



RESEARCH ARTICLE

An evaluation of the impact of lean management practices on patients' satisfaction at a small healthcare facility

Tarannum^{1*}, Anuja Pandey², Arti Rauthan³

Abstract

The study aims to find the impact of lean management practices (LMP) on patients' satisfaction (PS) in a small healthcare facility (SHF). The selected sample size of the study is 229. The researcher has used primary data in this investigation. The researcher uses Interviews, questionnaires, and experiments to acquire primary data directly through primary sources in the study. The interview schedule and substance of the question are created with the study's goal in mind. ANOVA, SPSS tool, and Regression Analysis technique are used in the study. According to the research, lean adoption in healthcare enhances patient satisfaction at small medical facilities. People are central to every efficient lean healthcare system, and their goals and motivations drive change.

Keywords: Healthcare sector lean management, Lean adoption in healthcare, Lean management practices, Patient satisfaction, Small healthcare facilities.

Introduction

An Evaluation of the Effects of "LMP" on PS at a "SHF" has gained attention in the "healthcare and academic" communities. According to De Souza, L. B. (2009), the "United Kingdom National Health Service" (NHS) Digitalization Unit released the first paper on the possible application of lean management methods in healthcare in 2001. Since then, several healthcare companies worldwide have implemented lean programs for medical facilities in large and small healthcare sectors. Such several healthcare companies include "Virginia Mason Medical Center in

Seattle, Washington, in 2001; ThedaCare in Appleton, Wisconsin, in 2003; the Flinders Medical Centre in Bedford Park, Australia, in 2003; the Royal Bolton Hospital in Bolton, United Kingdom, in 2005, and the St. Boniface Hospital in Winnipeg, Canada, in 2008." Several research publications on "lean management practices in healthcare" have been released concurrently (De Souza, L. B. 2009).

The adoption of "lean management concepts in healthcare" has varied significantly, with differences in approach and scale needing increasing emphasis on how lean is interpreted and performed (Radnor and his associates 2012). As a result, the focus of the study is the influence of "lean healthcare practices on patient satisfaction at a small healthcare institution," as reported mostly. The sections defined "lean operations" and "lean healthcare" accordingly. The next section then goes through four execution topics. This section on specific "lean healthcare implementations," a concluding discussion, and research recommendations follow. The following objectives of the literature review are offered in this paper.

- The first is to help those invested in healthcare and considering adopting lean methods inside their companies make informed decisions.
- The second is to provide a precious overall view of research results to healthcare entities seeking to implement lean perspectives within their organizations to transform healthcare practices.

The research evaluation described in this paper is the result of a method that is sequentially carried out to accomplish these goals. The first phase was to discover a collection of

¹Health Care Management, Himgiri Zee University, P0-Sherpur, Chakrata Road, Dehradun, Uttarakhand, India.

²School of Pharmaceutical Sciences, Himgiri Zee University, P0-Sherpur, Chakrata Road, Dehradun, Uttarakhand, India.

³Department of Public Health, Himgiri Zee University, P0-Sherpur, Chakrata Road, Dehradun, Uttarakhand, India.

*Corresponding Author: Tarannum, Health Care Management, Himgiri Zee University, P0-Sherpur, Chakrata Road, Dehradun, Uttarakhand, India, E-Mail: nomanitarannum@gmail.com

How to cite this article: Tarannum, Pandey, A., Rauthan, A. (2023). An evaluation of the impact of lean management practices on patients' satisfaction at a small healthcare facility. *The Scientific Temper*, 14(3): 591-600.

Doi: 10.58414/SCIENTIFICTEMPER.2023.14.3.05

Source of support: Nil

Conflict of interest: None.

essential connections using a systematic search procedure. The second step was to evaluate selected references, and the third was to present and discuss the findings. The stages and accompanying procedures are broken out in the methodology part. The remaining parts of the manuscript are laid down in the following order. The underlying ideas are the primary topic of discussion in the second part. The methodology is the topic of the third and final part. The conclusion part is the topic of the fourth and final portion. In the end, the study ends with some recommendations for further research.

Lean management practices

“Lean” is a phrase that arose from Japanese manufacturing and defined a mindset that despises waste in any form and works tirelessly to eliminate flaws. A continual improvement is a lengthy approach to work that systematically way aims to accomplish small, “incremental changes” in processes to improve quality and efficiency. “Lean management is an approach to managing an organization” that leads to continuous improvement. Lean management is a way of running a business that is based on the idea of constant refinement.

The basic objective of “LMP” is to provide value for the client by optimizing the use of available resources and establishing a consistent workflow based on the requirements being posed by the client. It identifies each stage in a business’s operations and then strives to improve or remove those phrases that do not contribute to creating value. This reduces or eliminates any time, resource, or financial waste. LMPs make it easier to divide responsibility and ownership among employees, and continuous improvement makes certain that every worker contributes to the process of making improvements. The managerial technique functions as a guide to developing a successful and strong organization that is continually developing, detecting actual problems, and finding solutions to those problems. This type of organization is continuously moving forward.

Small healthcare facilities

Healthcare pollutants and their treatment are to blame for many, but not all, of the negative environmental effects and health concerns linked with medical facilities. A healthcare facility’s healthcare operations create waste, which is considered healthcare waste. This is household rubbish that has been labeled as “general waste.” Soiled dressings, bodily fluids (including blood), diagnostics samples, diapers, and laboratory cultures are only some of the hazardous or extremely hazardous items in the rest of the waste stream. These wastes can infect people or represent a chemical threat depending on their composition. Although radioactive materials are likewise hazardous healthcare waste, they are not addressed here since modest health institutions do not commonly create them. To learn more about medical waste, its hazards, and how it should be

managed, see the health - care waste guideline.

