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EFFICIENCY IN HEALTHCARE ORGANIZATIONS WITH THE POWER OF LEAN THINKING

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INTRODUCTION

In contemporary management, the *Lean Thinking* (*LT*) philosophy is not a new strategic thought, it is a term used in industry to improve production capacity and omit waste in the process, but it has gained relevance in the last two decades with regard to its focus on health organizations, namely, so that each service faces the improvement of the performance of care provision and the efficiency of its processes.

LT as a quality approach is gradually being introduced in hospitals around the world, but evidence of its impact on the efficiency of healthcare organizations is scarce. LT initiatives are social, complex and context-dependent, which requires a shift from cause-effect to conditional attributions for a better understanding of how *LT* works (Andersen, H. & Røvik, K., 2015). Explicit in the systematic approach to quality improvement through *LT* thinking is the importance of identifying and eliminating non-value-adding activities in work processes, especially the elimination of waste through the identification of non--value-adding activities, such as useless steps that add no value to the customer in terms of care (e.g. waiting times).

The main focus according to this line of thinking translates into zero defects, no delays, quality improvement and "*just in time*" (Andersen, H. & Røvik, K., 2015), which makes *LT* especially suitable for healthcare organizations. However, in practice, interventions are characterized by high variance, i.e. great heterogeneity of the context and the intervention itself, from the content to its application and the results of *LT* (Andersen, H. & Røvik, K., 2015).

In *LT* management, the customer has a very important place and it is believed that in order to improve the system, considering the customer and increasing value, you have to forget about competitors and focus on yourself (Andersen, H. & Røvik, K. 2015). Within this framework, it becomes imperative to recognize waste and eliminate it, as a perfectionist approach to the cycle of continuous improvement. The importance of the organization as a whole must continually move confidently towards operational excellence, replacing the priority of health management.

The implementation of *LT* management in healthcare organizations promotes a major change in the provision of services and, of course, change requires management responsibility, otherwise various organizational and structural problems may arise in its implementation or the motivation to implement it will be lost (Al-Hakim, A. & Sevdalis, N., 2021). On this premise, strong leadership is needed to create motivation, drive change and lead continuous improvement projects.

The elementary principles of *LT* are to add value for the customer, and thus the entire process that leads to this value must be "anchored" (Andersen, H. & Røvik, K. 2015), i.e. the entire process that leads to this value must be optimized and continuously improved. This improvement should not be focused on specific areas, but on the overall optimization of quality, costs, production time, customer satisfaction, safety and worker satisfaction (Andersen, H. & Røvik, K. 2015; Bucci, S. *et al.*, 2016; Souza, D. *et al.*, 2021).

OBJECTIVES

GENERAL OBJECTIVE

Analyze the impact of the *LT* philosophy on the efficiency of healthcare organizations.

SPECIFIC OBJECTIVES

Identify the benefit of *LT* in improving customer service (customer satisfaction and safety);

Exploit the advantage of *LT in* the use of resources (reducing waste and increasing productivity).

REVIEW METHOD

This *Scoping Review* followed the methodology recommended by the *Joanna Briggs Institute (JBI; Peters et* al., 2020), and in accordance with the *Preferred Reporting Items for Systematic Reviews - Scoping Reviews* (PRISMA-ScR). Eligibility criteria were defined based on population, intervention, control and outcome (PICO), according to the methodology proposed by the JBI.

SEARCH STRATEGY AND IDENTIFICATION OF STUDIES

The research followed the following stages: selection of the theme; establishment of criteria for inclusion and exclusion of articles (sample selection); definition of information to be extracted from the selected articles, analysis of the results, discussion and presentation of the results.

In the initial phase, in order to identify the keywords most frequently used in titles and abstracts, as well as the indexing terms used in the literature, a restricted search was carried out in the MEDLINE (via PubMed) and SciELO databases.

The question that guided the research was formulated: "What is the impact of *Lean Thinking* on the efficiency of healthcare organizations?" after selecting the topic. The research took place during the month of July 2024, using the following databases: MEDLINE (via PubMed) and SciELO.

The descriptors were: "efficiency" and "healthcare organizations" and "*Lean Thinking*".

