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Analysis of the Implementation and Systematization of a Nursing Office in a Specialized Lithotripsy and Endourology Unit Following the Lean Healthcare Methodology

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Abstract

Objective: To evaluate the effectiveness and patient satisfaction of the implementation and systematization of a specialized nursery office in a Lithotripsy and Endourology Unit following the Lean Healthcare methodology.

Material and Methods: A total quality project management (TQPM) was developed in 2012 and applied in a Lithotripsy and Endourology Unit from a tertiary public Spanish hospital. The initial phase of the BPM was to evaluate the outcomes of our clinical practice and to identify improvement opportunities. The office process is the initial contact of the patient with the Unit in which is made a treatment decision. One of the main steps in the office process was the implementation and systematization of a specialized nursing office. To evaluate the implementation and systematization several indicators were designed and used. A specific satisfaction survey was designed and used for calculating the satisfaction index.

Results: A total of 5510 office processes were included and analyzed from 2014 to 2019. The initial organization and implementation of the nursing office into office process showed an improvement of the perception of information care quality. The posterior systematization of the tasks showed an improvement in the analysis of the office time. The percentage of patients that took more than 60 minutes for office visit was reduced significantly over the years until a value of 9% in 2018. The detailed analysis of the times by stages into the office process showed a reduction of the nursing office assessment time in more than 2 minutes (from an average of 14.56 in 2016 to 12.03 minutes in 2019). It allowed increasing the number of total nursing office visits in the last year (a total of 346 visits more). There was a global satisfaction increase from 90% to 98% in these years after achieving the improvement of the times.

Conclusion: The implementation and systematization of a specialized nursery office in a lithotripsy and Endo-Urology unit increases assistance quality and patient satisfaction. Lean methodology can effectively be applied to improve efficiency.

Keywords: Lean methodology; Nursery office; Systematization; Implementation; Continuous improvement

Introduction

The application of Lean methodology to healthcare has shown important benefits for patients and health organizations. Lean thinking comes from the Japanese manufacturing industry. The aftermath of World War II did Japan was devastated and being forced to rebuild its productive system. The Japanese automobile manufacturer Toyota, (since 60s decade) optimized their workflow and efficiency by developing and implementing The Toyota Production System (TPS) [1]. The TPS focuses on identifying and eliminating waste or non-valued activities, which impede the effective flow for the services. After 10 years, the system was established in the United States of America with the name of Lean [2]. Lean implementation emphasizes the importance of optimizing work flow through strategic operational procedures while minimizing waste and being adaptable. It is a philosophy based on reducing loses and increasing the value of the business. Lean includes principles, methods and tools that are applied to improve the speed and efficiency of the processes through the detection and elimination of any unnecessary step or in which material losses occur [3]. TPS principles of value, value stream, flow, pull and perfection were tagged by Wormack and Jones as lean methodologies.

As Lean had proved itself to be useful in other sectors and began to show promising results in healthcare [4], organizations in the United States, such as the Institute for Healthcare Improvement, and the United Kingdom, such as the NHS Confederation and the Institution for Innovation and Improvement, advocated the use of Lean in 2005, 2006 and 2007, respectively. The implementation of lean processes can improve the delivery and quality of patient services, and provide operational advantages to healthcare institutions [5]. The main advantages of the application of Lean Healthcare methodology are the reduction of costs, optimization of resources, the improvement of the feedback, and activity systematization for reduction of variability in clinical practice [6-8].

In our department, we implemented the Lean Healthcare methodology in 2012, in a subspecialized unit (Lithotripsy and Endourology Unit) with a great workload and a high cost due to the disposable material and technology used. The specialized nursery office was implemented as an important part of the activity flow of our unit. For that reason, the main objective in this paper was to evaluate the effectiveness and patient satisfaction of the implementation and systematization of a specialized nursing office in a Lithotripsy and Endourology Unit following the Lean Healthcare methodology.

Materials and Methods

A total quality project management (TQPM) was developed in 2012

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and applied in a Lithotripsy and Endo-Urology Unit from a tertiary public Spanish hospital. This Lean Healthcare initiative was focused on the main activities of this Unit (treatment and surveillance of the stone disease and the endoscopic treatment of upper tract urothelial cancer (UTUC). The TQPM design was based on five pillars: business process management (BPM), patient safety management (proactive and reactive management), efficiency analysis of the main operative processes of the unit, proactive management of stone chronic disease condition and analysis of the perception of the quality care.