The lean implementation 5 S’

The 5’S method is a system that was designed to better the adoption of Lean techniques in the healthcare industry. This tool generates a workplace atmosphere that is not real and analyses, orders and develops independently. The purpose of this approach is to contribute to the development of an improved low-capacity facility in the healthcare industry. Figure 1. (Paulise, 2015)

- **Sort:** This simple idea seeks to eliminate waste in the workplace, including any unnecessary parts, furniture, documents, machines, and equipment. Any elements, furniture, documents, machinery, and equipment that impede staff movements must be removed to improve the efficiency of the workplace. Utilizing the red tagging strategy is an effective method for accomplishing this objective. The purpose of the moderation system is to affix a tag to the box. This tag will contain information on the package, including the item ID, the date, and the work section.
- **Set in order:** This idea pertains to the design of the workspace itself. Because of the likelihood of unnecessary mobility for personnel, the arrangement of staff workstations, machinery, and material handling might alter the process flow. Use the rationalized placement approach to reduce unnecessary movement in the workforce. This process requires first arranging the workspace on paper to eliminate any potential for unneeded movement.
- **Shine and inspect:** Clean and orderly workspaces are the goal of this idea. This is a simple idea to adhere to, as it needs no special techniques beyond routinely cleansing

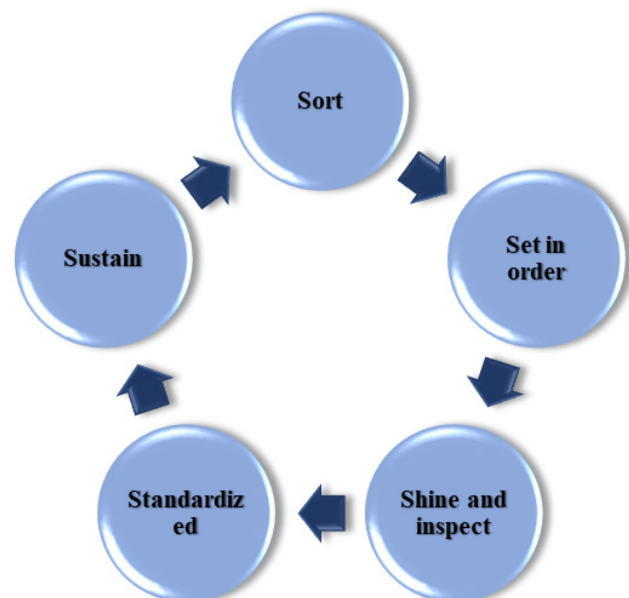


Figure 1: The Lean Implementation 5 S

the workplace.

- Standardized: It implies that the hospital should have a consistent approach for measuring the Five’s system and ensuring that it improves following the health sector’s regular procedure.
- Sustain: To “sustain” a system is to ensure that it performs as intended and constantly improves it to meet corporate goals.

The Purpose of Patient Satisfaction Measurement

Scholars generally agree that assessing patient satisfaction serves many purposes—research by Fitzpatrick *et al.*, (1983). The following are four suggestions: gaining a better knowledge of how patients feel about their health care, encouraging them to cooperate with their treatment, recognizing difficulties in healthcare coverage, and conducting an evaluation of medical services.

- A patient’s viewpoint can easily be explained as satisfaction work.
- Patients’ satisfaction may be viewed as a metric of the “process” of care in Donabedian’s paradigm for health care assessment (see below). It is possible to pinpoint specific problems and produce creative remedies. (Locker, D., 1999), (Dunt, D. 1978).
- Patients’ perceptions of the quality of treatment they get are a major focus of “patient satisfaction research.” Patients’ satisfaction, for example, was the sole focus of Bond and Thomas’ (Bond & Thomas, 1992) approach.

Lean in Healthcare

Lean healthcare is the application of “lean” principles and a continuous improvement methodology to the healthcare industry to reduce waste. Using lean concepts, all company employees, from physicians to operational and administrative personnel, are always striving to find and reduce waste. Additionally, they offered a variety of hospital configurations. Begin, the staff station absolutely must be positioned such that it is in close vicinity to the care facility in which the patients are housed. This will significantly reduce the number of walks the employees must perform throughout their shifts. This is because the medical staff is not authorized to walk within the hospital for lengthy lengths of time to deal with their patients since doing so is inefficient and a loss of effort. Increasing “customer” (patient and payer) happiness while maintaining a profitable business model is one area of concentration. Since a key aspect of lean principles is the removal of waste at every level of an organization, and since “lean thinking” necessitates the participation of every team member, it becomes firmly established in the culture, leading to innovation at every level. As a result of implementing lean healthcare, companies are also increasing the level of patient satisfaction they experience. This is because decisions and procedures are becoming increasingly patient-focused.