The Boolean operators were: Efficiency [All Fields] AND ("healthcare organizations"[MeSH Terms] OR " Efficiency"[All Fields] OR "healthcare organizations "[All Fields]) AND *Lean Thinking* [All Fields] AND "Efficiency" [All Fields] AND (("healthcare organizations "[All Fields] AND "*Lean Thinking* "[All Fields] AND " Efficiency"[All Fields]) OR " *Lean Thinking* "[All Fields]).

Table 1 shows the research carried out with the respective descriptors.

Database	Strategy
MEDLINE (via PubMed)	Efficiency [All Fields] AND ("healthcare organizations"[MeSH Terms] OR " Efficiency"[All Fields] OR "healthcare organizations "[All Fields]) AND *Lean Thinking* [All Fields] AND "Efficiency" [All Fields] AND (("healthcare organizations "[All Fields] AND "*Lean Thinking* "[All Fields] AND " Efficiency"[All Fields]) OR " *Lean Thinking* "[All Fields]).
SciELO	The impact of *Lean Thinking* on the efficiency of healthcare organizations.

Table 1 - MEDLINE (via PubMed) and SciELO search carried out on 07/07/2024 for the *scoping review of* "The impact of *Lean Thinking* on the efficiency of healthcare organizations"

Source: Created by the author.

In the next step, the natural terms and keywords listed were combined to form a search expression, which was adapted to the specifics of each database or repository.

Finally, in the third stage, in order to identify potential studies to be included in the integrative review, the bibliographical references of all the articles and studies selected were analyzed in an attempt to identify other studies that could be included in this review.

The results of the search in the different databases were exported to a *Mendeley Desktop* reference manager application (version 1.19.4), through which duplicate records were identified and removed. The results grouped in the library were then shared with the other reviewers to select the studies. Screening was carried out by analyzing the title and abstract in order to verify the eligibility of the documents. This process was carried out by the independent JBI reviewer, with the help of another reviewer to clarify any differences that might exist in the article selection process. The documents that met the eligibility criteria outlined went on to the next stage, full reading, i.e. analysis of the full text, and application of the selection criteria defined in the

protocol (based on the mnemonic coinciding with the review question). The results obtained from the screening process were presented in accordance with the recommendations of the PRISMA *Extension for Scoping Reviews*.

DATA EXTRACTION

Data extraction was carried out using tools developed by the reviewers for this review, which may be altered after analyzing the data obtained from the selected articles - see Table 2.

The selection criteria were:

- Open access articles, in full (with abstracts and full texts);
- Articles written in Portuguese or English;
- Articles from January 2019 to June 2024;
- Articles aimed at health professionals;
- Articles containing the above-mentioned descriptors in their titles or abstracts.

Exclusion criteria were:

- Articles aimed at other professional groups;
- Articles with only a conceptual and narrative description of *LT;*
- Systematic literature reviews*;*
- Articles that, after reading the text, did not mention theoretical concepts about the impact of *LT* on the efficiency of healthcare organizations.

Also excluded during the search were: all duplicate production, editorials and letters to the editor, as well as epidemiological bulletins. The list of excluded studies and reasons for exclusion were grouped by "reason for exclusion" in a digital folder.

Regarding the origin of the articles, of the nine obtained, one was from Saudi Arabia and one from South Africa;

one from Canada; one from Denmark; two from the United States of America; two from Italy and one from Switzerland.

Figure 1 shows the flowchart of the research carried out, adapted by Prisma.

RESULTS

Table 2 summarizes the analysis of the selected articles, including author, year of publication, type of study, general objective, sample and participants and main results.

Considering the JBI references for critical evaluation of the quality of studies, the *checklists* were used for the different types of study, and it was found that the ratio between the number of items and positive compliance was greater than 75% for all the articles selected.

DISCUSSION

Historically, LT thinking emerged more than six decades ago as a promising approach to reducing waste and improving efficiency in Japanese industry, often known as the *Toyota* Production System. LT looks at "value" from the customer's perspective and aims to reduce waste and non-value adding activities in order to create an efficient, high quality system that improves operational performance and ultimately organizational performance, as well as competitive advantage for the organization applying it.

