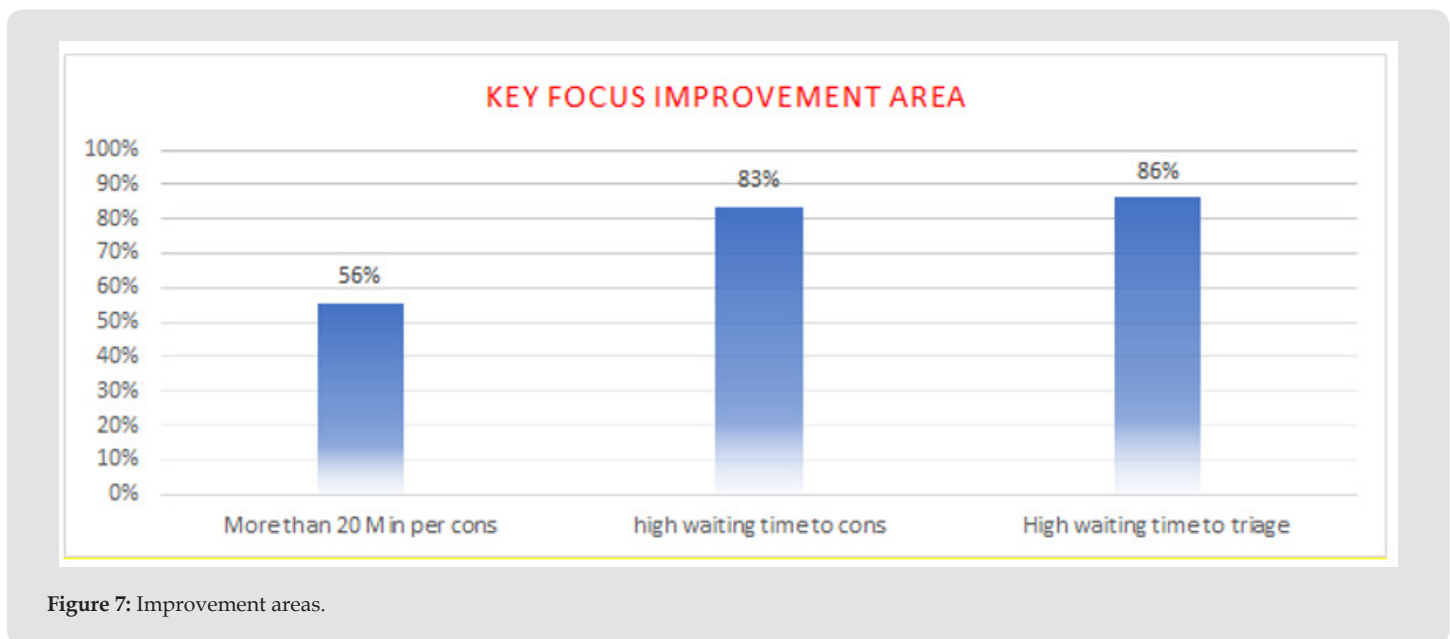


Figure 7: Improvement areas.

Step 5 - Monitoring of Results and Horizontal Replication

Daily accountability plays a pivotal role in the realm of lean management, ensuring that each step maintains a consistent pace. The act of ongoing monitoring equips the team to promptly address and tackle emerging issues, preventing them from evolving into more significant problems at later stages. This approach curbs variations in the process steps, ensures effective troubleshooting, and aids in standardizing operations. This project demonstrates the practice of continuous checks and balances. For instance, during appointment scheduling, the development of a call center script is crucial. This script facilitates patient coordination in line with their designated appointment times. A revamped check-in-system, along with redesigned screens, involves

the deployment of a unified screen at the receptionist counter. This consolidation streamlines information input, avoiding the need for separate screens. To enhance problem-solving reliability, the systems used by the nursing team and doctors underwent a redesign. This modification ensures that they receive accurate patient information, appointment times, check-in times, and patient types. This empowers them to prioritize tasks and adhere to authentic patient protocols. The execution of the action plan yielded tangible results, evidenced by a reduction in time spent at each touchpoint and the overall patient journey time, as portrayed in Figure 8. The total time a patient spent throughout their consultation journey was segmented into individual steps, from check-in time to consultation time Figures 9 & 10. Notably, the overall journey time was slashed from 76 minutes to 40 minutes.

Touch Point	Process step	Issue	Action	Status
Call center	Booking	Patient not following appointment time	Call center to affirm the appointment time with the patient at the end of conversation	Done
			confirmation SMS to be sent to the patients	Done
			patients should be made aware about check in time and consultation time	Done
			Appointment confirmation process to be developed	Done
			late arrival policy to be developed	Done
Reception	Check in	Taking long time for check in	reduction of multiple screen for the reception team	Done
			relayout of the information on the system reception using	Done
			System performance enhancement	Done
			Training of the reception staff	Done
Triage	Vital Sign	not constant time and flow	nursing team to have the visibility of the patients who are checked at reception	Done
			nursing team to have visibility of the time of the appointment and check in time	Done
			Nursing team to follow the check in time	Done
			late patients to be considered as walk in and should be adjusted whenever there is no show or at the end	Done
			Rule to be developed to ensure constant patient flow	Done
Consultation	Consultation	Taking long time for consultation	doctor to have the visibility of the patients who are checked in	Done
			doctor to have the visibility of the patients appointment time	Done
			doctor nurse to follow the appointment time	Done
			doctor nurse to follow the appointment type	Done

Figure 8: Deployment action plan.