The development of BPM was the first step and included the main operative processes of the Unit. These were the office, lithotripsy, and percutaneous surgery, retrograde intrarenal surgery (RIRS) and ureteroscopy process (URS). Currently, three new processes are being developed (clinical integrated process with emergency department for the treatment of renal colic, scientific quality production and UTUC process).

The initial phase of the BPM was to evaluate the outcomes of our clinical practice and to identify improvement opportunities. The identification of the patient flow into the organization, the draw of the map process and the development of each process were the next step. At that moment, the specific formation of the staff was a mandatory aspect in order to the fact that the staff could understand the change in the way of working that we wanted to do. The following phase was to establish a team for each process, integrated by a medical coordinator and a registered nurse for the control of the process indicators and to make improvement proposals according to the results previously obtained. For that, a value stream analysis was previously performed for each process.

The office process is the initial contact of the patient with the Unit in which is made a treatment decision. This initial process supposes in the majority of the cases an evaluation of the medical conditions, specific disease conditions and to make a therapeutic decision (Figure 1). The implementation of a specific nursing office was necessary. It was due to the fact of increasing the quality of the patient information in patients that need an intervention. So, it was considered that a complete evaluation of the patient is needed including nursing evaluation when the patient needs an extracorporeal lithotripsy and also in an endoscopic surgery. If the patient needs only a medical treatment or follow up, they will be visited only in the medical office. However, the activity in the nursing office is completed with other procedures. There are non-contact visits like urine culture control, re-check patients for operating room weekly as well as the results of the blood samples and complementary test, citation of patients for extracorporeal lithotripsy and surgery activity, phone queries. There is also another process like preoperative coordination that includes the contact visits with patients, it includes some tasks like instructions before surgery, surgery activity information, postoperative information, resolve doubts and wound healing when is needed. We also find the process of first appointment that includes the patients who must take an extracorporeal lithotripsy or surgery for the first time. It provides the necessary information and resolve the doubts to the patient about the procedures it is gone to take.

The nursing office systematization was established in 2018 for the great variation in the clinical practice and the times consumed between the nursery staff. The systematization of the tasks made is shown in the (Table 1). A new task (preoperative coordination) was defined for getting that all patients had a negative culture before intervention and get the information and resolve doubts. A few days before the intervention the patient is visited, and a checklist is performed in order to look over all the preoperative tests including urine culture. If the urine culture is positive, an antibiotic treatment is prescribed.

To evaluate the implementation and systematization of a specialized nursing office into the office process, several indicators have been used. For controlling the time of the process, different control points were defined (waiting time, medical office time, waiting time between offices and nursery office time). A specific satisfaction survey was designed with help of the Quality Department of the Hospital and was used for calculating the satisfaction index. The main items evaluated were