Gradually, over the last two decades, the LT philosophy has been introduced into the field of hospital health, more precisely in healthcare. Current literature shows potential benefits of LT applications in healthcare, however, these are often considered inconsistent. In this sector, it is argued that the customer or user of the health service should define, in particular, what creates value. In this context, LT approaches have been criticized as having unclear applicability and usefulness for the health sector in general.

To date, LT has been applied in service organizations, with literature showing that while many organizations can implement LT, others fail to do so. Its applicability to and effectiveness in healthcare, especially hospital care, re-

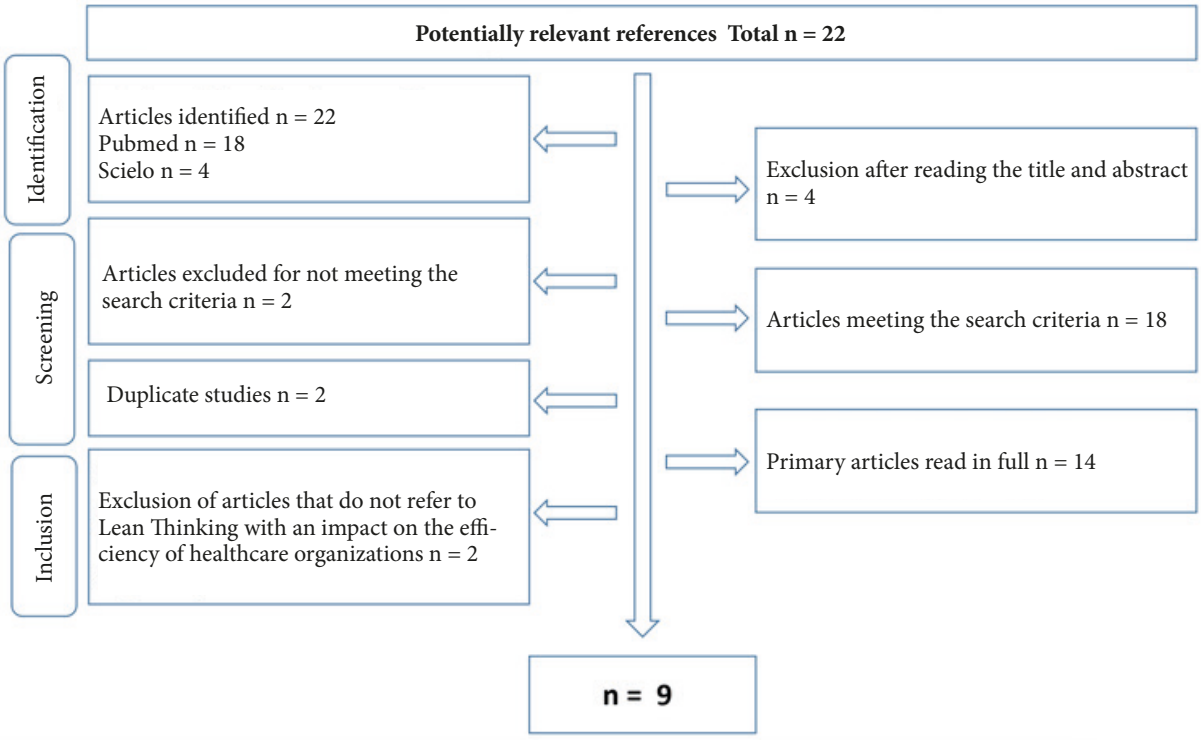

Figure 1 - Article selection flowchart (adapted from PRISMA).

Source: Adapted by Prisma from *Moher* et al. (2015).

Author(s) Publication Year of study	Type of Study Origin of the study	Title Publication	General Objective Population	Results Main
Logandran Naidoo & Ziska Fields Human Resources for Health - BMC **2019**	Study observes and descriptive with Quantitative Methods tives South Africa (*KwaZulu-Natal*)	***Critical success factors for the successful initiation of Lean in public hospitals in KwaZulu-Natal: a factor analysis and structural equation modelling study***	Identify the key variables for the successful start of *Lean* and then conduct the factor analysis and structural equation modeling (SEM) on these variables, leading to the identification of critical success factors (CSFs) for *Lean* startups. **Population:** 500 senior managers in 73 public hospitals in KwaZulu-Natal	None of the three Critical Success Factors (CSFs) (strategic leadership and organizational attitude; integration of *Lean* elements, tools and techniques; and basic stability in operational processes) can be seen in isolation, as they all have significance in different dimensions of capability within the organization. The use of these KSFs and the context, content, application and results of *Lean* must be seen in the light of the organization's strategic, technical, structural and cultural environment. Further research into the effectiveness of these CSFs for implementing *Lean* in South African hospitals would be of great value and benefit to the body of *Lean* knowledge.