Healthcare “waste” is any action that does not benefit the patient. Waste is behaviors that add no value to the product. Healthcare systems today are designed to make physicians more efficient and reduce waste. This approach contradicts Lean manufacturing since it prioritizes factory workers above products. The Lean process starts with a step-by-step review of operations to find unnecessary expenditures, then develops new solutions to improve operations, efficiency, and cost. A doctor’s two most critical tasks are focusing on the patient and improving treatment and patient flow at a small medical facility to optimize patient pleasure. Switching to the healthcare industry means that all doctors now have two jobs: improving patient care and treating patients. Lean begins with flowcharting the system, which is quite beneficial. Figure 2. (Dickson, 2009)

Lean emphasizes the flow of processes in health care as the most critical factor. A lean assembly line guarantees that the flow procedure is continuous and without any backlogs at any stage in the process, even if it means providing some downtime for the individual. It may seem counterproductive to have parts move from one location to another, but the time saved by not having to store unneeded materials and the increased mobility of partly assembled vehicles more than makes up for the inconvenience. Waiting in a hospital bed for an extra supply of nutrition, and test results, or to be transferred to a hospital floor for admission requires a lot of additional time and effort.

Benefits of Lean Management in Healthcare

One of the main reasons for the widespread reluctance to implement lean in the healthcare business is the disillusioned concept that simplifying operations and cutting costs might result in a decline in the quality of treatment offered to patients. This is one of the main reasons the healthcare sector needs to be faster to embrace lean. On the other hand, the contrary is true. Even though several redesign initiatives have been attempted in the past with different and elusive “degrees of success,” numerous articles describe lean principles and redesigning as being “very successful.” Research-based on empirical data shows that the lean management system may effectively minimize patient length-of-stay, decrease emergency department wait times, reduce expenses, increase performance in safety and quality

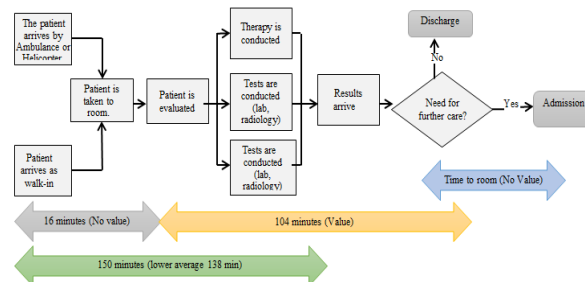


Figure 2: General process map (consolidated into eight process steps) used to general Emergency Department flow in the hospital.

of treatment, and improve physical work conditions for health workers.

Although lean has seen enormous success in the health sector, only about 13.3% of businesses operating in the healthcare industry in the United States and Great Britain have adopted lean thinking. This is in stark contrast to the widespread adoption of lean in the. A significant amount of work still needs to be done to incorporate lean concepts in the day-to-day provision of medical services.

The Lean Philosophy and Healthcare

“Lean thinking” and “lean production” may be used interchangeably in the healthcare industry since they are not so much concerned with production processes as they are with services. Patient care is the primary emphasis of organizations that have adopted lean management concepts. That’s why focusing on maximizing happiness among existing customers is so crucial.

Since the patient is engaged throughout the whole process and not only at the receiving end like a consumer, installing lean in the service sector varies significantly. It is linked with distinct criteria than applying it to production. Consequently, lean parts are now more subjective and not as easily quantified as they were in the manufacturing setting.

In the field of service, additional parts are occasionally subjected to more thorough inspections, including:

- Presence, accessibility, availability, tangibility
- Dependability
- Attention, helpfulness
- Reassurance (Does everything work as it should?)
- Empathy

Implementing lean principles in healthcare

The Steps to be taken are as follows

- Reduce Waiting/Idle Time-According to lean management principles; waste arises whenever patients or staff members are required to wait to stand by. Waiting areas packed with patients, meetings disrupted by late arrivals, waiting lists for appointments, and idle high-tech technology are all instances of waste reduction opportunities that healthcare firms may choose to take advantage of.
- Minimize Inventory: The total Cost of goods sold (COGS) include the expense of holding and tying up capital in inventories. Extra supplies, pharmaceuticals, technology, information, and pre-printed forms are all examples of inventory waste. Overstocking also increases the risk of loss due to theft or obsolescence. Training all staff to look for and develop innovative techniques to reduce excess inventory is possible.
- Root out flaws to boost care quality and financial compensation: damaged goods and services, such as medical blunders, system failure, and misdiagnoses, are clogging up the healthcare system. “Blood clots

and infections, medication errors, unnecessary readmissions, avoidable allergic reactions, and erroneous or incomplete medical records” are just a few examples of healthcare faults that waste time and money. Promote and penalize quality and decrease waste; lean ideas may be used as payers transition toward performance pay, positively impacting the bottom line and minimizing downtime.

- Patient, supply, and equipment movement is reduced through transportation, leading to better patient flow: Transport waste is a term used to describe the inefficient transportation of people, supplies, and medical devices in the healthcare business. Transporting patients and obtaining supplies slows down the flow of medical treatment, which increases the risk of injury to patients and healthcare providers. To improve patient flow and save time, lean thinking may be applied to the movement of patients and caregivers at a hospital.
- Reduce motion to prevent injury and gain efficiency: Patients are referred to as “waste motion” in the healthcare sector if they do not benefit from the movement. The extra walking necessary to access widely used supplies and equipment, or the greater walking required as a result of faulty building design, can all result in motion waste during patient transitions between beds, wheelchairs, and operations tables that are not comfortable.
- Reduce wasteful healthcare output to maximize available resources: Oversupply waste occurs when too much of anything is produced or created incorrectly. Providing medications for patients who have been discharged, re-testing patients, or prolonging hospital visits beyond medical need can decrease waste in healthcare.
- Remove waste from over-processing: Over-processing is a term used to describe when a patient’s care takes up too much time. For example, several forms filled out with the same information, and data entered into different systems are examples. You may change or eliminate everything in your therapy process that is not helping your patients get better results using a lean analysis. An employee’s job is made easier by applying lean healthcare principles to all of their work and eliminating pointless or repetitious processes.
- Understand how healthcare waste leads to untapped human potential: The Pinnacle of Waste in Healthcare Patients receive poorer care, and activities are hampered when any of the abovementioned factors occupy employees’ time. In healthcare, time spent on personnel education, patient interactions, or systemic changes is wasted. There are several benefits to implementing lean practices in the healthcare industry, including improved patient outcomes and lower costs. Figure 3. (Lawal, A. K., *et al.*, 2014)