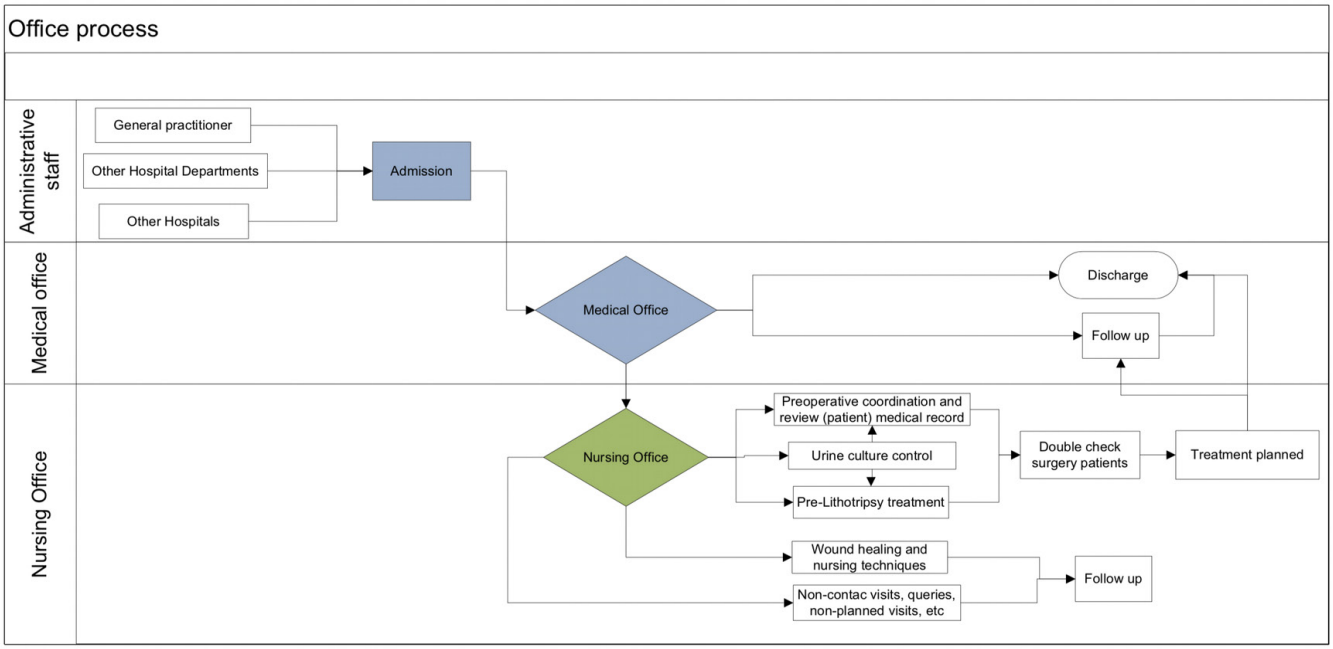

Figure 1: Office process for active treatment decision in the Lithotripsy and Endourology Unit of La Fe Hospital.

accessibility, comfort, waiting time, quality of the medical and nursery information and global satisfaction. The main variables analyzed were:

- Percentage of patients that takes more than 60 minutes for office visit (standard established like an optimal time for medical and nursery office visit). This indicator includes both visit office.
- Individualized items and global satisfaction index (standard value defined as $\geq$ 90%). A specific hospital survey was used.
- Average time for each control point (waiting time, medical office, waiting time between medical and nursery office), nursery office and total time of the process.

All the variables were analyzed over the time. The categorical variables were summarized using number and percentage and the average and 95% of confidence interval were used for continuous variable.

Results

A total of 5510 office processes were included and analysed from 2014 to 2019. The initial organization and implementation of the nursing office into office process showed a serious improvement of the perception of information care quality from its beginning and it was kept over the time (Table 2).

The posterior systematization of the tasks showed an improvement in the analysis of the office time. The percentage of patients that took more than 60 minutes for office visit (standard established like an optimal time for medical and nursery office visit) was reduced significantly over the years until a value of 9% in 2018 (Figure 2). The average of the stay office time was reduced progressively since 2014 and its evolution is shown in Table 3.

The detailed analysis of the times by stages into the office process is shown in Table 3. The implementation of the systematization showed a reduction of the nursing office assessment time in more than 2 minutes (from an average of 14.56 in 2016 to 12.03 minutes in 2019). It allowed optimizing and increasing the number of total nursing office visits. So, in 2019 a total of 5507 nursing office visits (contact and non-contact) were done which meant an increase compared to the previous year of 346 visits (6,7% more). In the other hand, the initial waiting time was reduced and the waiting time between medical office and nursing office was also improved.

Moreover, the systematization of the nursing office process increased the patient satisfaction when it was implemented and applied (2017 and 2018). There was a global satisfaction increase from 90% to 98% in these years after achieving the improvement of the times (Table 2).

Discussion

In our knowledge, this paper is the first that analyses the implementation and systematization of a specialized nursery office in a lithotripsy and endourological unit in a public tertiary hospital. The implementation of nursing office in our department allowed us to increase the patient care time. The information to the patient is mandatory in healthcare, especially in a surgical department. The additional information provided in nursing office about the technique, process and the attention afford an added value. This fact improved the quality of the nursing assessment and the satisfaction by the patient, as our results showed.