Patrick Lee; Linhchi Pham; Stephen Oakley; Kimberly Eng; Elena Freydin; Tayla Rose; Alyssa Ruiz; Joyce Reen; Deborah Suleyman; Vanna Altman; Kara Keating Bench;Alice Lee; Kiame Mahaniah. *BMJ Open Quality* **2019**	Case Study USA	***Using lean thinking to improve hypertension in a community health center: a quality improvement report***	To demonstrate improvement at the hypertension control system level in qualified health centers (FQHC) through the situational use of *Lean* thinking and statistical process control. **Population**: 4762 Adults with hypertension.	Success factors included experienced improvement leaders, a focus on involving frontline staff, the situational use of *Lean* principles to make work easier, better, faster and cheaper (in that order of emphasis) and the use of statistical process control to validate variation. The challenge of transforming the delivery of care in the safety net warrants a more detailed analysis of the principles, relevance and potential impact of *Lean* thinking in FQHCs.
Gustavo Teodoro Gabriel. Afonso Teberga Campos. Aline de Lima Magacho , Lucas Cavallieri Segismondi, Flávio Fraga Vilela, José Antonio de Queiroz, José Arnaldo Barra Montevechi Peer] Computer Science **2020**	Case Study Canada	***Lean thinking by integrating with discrete event simulation and design of experiments: an emergency department expansion***	Reduce the length of stay of the number of clients in the Emergency Department (ED), using *Lean Thinking* principles. Population: Canadian Hospital Emergency Department	Increasing the number of patients treated and reducing the length of stay, without compromising the quality of services and patient safety. The resource workload was balanced according to the principles of LT. In this way, they achieved a significant improvement in the process.
Giuseppe Cesarelli, Rita Petrelli, Carlo Ricciardi, Giovanni D Addio, Orjela Monce, Maria Ruccia and Mario Cesarelli MDPI Helthcare **2021**	Case Study Italy	***Reducing the Healthcare-Associated Infections in a Rehabilitation Hospital under the Guidance of Lean Six Sigma and DMAIC***	Apply corrective measures and reduce the occurrence of healthcare-related infections and the length of hospital stays. Population: 2,415 clients	*Lean* thinking has enabled the team to re-evaluate the performance of the entire operational set as a system, starting from a sub-process as a change. In order to improve further and achieve sustainable results over time, it is essential to act at system level, defining a common goal among all stakeholders, supported by a management and leadership system, such as visual/weekly management, planning optimization, implementation of standard works, to be followed by all associates and guaranteeing the role of the surgeon as the driving force behind the process.
Katlyn L Burr, Angela A Stump, Rustin C Bladen, Paul R O'Brien, Brenda J Lemon, Donna K Tearl, Maureen Roby, Lauren M Daley, Joel M Brown and James H Hertzog Respiratory Care **2021**	Descriptive retrospective study tivo USA (North Carolina)	***Twice-Daily Huddles Improves Collaborative Problem Solving in the Respiratory Care Department***	To describe a quality improvement intervention in a respiratory care department. Population: 366 improvement processes.	By using a standard meeting process, the respiratory care department has solved quick and complex problems in a timely manner. This process allows for transparency in problem solving, as well as direct and rapid communication with the department's associates. The meeting process has provided staff and leaders with a channel to improve their work, an environment that is not limited to the confines of a single department, but also includes the entire company.