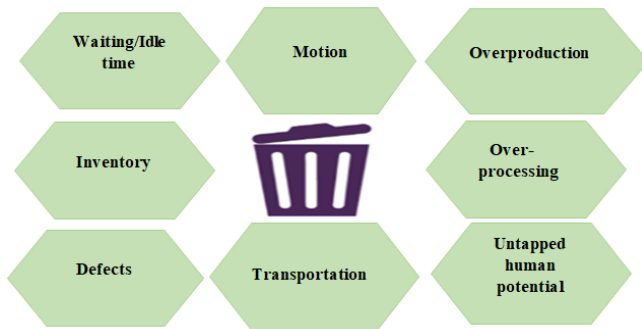


Figure 3: Eight Wastes of the Lean Healthcare

Review of Literature

Mahmoud, Z. *et al.*, (2021) observed that Lean's influence on front-line healthcare personnel has never been studied in depth until this analysis. More research is needed to determine the underlying causes of these results, as the study's findings show a spectrum of both good and unfavorable cable and mixed consequences.

Tlapa D. *et al.*, (2020) stated that "Lean healthcare" may improve ambulatory patient flow and that waiting times and lengths of stay (LOS) can be reduced as a result of LH. According to our results, aiming to identify and eliminate "non-value added" tasks have been proven to reduce the waiting period and length of stay in outpatient treatment. However, evidence on the influence of LH on patient and staff satisfaction and the ability to translate the resulting reductions into real-world savings is sparse.

Parkhi S. S. (2019) aimed this research to summarize the extent to which "lean implementation in healthcare" has been examined in the literature since its start a decade ago. Most of the scholarly publications reviewed for this work were written in the areas of operational planning and healthcare. Research on "lean healthcare implementation" is benefit-oriented and process-oriented, and it is unusual to find a comprehensive approach (interaction of lean implementation and clinical practice). A summary of findings relevant to healthcare entities engaged in "lean implementation" is provided in this publication, which points academics on the right path.

Hussain, M. *et al.*, (2016) found and ranked the public hospitals' top potential for lean improvement. Each of the seven wastes of lean healthcare has been broken down into three categories (sub-criteria) further to demonstrate their most typical forms (criteria). To accomplish this, AHP was used, whose power rests in the systematic conversion of qualitative judgment by senior healthcare staff into quantitative data ranking the chances for waste reduction in Abu Dhabi's public hospitals.

Kovacevic, M. *et al.*, (2016) examined that the lean concept originated in the health industry and has been effectively applied in health systems as a management technique and philosophy for over a decade. A substantial number of

examples of lean in "healthcare projects" failed to obtain any measurable outcomes and sustained advantages from it. However, the implementation of lean in healthcare might be far more challenging than in a conventional industrial context. The purpose of this article was to provide an overview of some of the most practical uses of lean concepts and tools in healthcare businesses.

Costa, L. B. M., and Godinho Filho, M. (2016) evaluated 107 lean healthcare papers to track their growth. Updated literature studies were categorized and analyzed. The previous study was analyzed, and the results were given. Lean healthcare's spread to Brazil and the Netherlands is one example. Lean healthcare is implemented at all hospitals, not just one. Some papers cover lean implementation in detail and employ uncommon methodologies. These papers show lean implementation hurdles and keys.

Hussain A. *et al.*, (2015) cited management's failure to recognize the issues that affect care quality and build a system that would effectively address them as a key source of stress. Work process parameters and human performance aspects were crucial to an organization's success. To reduce the prevalence of prescription mistakes in healthcare facilities, the authors suggested that businesses use the Toyota Production System (TPS) in conjunction with human performance improvement (HPI) strategies.

White M. *et al.*, (2013) explored the leadership and implementation implications of a deeper look into the correlation between the two models. The similarities between the Productive Ward: RTC program and other Lean-type improvement efforts were outlined. The prospects for leadership were discussed, along with the three major topics of the report: empowerment, leadership, and engagement. It also highlighted a fundamental distinction between the two programs, namely the emphasis placed on the initiative's socio-cultural impact reports. Lean and the original Toyota production method include the socio-cultural element as one of its foundational tenets, which was addressed and presented.

Nicholas, J. (2012) claimed that healthcare was the latest industry to adopt Lean production techniques developed by the industrial sector. The author demonstrated that these techniques were useful for reconfiguring healthcare facilities. When used holistically and with teams comprised mostly of doctors, the methodologies provided facility designs that were tailored to individual patients' requirements and caregivers' workflows, all while lowering operating costs. The author discussed how hospitals might benefit from incorporating lean practices into their building renovations.

Dahlgaard, J. J., *et al.*, (2011) mentioned healthcare organization assessment and improvement framework creation. The 4P Excellence Model, upon which the method is founded, includes both the more illogically tangible components (Processes and Product/Service Results) and the more intangible (Leadership, People Management, and Partnerships). Using the proposed framework, businesses

will be able to evaluate their current ILL-related company culture and pinpoint areas in need of improvement.