Implementing lean methods improved the patient flow and quality of care decreasing waiting times. The activity systematization in nursing office improved waiting times and quality care perceived by the patient so as to homogenize the activity and decrease the clinical variability. Identifying and eliminating unnecessary steps (clinical variability), allowed us to use this time to improve the patient care and increase production. But it involved a strategic alignment of all members of the team, working for the same objectives.

The main objective of strategic alignment was the reduction of the variability in healthcare practice in the nursing office. The systematization searched for the optimization of the times (waiting and office times) and for decreasing the clinic variability. The homogenized nursing care assessment increased the efficiency, optimizing the times

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8.00h-8.05h (7.30h-7.35h)	ISBAR	ISBAR	ISBAR	ISBAR	ISBAR
8.05h-9.00h	UC Control	UC Control	UC Control	UC Control	UC Control
9.00h-10.00h	Re-check operating room patients	Preoperative coordination "in-situ" (6 patients)	Preoperative coordination "in-situ" (6 patients)	Preoperative coordination "in-situ" (6 patients)	Preoperative coordination "in-situ" (6 patients)
10.00h-11.00h	Preoperative coordination "in-situ" (3 patients)				
11.00h-12.00h	Surgery patients telephone citation	Wound healing	LEOCH citation	LEOCH and surgery patients	Wound Healing
12.00h-13.30h	Review medical record -CI -Anesthesia -Blood Samples	Review medical record -CI -Anesthesia -Blood Samples	Citation surgery patients	Review medical record -CI -Anesthesia -Blood Samples	
13.30h-14.30h	Extras	Extras	Extras	Extras	Extras

Table 1: Schedule of the tasks into the nursery office.

Parameters	Basal (Jun 14) (%)	Dec 14 (%)	July 15 (%)	Sept 15 (%)	Dec 17 (%)	Dec 18 (%)
Personal care	91	91	100	100	100	97
Comfort	80	82	82	80	100	96
Appointment delay	91	91	100	66.67	89	83
Safety	91	----	----	----	98	95
Information	85.11	93.3	100	97.87	99	94
Global satisfaction	91	91	92.5	88.57	98	93.17

Table 2: Analysis of the perception of information care quality over the time.