Mirjam Amati;Alan Valnegri;Alessandro Bressan;Davide La Regina,Claudio Tassone;Antonio Lo Piccolo[0];Francesco Mongelli;Andrea Saporito Original research **2022**	Study of Case Switzerland (Canton Ticino)	***Reducing Changeover Time Between Surgeries Through Lean Thinking: An Action Research Project***	Provide information on how healthcare professionals can get involved in continuous improvement, adopting *Lean Thinking* and ultimately reducing waiting times between surgeries and maximizing the use of the operating room. Population: + 100 staff working in the Operating Room (7000 interventions per year)	Lean thinking allowed the team to re-evaluate the performance of the entire operational set as a system, starting from a sub-process as a change. In order to improve further and achieve sustainable results over time, it is essential to act at system level, defining a common goal among all stakeholders, supported by a management and leadership system, such as visual/weekly management, optimization of planning, implementation of standard works to be followed by all associates and guaranteeing the role of the surgeon as a driver of the process with performances.
Malene Grubbe Hildebrandt; Kristian Kidholm; Jørgen Eiler Pedersen; Mohammad Naghavi-Behzad; Torben Knudsen; Aleksander Krag; Jesper Ryg; Oke Gerke; Annmarie Touborg Lassen; Torkell Ellingsen; Henrik J Ditzel; Vibeke Andersen; Annette Langhoff; Gert Nielsen; Tahir Masud; Anna-Marie; Bloch Münster; Kirsten Kyvik; Kim Brixen British Medical Journal **2022**	Study of Case Prospective Denmark	***How to increase value and reduce waste in research: initial experiences of applying Lean thinking and visual management in research leadership***	Apply the *Lean Thinking* method by training teams and setting up intervention working groups to investigate waste in various hospital units. At a later stage, evaluate its success. **Population:** Hospital research units in Southern Denmark	With the *Lean* method, there was a potential increase in research productivity, research quality and patient-related results.
Giulia Goretti; Martina Pisarra; Maria Rosaria Capogreco; Patrizia Meroni SAGE **2023**	Study of Case Italy (North)	***A framework for lean implementation in preoperative assessment: Evidence from a high complexity hospital in Italy***	Report the evidence on how implementing *Lean* in the preoperative assessment and how to evaluate the positive results obtained. **Population:** 14,466 patients in 2019 9,419 patients in 2020 14,091 patients in 2021 (for three years)	The proposed *Lean* framework should be used to improve the quality of care in preoperative admissions, adopt the *Lean* drivers for successful implementation and report on the impacts. Efficiency data, such as costs, will have to be analyzed further. In addition, the results are based on a single hospital environment; in order to generalize the model, other studies should be tested.
Aramco Healthcare Huda Al-Sayed Ahmed, Nafeesa A. Al-Faris, Joshua W. Sharp, Issam O. Abduljaber, Salam S. Abou Ghaida Innovations Journals **2023**	Case Study Quasi-experiential Saudi Arabia	***Managing Resource Utilization Cost of Laboratory Tests for Patients on Chemotherapy in Johns Hopkins Aramco Healthcare***	Evaluate the cost of laboratory tests carried out for patients undergoing chemotherapy at the cancer treatment center. Population: 200 randomly selected cancer patients with treatment plans chemotherapy, including 10 treatment protocols	This study showed that failure to adhere to evidence-based guidelines leads to excessive and unnecessary use of laboratory tests and health resources. Standardized implementation, use of laboratory tests according to British Columbia Cancer Agency (BCCA) guidelines in the electronic patient record (EHR) system has significantly reduced financial difficulties in the organization.

Table 2 - Analysis of the articles selected in the *scoping review* "The impact of *Lean Thinking* on the efficiency of healthcare organizations"

Source: Created by the author.

mains shrouded in uncertainty. This *Scoping Review* aims to answer the question: "*What is the impact of LT thinking on the efficiency of healthcare organizations*?" and its objectives are: to identify the benefit of LT in improving customer service (customer satisfaction and safety) and to explore the advantage of LT in the use of resources (reducing waste and increasing productivity).

The intention was to offer an innovative conceptual perspective to answer our question. Accordingly, some literature shows that LT offers significant opportunities for improvement in hospitals. However, there are researchers who argue that LT principles, as they originally emerged in industry with manufacturing, are not well reflected in healthcare systems.

LT began to branch out into healthcare in the late 1980s with initiatives such as Continuous Quality Improvement. Scheduling and access to care are examples of issues that have been successfully addressed in many healthcare organizations using LT principles. Meetings are one of the many tools available in the LT methodology and team meetings have been shown to increase processes when leaders reinforce continuous improvement principles (Burr, S., et. al, 2021).