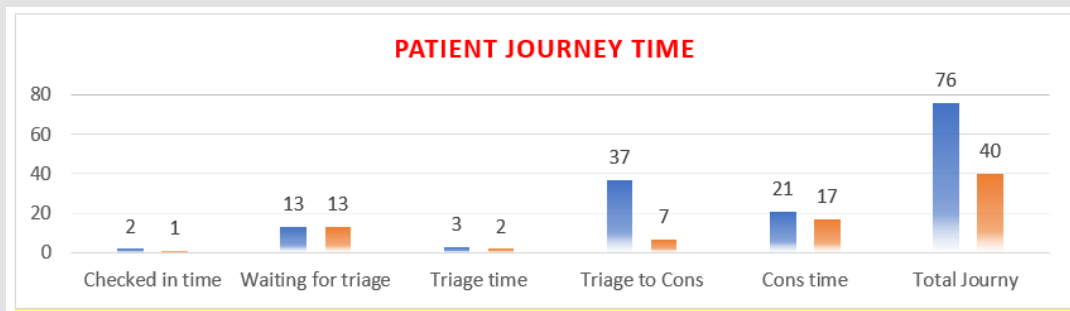


Figure 9: Total expedition time by the patient.

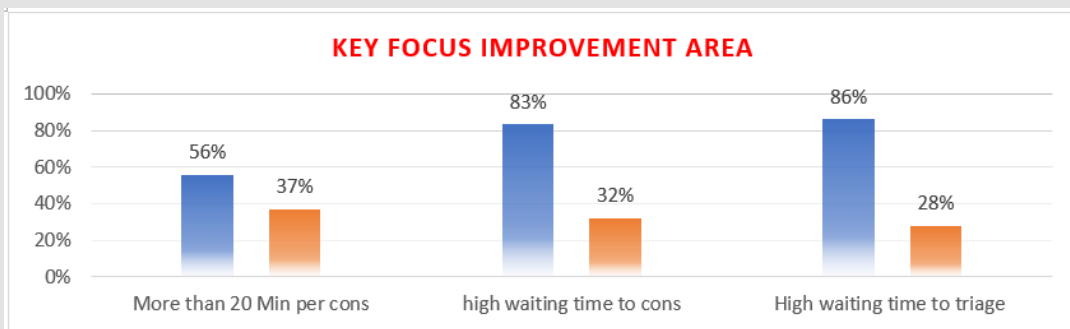


Figure 10: Improvement areas of the Patient Journey.

Future Strategy

The practical application of Lean Management within the global healthcare sector offers numerous advantages. These benefits encompass the elimination of wasteful practices, removal of non-value-added steps, reduction in errors, and an overall enhancement of patient and organizational satisfaction, thereby bolstering work efficiency. In the context of My Clinic in Saudi Arabia, Lean management is adopted to enhance patient contentment by minimizing long wait times and eliminating activities that don't contribute value. This assertion is supported by Cardoso, who validated the positive impact of Lean Management on healthcare processes by identifying wasteful elements within specific stages [27]. To address the identification of problematic areas and improve the transformative process of admitting and treating patients, the hospital utilized value-stream mapping. An interesting observation during the Lean management implementation was the shift in attitudes and behaviors of the leaders and planning team members.

Initially, there was apprehension regarding the elimination of non-value-added elements when deploying the action plan for selective value-added steps. However, following implementation, interviews revealed a change in attitude due to the reduction in triage time. A noteworthy aspect is the integration of Lean management tools with work psychology. This synergy not only motivates employees but also instills patient trust in the organization. A key requirement in value stream mapping is training, which must encompass all hospital trainers and caregivers across various steps and processes. Future project actions are outlined, indicating the overall project's progress. Additionally, further work has been documented for exploration in subsequent stages, aiming to optimize the patient journey. Examples of this include the implementation of a digital check-in process to eliminate the need for reception visits, automatic triage, digital queues for the pharmacy, laboratory, and radiology services.

Conclusion

In outpatient facilities and hospitals, various processes are integral for patients to obtain the services they require—such as consultations, laboratory tests, radiology services, or medications. The research conducted focuses on a specific area, yet the same methodology can be extended to optimize other processes within My Clinic's healthcare system. The central idea revolves around identifying instances of value addition at each phase of patient care and subsequently enhancing the patient's overall journey. This study's outcomes resulted in noteworthy improvements, including a reduction in waiting times, alleviation of congestion within waiting areas, and a decreased burden on the available facilities. Furthermore, it positively impacted the morale of the team involved in patient care. By adopting this approach, our project systematically seeks substantial enhancements within procedures, aiming to elevate both quality and efficiency. Effectively employing Lean management techniques encourages team leaders to proactively eliminate any form of value-add-

ed waste encompassing effort, expenses, and time. This is achieved through meticulous observation of each step in the business process and a subsequent review of those steps that fail to contribute value. In essence, this approach aids in pinpointing areas where significant procedural changes can be made to enhance the overall effectiveness and quality of patient care.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2023.52.008290

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