De Souza, L. B. (2009) analyzed the development of lean healthcare through time, detailing how the idea has been used and the many emerging patterns and approaches. The study provided a comprehensive literature review of lean healthcare applications, organizing more than 90 papers into a taxonomy that the authors proposed. Despite widespread consensus on lean healthcare’s promise, researchers and clinicians have found it difficult to assess the approach objectively.

Fine, B. A. *et al.*, (2009) discussed the findings of research conducted with five Canadian healthcare facilities that had just adopted Lean. More and more pressure is being placed on healthcare institutions in Canada to provide the same level of service while spending less money. A viable alternative may be found in Japanese industrial enterprises’ “Lean” processes, most notably Toyota. Lean’s methodical techniques to waste reduction have made their way to healthcare institutions in Canada with encouraging results.

Fillingham, D. (2007) demonstrated the efforts made by Bolton Hospitals NHS Trust to investigate the viability of using lean methodologies—also known as the Toyota Production System—in healthcare. One learns early on that adopting a lean mindset may save lives. Producing vehicles using the Toyota Production System has shown to be very fruitful. It cannot be blindly transplanted into a healthcare setting, but there were lessons to be learned, and the approach can be refined so that it has owned by the healthcare team and geared toward better patient care.

Materials and Methods

Scholars utilize a variety of approaches to examine “An Evaluation of the Impact of LPMs on Patients’ satisfaction at a SHF,” the reasons behind them, the study instruments, and the study plan must be recognizable to the researchers. The research will include a total of 229 participants. Researchers employ interviews, questionnaires, and experiments to collect primary data from primary sources in the study. In this inquiry, the researcher relied on first-hand information. The researcher obtained this information through in-depth discussions and a questionnaire. The study’s objectives guide the interview schedule’s design and the inquiry’s content. The study used the statistical package for the social science tool, the regression analysis method, and ANOVA statistical techniques.

Aims and Objectives

Obj-1. To study the Impact of LPMs on Patients’ satisfaction at a SHF.

Obj-2. To find out the problem/difficulties and the critical success factors that arise in implementing lean Management practices.

Obj-3. To find out the outcome of Patients’ satisfaction at a Small Healthcare Facility.

Hypothesis of the study

H1. The greater the extent to which a small healthcare institution employs Lean Management methods, the more content its patients will be.

Results/Observation

Table 1 is a model summary table. According to Table 1, the R-value is 0.810, indicating a high degree of correlation. The table shows how big an effect an independent variable has on a dependent variable.

Table 2 is the analysis of the variance table, where the study evaluates how well the regression equation fits the data (i.e., predicts the dependent variable). The table shows that the regression model provides reliable predictions of the dependent variable. This demonstrates that the regression model statistically predicts the outcome variable with a significance level of 0.000 or less than 0.05. (i.e., it is a good fit for the data).

Table 3 shows that Patients satisfaction benefits significantly from LMPs, as seen in the coefficients table in the model. This data is statistically significant as the significant value is 0.002, smaller than 0.5.

There are additional “B” values under “Unstandardized Coefficients” that we may utilize in the calculations.

To present the regression equation as:

$$\text{Patients' Satisfaction} = 3.149 + 0.867 * \text{Lean Management Practices}$$

Problem/Difficulties and the Critical Success Factors

Many issues have arisen during the hospital’s lean implementation process in the small healthcare sector that has hampered its performance. In order to acquire a more comprehensive picture of how things work at the

Table 1: Model summary

Model summary				
Model	R	R Square	Adjusted R square	Std. the error in the estimate
1	.810a	.655	.654	1.29042

a. Predictors: (Constant), Lean Management Practices

Table 2: ANOVA

ANOVAa					
Model	Sum of squares	df	Mean square	F	Sig.
1 Regression	718.676	1	718.676	431.590	.000b
Residual	377.996	227	1.665		
Total	1096.672	228			

a. Dependent Variable: Patients’ Satisfaction

b. Predictors: (Constant), Lean Management Practices

Table 3: Coefficients

Coefficients					
Model	B	Unstandardized coefficients		Standardized coefficients	
		Std. Error	Beta	t	Sig.
1 (Constant)	3.149	.986		3.194	.002
Lean management Practices	.867	.042	.810	20.775	.000

a. Dependent variable: Patients’ satisfaction

institution and to pinpoint any potential issues, interviews are conducted with a wide range of employees. These difficulties/problems and the critical success factor are defined therein in detailed.

- **Budget and Financial decisions:** Most of the financial choices are made by county council members. The lawmakers then monitor and verify that the choices are implemented properly. When it comes to making budgetary decisions, the hospital has extraordinarily little said. These judgments are taken by politicians, although there has been a shift in the previous several years, as the regional council's division manager was responsible for approving the "health sector's budget." The "hospital's management team" often adjusted this budget in their annual financial plan. There is a communication problem here between the decision-maker and the hospital administration. There has been no progress in the hospital's efforts to increase communication with the decision-making.
- **Wastes:** Organizations have seven waste categories. This study finds healthcare waste. Wastes usually raise costs. The institution schedules physicians in four-month intervals. Any doctor may seek time off. Last-minute itinerary changes cost the hospital money and time. If the doctor is working in the operating room, all planned procedures must be canceled and postponed. It is also a waste of time and money since the operating theater will be empty. A co-worker may fit into the doctor's timetable. Instead, they discovered additional rubbish in the hospital. The doctor thinks the timetable is faulty. The department manager meets every morning at 7:30 a.m. to discuss patient care. X-Ray department meetings follow. Doctors start work at 9:00 a.m., but too frequent coffee breaks delay them.
- **Organizational culture:** The implementation process relies heavily on the culture of the healthcare sector to be successful. An individual's personality should be defined and documented by Achanga *et al.*, (2006). It is critical to pick and stick with a strategy, whether it is long-term sustainability, iterative progress, or effective communication. Any hospital's lean implementation will be more effective if its employees are open and honest with one another. A multicultural health institution has no inherent flaws, although it might encounter issues from time to time.
- Another participant argues that people from other cultures respond in many ways because of the language problem as well. As a result, getting your point through to co-workers might be a challenge at times. There is a learning curve for foreign workers who have to adapt to the Swedish work culture and system. In addition, this difficulty varies among individuals based on characteristics such as age.