Researchers Naidoo, L. & Fiels, Z. (2019) identified three critical factors for LT success in their study: strategic leadership and organizational attitude; integration of LT elements, tools and techniques; and basic stability in operational processes. What needs to be done may be known, but the "how" it should be done may be foreign to most managers. In order to recognize the "how", it is necessary to know the critical success factors for LT initiation.

To identify the benefits of LT in improving customer service, in terms of customer satisfaction and safety, researchers reiterate the need to understand value from the customer's perspective. LT thinking classifies activities from the customer's point of view into three thematic focuses: adding value; not adding value, but supporting; activities that do not add value (or waste). To designate "value", flow mapping techniques are used to convey value and diagnose non-value adding activities, which are considered for elimination, i.e. waste.

These researchers only describe a few challenges and barriers in implementing LT in the health sector, for example, the variability of processes and patient flow, a lack of understanding of LT, poor communication and leadership, difficulty in defining waste and the challenge of defining value from the patient's perspective. Regarding LT content, interventions should be adapted to local conditions, with a focus on creating value for the customer, work culture and an emphasis on substantial training in LT tools, with accurate and robust techniques and data.

The focus of LT is to reduce waste, synchronize flows, and manage variability in (process) flows. These researchers describe the LT methodology as comprising five fundamental principles: specifying what is of value to the end user (the customer); identifying the value stream in a workflow process; making the value stream flow by re-engineering process steps; eliminating waste; and creating the value stream that signals when activities can begin in the pursuit of perfection through continuous improvement.

Other scholars, Lee, P., *et. al*, (2019) reiterate that talking about challenge in the application of LT implies developing capabilities while avoiding the "traps" of "top-down" intervention, "copy/paste" thinking and looking for something easier, better, faster and cheaper, and having the courage to persist. That is, if the organization's focus wavers, processes can degrade and performance can regress towards the baseline.

On this premise, the main objectives of LT in healthcare have been to increase the quality of customer service and increase the efficiency of healthcare organizations. To achieve these goals, the majority of healthcare organizations have emphasized the application of LT tools to reduce direct waste, but have neglected the development of professionals' problem-solving skills (Cesarelli, G., et. al, 2021). Therefore, according to the same authors, this approach may create some process improvements, but the long-term benefits for the whole hospital have rarely been achieved. They suggest structured problem-solving that should be developed throughout the organization in order to harness LT potential and improve processes in a sustainable way.

The authors, Gabriel, G., *et. al*, (2020) investigated the multiple management tools such as discrete event simulation and LT thinking and how they are effective in supporting and assisting the quality of healthcare. In this sense, their study aimed to use LT principles combined with discrete event simulation to plan the expansion of the emergency department.

The aim of this project was to reduce the number of clients on hold, i.e. they had to be seen as quickly as possible after the triage process. Thus, in line with the LT, they managed to increase the number of patients seen and/or treated and reduce the length of stay, without compromising the quality of services and client safety. Following this, standardized and prioritized metrics were defined, namely: the ideal number of human resources on each shift; reduction in length of stay; waiting time after triage and client transfer/transport time, and in this way they achieved a significant improvement in the process.

In another study, we can "look" from the perspective of the operating room functioning as its own "production site" within a hospital, whose rules and processes differ from the rest of the organization. Healthcare professionals are faced with the challenge of harmonizing the need for process flexibility with clinical requirements and standardized work to improve safety, quality of delivery (delivery times) and efficiency. Although there is a great deal of natural variability between clients, the main steps of a given procedure are generally consistent and can therefore be standardized (Amati, M., et. al, 2022).

On the other hand, in the study by Giulia, G. *et. al* (2023), despite not evaluating clinical health and its results, some positive effects are also reported in the sphere of the client, namely the clinical contribution of the application of LT which has made it possible to increase the appropriateness of care (identifying the right clinical path for each client and increasing safety in personalized care).

The researchers, Ahmed, A., *et. al*, (2023) reinforce that clinical decision support systems are recognized as important tools to ensure safety during health decision making. These systems are widely applied in laboratory medicine (for example) to order diagnostic tests and monitor treatment as part of the electronic client record, which supports holistic client-centered care. Furthermore, applying evidence-based medicine is highly promising, as long as it is a user-friendly system. These researchers have demonstrated a positive economic impact of clinical decision support systems in improving healthcare efficiency. Treatment outcomes and client satisfaction were monitored, as well as other factors, including alignment with the organization's objectives in the pursuit of client safety, continuity and sustainability. This approach mirrored the benefits that can improve client safety, quality of care, health system efficiency and resource management capacity.