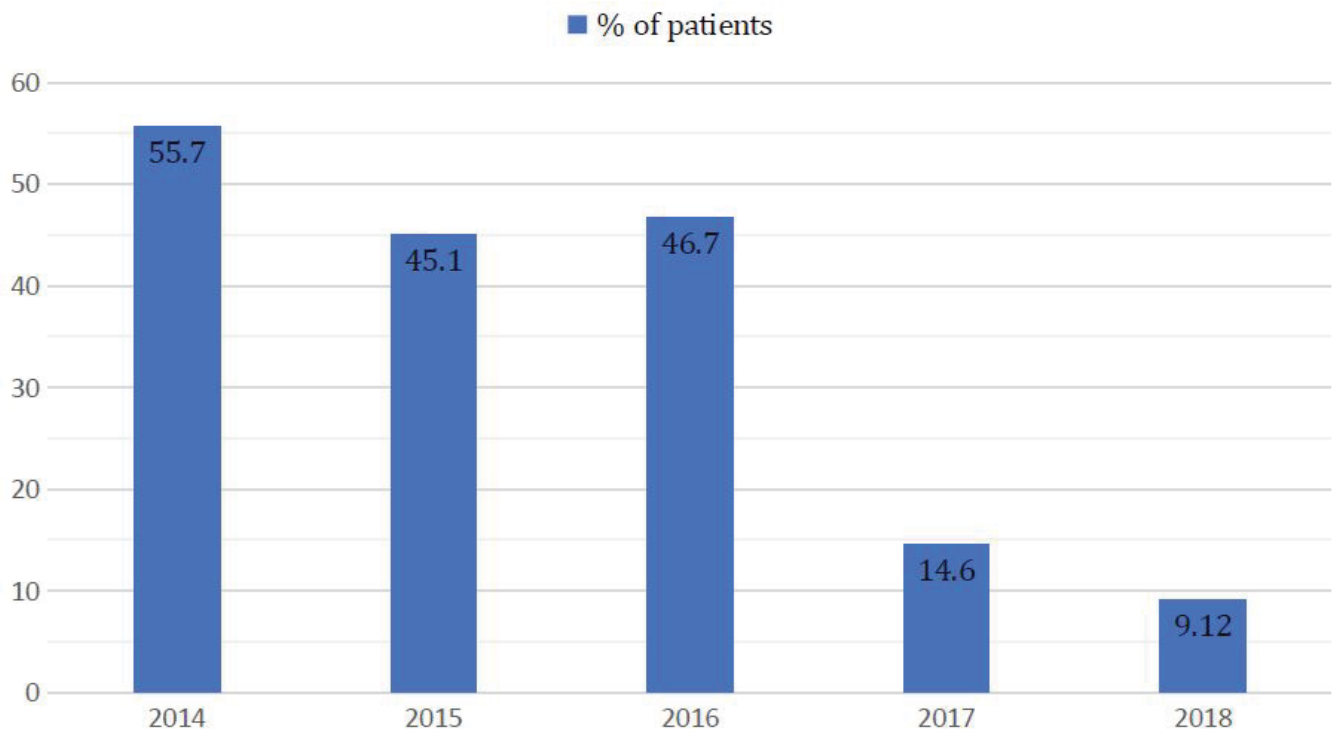

Figure 2: Percentage of patients that took more than 60 minutes for the office visit.

Time	2016 x (CI95)	2017 1st semester x (CI95)	2017 2nd semester x (CI95)	2018 x (CI95)	2019 1st semester x (CI95)
Waiting time	47.89 (37.3-58.4)	13.49 (9.79-17.18)	26.1 (18.43-33.17)	15.10 (11.17-19.03)	11.36 (8.05-15.08)
Medical office	19.84 (16.3-23.3)	17.56 (14.08-21.02)	19.2 (13.57-24.03)	17.26 (15.24-19.27)	18.42 (16.25-20.58)
Between office	36.53 (28.5-44.5)	18.96 (9.58-28.34)	29.1 (23.35-34.25)	42.14 (32.07-52.21)	29.51 (22.08-37.34)
Nursery office	14.56 (14.16-14.96)	13.48 (8.16-18.79)	26.8 (22.13-29.47)	13.11 (8.01-18.20)	12.03 (10.23-13.42)

Table 3: Analysis of the average of the times in the different stages of the office process.

and allowing increasing the number of patients visited in the office (6, 7% in our department). These results were perceived as an improvement by professionals and increased their involvement [9].

It is important to consider that the systematization of nursing care assessment should not be seen as a simple bureaucratic norm. It is necessary to have a notion of its real importance and the clinical assessment and administrative implications derived from the omission in applying it. This represents a legal document with information to the interventions made by the nursing team [10]. The organization of nursing assessment provides the patient an improvement in the quality of the assessment received and a greater resolution of the problems through a holistic vision.

Despite the systematization of the activity in the nursing office and the improvement of the indicators of time there is an improvement margin. It is still possible to improve the waiting times between medical office and nursing office. The main difficulty to get it is that there is a percentage of the assessment activity that cannot be scheduled because it is generated during the own assessment activity in medical office.

One of our great challenges has been to get the staff alignment with this methodology. The participating staff needs to understand that working together as a team and to know the main reasons for changing is the key. The main drawback of staff alignment is resistance to change. The first phase of resistance is the absence of knowledge that is easily correctable through training sessions to staff. The second phase of resistance is the absence of time to apply it, also easily surmountable aspect providing an adaptation time. The third phase of resistance is the unwillingness to adapt to change in spite of having a specific training and the necessary time for applying it. This phase is unrecoverable and difficult to overcome. If someone from the staff enters this phase, the solutions are limited. The rejection of the change means that the process is sometimes not carried out with the established guidelines. So, in these cases the team leader must explain the advantages of the change and try to encourage the worker to adopt the new way of working.

The main limitation of this study could be the difficulty of extrapolation of the results to other hospitals or health systems. However, our results have shown that the application and systematization of a nursing office following the Lean Healthcare methodology can optimize and increase the productivity without acquiring more resources. For that, the authors think that this model is useful for any nursing office in a public or private hospital.

Conclusion

According to our results, the implementation and systematization of a specialized nursing office in a lithotripsy and endourological unit increases assistance quality and patient satisfaction. Lean methodology can effectively be applied to improve efficiency.

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