- **Patient Flow:** In the healthcare industry, "patient flow" refers to the sequence of events and activities that occur from the time a patient enters the hospital until they leave after treatment. Medical department patients (process flow) were interviewed to understand their management better. Patient flow (PF) in the medical ward for primary health care provider-advised patients is: The patient visits "Patient flow" (the medical clinic) and then (the nurse) to schedule treatment. Nurses greet patients at the clinic. After then, a specialist may order lab testing. After the expert diagnoses and explains the treatment plan, the patient goes home to follow it.
- Dennis (2002) suggests a standardized method for assessing the Five's system and ensuring it complies with corporate regulations. Healthcare's medical ward has another difficulty. Since the prior doctor's written report is gone, it's hard for another doctor to follow up on the patient's health progress. Lack of uniformity may affect lean implementation and patient satisfaction.
- This service refers to patients who are ready to go home but need home health care. The home healthcare service center helps elderly or disabled individuals. Home care services must come within seven days of the nurse notifying the facility.

The Outcome of Patients' Satisfaction at a Small Healthcare Facility

The lean concept identifies the value-added operations in the healthcare process flow. Nonvalue-added activities in the process flow (patient flow) exist in the healthcare industry, such as "patients waiting," "unneeded laboratory testing" in the "emergency department," and patients waiting for home care services at the hospital after getting essential treatment.

This is an issue that the hospital has to address head-on. Delays in scheduling patients for doctor's appointments make it easy to see when they are stuck in a waiting room. The patient may have to wait up to three months to see a professional. Some patients may be at risk in this circumstance, which involves dealing with human lives. Patients' wait times can be reduced in the future if the hospital and outpatient clinic staff operate more efficiently and increase their working hours. Another waste that has been found in the "Health sector organization" is over-processing. More time is devoted to documentation rather than patient care; nurses are required to fill out paperwork many times a day with data that may or may not be relevant to patient care. So that no time is wasted, the hospital's management team must determine exactly what information must be documented.

Stocking unnecessary raw materials, components, or completed products was determined to be a kind of stock

waste. They cannot investigate the inventory circumstances because of time constraints, but the waste can be connected with other comparable situations. It is wasteful to keep people in the hospital who may benefit from home health care after they have finished their inpatient treatment (beds in this case). The hospital's administration is devising the newest strategy to address this issue.

When a health sector that has been using the lean methodology for 10 years still has these kinds of waste, it is time to reconsider the lean approach. Managers and staff at the hospital must do a better job of identifying problems and implementing quick fixes. Process mapping and "Value stream mapping," a hospital context called Patient Flow, are some of the "lean implementation tools" and approaches management uses.

As previously stated, the Patient Flow serves as a procedural map for any hospital. Many non-value-added operations that might be removed or reduced to produce an efficient process were discovered in the healthcare sector. It is possible to cut wait times by streamlining the referral process from primary care centers to the medical clinic. Patients at primary healthcare facilities should be sent to specialists more efficiently if this approach is to be more successful.

Another lean approach, known as process standardization, is standardized treatment processes. This is a vital issue to consider for the "lean implementation process" to be successful. Because all doctors in the medical field are required to adhere to the same set of protocols, the process has become more standardized. The use of a standard method helps speed up the task and ensure that the work is done properly from the start.

When individuals are ready to be released but cannot because they require additional home care assistance, the issue of hospital discharge with extra assistance emerges. Patients with disabilities or advanced age may require municipally offered home care services. One week is all a patient's home care center has to care for him or her once they receive word from the nurse.

It was not easy for the health institution to confront or address its problems when implementing lean tactics. Even 10 years later, there are still significant issues with the hospital's organizational structure. Before this, the magnitude and complexity of the process were mentioned as one of these difficulties. A procedure that entails interacting with patients and a variety of departments and therapies might be difficult to observe changes at the end-to-end level. According to several academics, this type of procedure is difficult to enhance in a brief period. To reap the benefit of "Lean management adoption," several elements must be followed to the letter in each given firm. The organization's capacity to enhance patient satisfaction from lean management. Economic and financial issues plague the healthcare sector. The need for hospital administrators to get the yearly resource allocations they

want is the root of this issue. An excellent strategy is to strengthen the interaction among hospital administrators and county council finance staff to make better decisions about budget allocation. However, this decision is tough to influence because of the different responsibilities. Legislators make these decisions with various interests, aims, and rewards. As a result, the management needs more power to sway the final decision.