In the view of Lee, P. and collaborators, (2019) well-defined LT principles that are properly understood and incorporated into the day-to-day activities of a healthcare organiza-

tion can enable these organizations to provide extraordinary value for their customers, as well as better paid work for their employees, accelerating the transformation of the healthcare system towards quality.

Without a doubt, LT has been revolutionizing health production and services around the world for many years and is advocated as "creating a balance between quality and funding", through the development of the most efficient and effective method for providing value to the customer (Naidoo, L. & Fiels, Z., 2019).

LT can be summarized as a situational leadership practice that balances respect for people with continuous improvement to maximize customer value while minimizing waste (Lee, P., *et. al*, 2019).

By exploring the advantage of LT in the use of resources (reducing waste and increasing productivity, we see that LT has been adopted in the healthcare sector to reduce waste *versus* increasing productivity, thus improving processes and achieving widespread diffusion in hospital operations around the world (Giulia et. al, 2023). According to the same researchers, there are five principles of *LT*, namely: identifying value from the customer's perspective; understanding the value stream; identifying and improving the process flow; adopting logic and continuous improvement to achieve perfection.

Some researchers consider that the waste recognized by LT has also been found in the health area, in a context with an appropriate connotation, namely:

- Transportation: moving patients and equipment;
- Stocks: unnecessary stocks and supplies;
- Movement: similar to transportation, although it means the movement of personnel and information;
- Waiting: delays in diagnosis and treatment;
- Overproduction: unnecessary tests;
- Overload: related to staff *stress* and overwork;
- Defects, which can be more dangerous in the health area (e.g. medication errors and infections (Cesarelli, G., *et. al*, 2021).

Burr, S., *et. al*, (2021) reinforce that LT processes are used in healthcare systems to increase safety and efficiency. For them, LT is a process that relies on a team approach focused on removing waste and variation from processes and worsening performance. They add that a variety of tools are included in the LT methodology, including daily meetings, where a meeting is a process in which leadership and direct or care provider subordinates meet face-to-face. The meeting is a time for leaders and employees to raise problems and suggest ideas, and the time limit on these is a guarantee that the meetings are a place for problem-solving and not long conversations, with a real contribution to improving customer safety. In general, these authors observed that team meetings increased mentality and positively affected team performance, with complex problems being solved more quickly and skillfully.

Nevertheless, successful intervention strategies with simple performance measures have led to a statistically significant reduction in unnecessary costs, substantially improving the efficiency of healthcare resources in their use. Improving quality can offer a huge financial return and raise awareness of new efforts to expand this practice. Adherence to evidence-based guidelines with standardized implementation significantly reduced the organization's financial difficulties (Ahmed, A., et. al, 2023).

In their research, Amati, M., *et. al*, (2022) show that LT thinking enabled their team to re-evaluate the performance of the entire operational set as a system, starting from a sub-process such as change. They conclude that

in order to achieve sustainable results over time, it is essential to act at system level, setting a common goal among all stakeholders, supported by a management and leadership system, such as visual/weekly management, planning optimization, implementation of standard works, to be followed by all workers.

The continuous growth of healthcare costs is a major concern for the sustainability of public finances in advanced countries. Although the overall quality of care is very good, this does not apply to each individual case. Insufficient quality and inefficient infrastructure lead to additional costs. In light of this, improving the quality of healthcare while controlling costs is a key priority for health policy strategies and hospitals are under constant pressure to find ways to improve efficiency and productivity while providing high-quality healthcare.

On this premise, the power of LT can be defined as the strategy of focusing on waste generated inadvertently in the organization and during the development of an activity. LT is a management system and a method for eliminating waste and creating more value for customers. Reducing changeover times means reducing the time spent on activities that don't add value, thus creating more time to look after customers. As a management system, LT encompasses different tools that can be applied at a macro level throughout the company and others at a micro level to improve specific processes.

Amati, M., *et. al*, (2022) consider that the core of LT lies in the need to involve all stakeholders in relation to the process to be improved, at the different levels of the organization. In order to be effective and sustainable over time, process improvement initiatives require the involvement and training of those closest to the work. In this project, the authors have shown that LT is highly beneficial to the process of preparing, implementing and sustaining change, offering a comprehensive management system and a mindset that, over time, creates a hospital culture of continuous improvement through the elimination of waste, which is then reflected in the real impact of organizational efficiency and cost reduction.

Other authors, such as Giulia, G. and collaborators, (2023) have shown that the use of a benchmark proposed taking into account the LT principles has contributed to the identification of value and the flow of value has resulted in the reduction of "Time Without Added Value" (such as x-rays and consultations). The search for continuous flow through innovation contributed to increasing the use of digitalization. The new organization helped reduce the average time spent per year and continuous improvement was ensured through results management. The organizational transformation reported through this case study has provided *insights* for applications of the structure in other hospital environments.

This team also introduced the concept of "Value Time" as the time spent on activities, medical appointments and examinations without waiting and wasting time. With a focus on value and multidisciplinary groups, they eliminated "non-value-added" activities (i.e. routine exams based on age were considered waste), and defined "value-added" activities (e.g. which should be included for each surgical procedure). They add that technology was the key driver for implementing LT and guaranteeing continuous flows. The implementation of computerized systems has yielded not only positive clinical results, but also notable organizational sustainability benefits in terms of quality improvement.

I am convinced that strong leadership and management commitment; a proven methodology and an LT thinking approach are key to improving interprofessional collaboration in teams. The focus of healthcare organizations has to be on achieving the goal of redu-

cing waiting times and costs, bringing gains for customers and reducing organizational waste, i.e. without having to make significant changes to infrastructures, making the most of existing resources and combining new technologies.

There are authors who have a different view on the implementation of the LT philosophy or soft *Lean* practices, reporting that these require a culture change that takes time to integrate into the organization (as is also observed in other health initiatives) (Hildebrandt, M., *et., al.* 2022). These researchers say they are aware that they have just started a long journey of implementing LT methods with a continuous improvement framework and that it will take time to see results. They reiterate that, generally, these LT processes represent rigid practices for which measurements must be evaluated at a later stage after up to five years to be representative of the changed leadership practices. Nevertheless, this applied LT initiative has improved their work processes and the efficiency of their team.

They argue that LT is often used successfully to improve repetitive tasks, and they still need more experience and evaluation to know whether this concept can improve more complex work processes, such as health research. Some research leaders were reluctant to employ "goal visualization" due to concerns that it could create frustration and harmful competition if goals were not achieved.

In short, the LT philosophy has been adopted in the healthcare sector to reduce waste, thereby improving processes, and has achieved widespread diffusion in hospital operations around the world. Regarding the potential of LT management in healthcare, its evidence highlights the lack of systematic adoption measures and the lack of full development of a methodology capable of capturing the systemic nature of LT implementation at hospital level and reporting on its impacts (Giulia, G., *et. al*, 2023). LT allows managers to assess the "deficiencies" in their institution, and that these, once improved, lead to greater success, more organizational efficiency and less waste (Naidoo, L. & Fiels, Z. (2019).

CONCLUSION

Studies show that successful and sustainable LT nurturing involves developing a culture of continuous improvement to establish a suitable environment for its application. Multidisciplinary team members including managers and others need to be educated and trained in LT concepts and tools, and encouraged to propose and implement problem-solving ideas. The commitment of leaders to the progress of teamwork is necessary, and a culture of continuous improvement is an essential element.

I believe that implementing LT approaches in "pilot environments" before large-scale or generalized operations is essential to avoid demotivating teams in unsuccessful projects. Efficient communication within the team also helps to spread the LT philosophy and is key to successful projects. It has been possible to identify an increase in LT in healthcare organizations, which has been verified by gains in quality, service efficiency, productivity, customer and professional satisfaction, and customer health and safety. LT's objective of adding value to clients, society and the economy has been met, as demonstrated in several studies. These have shown a reduction in waste in health services and an increase in productivity, with an increase in client safety and trust, thus reflecting its impact on the efficiency of health organizations.

Finally, the strengths of this work are that existing evidence suggests that within the area of healthcare organizations, LT approaches seem to be used more and more.

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