Discussion

According to the research conducted by Kovacevic *et al.*, (2016), the lean concept has been successfully implemented in health systems as a management style and philosophy for over a decade. Numerous "healthcare initiatives" that used lean methodology fell short of their goals and saw no long-term benefits. However, it may be far more difficult to adopt lean in healthcare than it is in a more traditional industrial setting. Using numbers, Costa & Godinho Filho (2016) analyzed the efficiency of the current healthcare system and suggested future research directions. Parkhi (2019) provided a summary of the research done on "lean implementation in healthcare" from its inception a decade ago. Studies of "lean healthcare implementation" often focus on either benefits or processes, and a holistic perspective is rare (interaction of lean implementation and clinical practice). According to Tlapa *et al.*, (2020), "Lean healthcare" (LH) has the potential to enhance the flow of ambulatory patients and decrease wait times and LOS. Finding and eliminating "non-value added" activities has been shown to shorten outpatient treatment wait times and hospital stays. Despite what Mahmoud *et al.*, (2021) have noted, this investigation is the first to examine Lean's effect on front-line healthcare workers.

On the other hand, the current study hypothesis analyses if Lean Management Practices have an impact on patients' satisfaction. The dependent variable, patient satisfaction, was regressed on the predictive variable of Lean Management Practices to test the hypothesis. $F = 431.590$, $p < 0.05$, demonstrating that Lean Management Practices have an important influence in increasing Patients' Satisfaction ($b = 0.810$ and $p < 0.005$). These data indicate the positive influence of Lean Management Practices on Patients' Satisfaction. Furthermore, the $R^2 = 0.655$ implies that the model explains 65.5% of the variation in Patients' Satisfaction. According to the findings, Lean Management Practices enhance Patients' Satisfaction by removing unnecessary procedures and interruptions, an alternate hypothesis is accepted.

Conclusion and Recommendation

The goal of lean management strategies is to assist firms in minimizing waste from their system & eliminating non-productive operations so that the value-added activities may function smoothly. This idea has been around for a

long time in both the industrial and service industries. However, the notion has not been effectively applied in the service industry to realize the optimum benefits. Due to the differences in the working processes, it has been shown in previous articles that implementing lean is simpler in the industrial sector than in the service sector.

The conclusion of the interviews conducted at the hospital is presented in this study. When the hospital began using lean management practices. Even Nevertheless, the hospital continues to encounter difficulties. That is why they set out to discover whether or not they could apply the philosophy created for the automotive sector to our healthcare system. If this is the case, what are the potential obstacles and key success criteria in implementing lean? This thesis indicates that companies should not assume the same issues or obstacles as in the industrial sector when transferring automotive production management principles into the "Health care sector" owing to the complicated conditions of the process. With lean in place for 10 years, doing this research at a healthcare facility made it easy to see how the idea might be used in the healthcare industry.

The interviewees mentioned almost identical issues and crucial elements, indicating that the hospital staff are actively participating in the procedure and are fully aware of the difficulties. Efforts by the hospital's administration to engage more closely with their workforce and incorporate some of the ideas put up by their workers are needed. The "management team" must be willing to put in the effort to find and execute solutions. To alleviate the hospital's financial woes, the manager must eliminate wasteful expenditures such as doctor scheduling, build new hospital software to speed up paperwork, and reduce the number of documents physicians and nurses must complete.

Limitations

- The study's findings have limited applicability beyond the specific small healthcare facility under investigation, which could limit the generalizability of the results to larger healthcare organizations or facilities in different contexts.
- The study was constrained by a relatively small sample size of 229, affecting the statistical power and precision of the findings. This limitation restricted the ability to capture the full range of patient experiences and perceptions.
- The reliance on self-reported data from patients could be subject to recall bias and social desirability bias. Various factors can influence patients' satisfaction levels and perceptions and may not fully align with objective measurements or observations.

Recommendation

The success of "lean healthcare systems" relies heavily on strong leadership throughout the deployment process so that a better LMP enhances patients' satisfaction. As a

result, it is critical to study the involvement of leadership (administrators and physicians) in launching and maintaining implementation. Healthcare organizations with creative CEOs who were committed to lean management practices.

The application of "LMP in healthcare for patient satisfaction" has to be studied further. This would include being aware of extent to which it is possible to develop the necessary competencies for running a lean healthcare system. To begin applying lean methods, one must first figure out how to develop the necessary competencies. To effectively execute a modern operating model, point out that operational capabilities must be developed and utilized. Studying how original institutions like "Virginia Mason Medical Center, ThedaCare, and St. Boniface Hospital" have implemented this might be of use. These four characteristics are defined as lean, actions completed, organizational preparedness, and long-term process development sustainability (Radnor *et al.*, 2012).

There is a lot of focus on the application of lean technology and techniques, but little attention is paid to the broader culture of a firm. As a healthcare sector, they need more study into how to cultivate an environment of constant improvement. "According to Joosten *et al.*, (2009), there is a dearth of socio-cultural research examining how the impact of lean healthcare practices interacts with patient satisfaction."

Additionally, lean adoption in healthcare is said to have several advantages for patient satisfaction at small medical facilities, according to the research. People are at the heart of any effective lean healthcare system, and their objectives and motivations are significant in any ongoing improvement efforts.

Acknowledgements and Conflict Of Interest

Acknowledgment

At the opening of my research paper, I express my profound gratitude to everyone who has assisted me in this quest. We would like to express my heartfelt gratitude to our research supervisor 'Dr. Anuja Pandey and Dr. Aarti Rauthan' for providing us with the opportunity to create this research paper on the topic 'An Evaluation of the Impact of Lean Management Practices on Patients' Satisfaction at a Small Healthcare Facility', which allowed me to conduct an extensive study and learn about many new things.

Competing Interests

The author declares that they have no competing interests.

Funding

There has been no significant financial support for this work.

References

- Alwan, F. (2013). Lean implementation problems in the healthcare system: A Case study conducted at Torsby Hospital.
- Cookson, D., Read, C., Mukherjee, P., & Cooke, M. (2011). Improving

- the quality of Emergency Department care by removing waste using Lean Value Stream mapping. *International Journal of Clinical Leadership*, 17(1).
- Costa, L. B. M., & Godinho Filho, M. (2016). Lean healthcare: review, classification and analysis of literature. *Production Planning & Control*, 27(10), 823-836.
- Dahlgaard, J. J., Pettersen, J., & Dahlgaard-Park, S. M. (2011). Quality and lean health care: A system for assessing and improving the health of healthcare organisations. *Total Quality Management & Business Excellence*, 22(6), 673-689.
- De Souza, L. B. (2009). Trends and approaches in lean healthcare. *Leadership in health services*, 22(2), 121-139.
- Dennis, P. (2017). *Lean production simplified: a plain-language guide to the world's most powerful production system*. Crc press.
- Dickson, E. W., Singh, S., Cheung, D. S., Wyatt, C. C., & Nugent, A. S. (2009). Application of lean manufacturing techniques in the emergency department. *The Journal of emergency medicine*, 37(2), 177-182.
- Fillingham, D. (2007). Can lean save lives?. *Leadership in health services*, 20(4), 231-241.
- Fine, B. A., Golden, B., Hannam, R., & Morra, D. (2009). *Leading lean: a Canadian healthcare leader's guide*. *Healthcare Quarterly*, 12(3), 32-41.
- Fitzpatrick, R. M., Hopkins, A. P., & Harvard-Watts, O. (1983). Social dimensions of healing: a longitudinal study of outcomes of medical management of headaches. *Social science & medicine*, 17(8), 501-510.
- Grove, A. L., Meredith, J. O., Macintyre, M., Angelis, J., & Neailey, K. (2010). Lean implementation in primary care health visiting services in National Health Service UK. *Quality and Safety in Health Care*, 19(5), e43-e43.
- Hussain, A., Stewart, L. M., Rivers, P. A., & Munchus, G. (2015). Managerial process improvement: a lean approach to eliminating medication delivery. *International Journal of Health Care Quality Assurance*, 28(1), 55-63.
- Hussain, M., Malik, M., & Al Neyadi, H. S. (2016). AHP framework to assist lean deployment in Abu Dhabi public healthcare delivery system. *Business Process Management Journal*, 22(3), 546-565.
- Jimmerson, C., Weber, D., & Sobek II, D. K. (2005). Reducing waste and errors: piloting lean principles at Intermountain Healthcare. *The Joint Commission Journal on Quality and Patient Safety*, 31(5), 249-257.
- Joosten, T., Bongers, I., & Janssen, R. (2009). Application of lean thinking to health care: issues and observations. *International journal for quality in health care*, 21(5), 341-347.
- Kovacevic, M., Jovicic, M., Djapan, M., & Zivanovic-Macuzic, I. (2016). Lean thinking in healthcare: Review of implementation results. *International Journal for Quality Research*, 10(1).
- Lawal, A. K., Rotter, T., Kinsman, L., Sari, N., Harrison, L., Jeffery, C., ... & Flynn, R. (2014). Lean management in health care: definition, concepts, methodology and effects reported (systematic review protocol). *Systematic reviews*, 3(1), 1-6.
- Locker, D., & Dunt, D. (1978). Theoretical and methodological issues in sociological studies of consumer satisfaction with medical care. *Social Science & Medicine. Part A: Medical Psychology & Medical Sociology*, 12, 283-292.
- Mahmoud, Z., Angelé-Halgand, N., Churruca, K., Ellis, L. A., & Braithwaite, J. (2021). The impact of lean management on frontline healthcare professionals: a scoping review of the literature. *BMC Health Services Research*, 21(1), 1-11.
- Nicholas, J. (2012). An integrated lean-methods approach to hospital facilities redesign. *Hospital topics*, 90(2), 47-55.
- Parkhi, S. S. (2019). Lean management practices in healthcare sector: a literature review. *Benchmarking: An International Journal*, 26(4), 1275-1289.
- Paulise, L. (2015). What is 5S Methodology: 5s Implementation Plan. *Simplilearn.com*. Retrieved July 29, 2023, from <https://www.simplilearn.com/implementing-5s-methodology-to-achieve-workplace-efficiency-article>.
- Radnor, Z. J., Holweg, M., & Waring, J. (2012). Lean in healthcare: the unfulfilled promise?. *Social science & medicine*, 74(3), 364-371.
- Soriano-Meier, H., Forrester, P. L., Markose, S., & Garza-Reyes, J. A. (2011). The role of the physical layout in the implementation of lean management initiatives. *International Journal of Lean Six Sigma*, 2(3), 254-269.
- Tlapa, D., Zepeda-Lugo, C. A., Tortorella, G. L., Baez-Lopez, Y. A., Limon-Romero, J., Alvarado-Iniesta, A., & Rodriguez-Borbon, M. I. (2020). Effects of lean healthcare on patient flow: a systematic review. *Value in Health*, 23(2), 260-273.
- White, M., Wells, J., & Butterworth, T. (2013). Leadership, a key element of quality improvement in healthcare. Results from a literature review of "lean healthcare" and the productive Ward: releasing time to care initiative. *The International Journal of Leadership in Public Services*, 9(3/4), 90-108.