

The Contribution of New Technologies to Lean and Safe Patient Care

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Background

When introducing new knowledge to healthcare organizations, in addition to professional and medical expertise, other knowhow is also included, typically from the field of safe and high-quality patient care, work organization, optimization of work processes, and the use of various technologies to record completed work processes. As well as relying on professional staff and their knowledge or competences, high-quality and safe patient care, which is primarily part of the process of treatment and nursing, is also largely dependent on the organization of the health institution at all levels. It is especially important how work processes, workflow and standardization are connected, how unnecessary work, errors and waiting are prevented, and how poor relationships in work groups and/or between different groups are eliminated.

In order to improve work organization and process optimization, the principle of lean organizations can also be used. In the recent years, it has been proposed as one of the models on which the foundations of a modern and efficient healthcare organization/hospital can be established. The beginnings of lean production [1] can be traced back to the turn of the twentieth century, when Sakichi Toyota switched from textile to car manufacturing. The principle of a lean manufacturing system is to identify and eliminate all losses throughout the production process, and the main goal of lean production is the eternal pursuit of perfection. As in manufacturing, healthcare organizations need to be concerned with improving quality and finding ways to get the job done better, faster and more easily. Whether the philosophy of lean manufacturing can be transposed into service industries, especially the health sector, has been a long-standing dilemma. Toussaint, Beery et al. (2013) state that the lean organization principle is a promising approach to managing healthcare organizations in the USA, as there is a need to improve the quality and effectiveness of healthcare organizations and to control costs [2]. Womack and Jones defined a “lean” healthcare organization as one that has committed itself culturally to the use of scientific methods in its operation, as well as to continuous improvement, to employee commitment to patient-centered care, and to continually improving attitudes toward patients, colleagues and the environment. Planning should be tailored to the needs of the patient and the work process. It is a patient-centered strategy. Hunter (2018) wrote:

“A healthcare system is very complex. However, based on my experience, I can only confirm that we can do this. " [3]

The lean organization philosophy is based on seeking suggestions and solutions regarding how to get the work done with as little human effort as possible (or with optimal effort) in the shortest possible time, anticipating potential issues or errors so as to prevent them before they can even occur.

Compared to existing and widespread organizations, lean organization is more dynamic. The introduction of lean organization achieves increased orderliness and workplace safety; work is done according to standards, and employees perform work in accordance with their competences/abilities, continuously striving for higher quality and reporting their work results on a regular basis [1]. However, in order to provide information on the work performed, accurate records are needed, which requires databases that can in turn be used with modern information technology. The latter can also be used for tasks in which human labor is replaced by usually very simple and efficient modern technology. Thus, as one of the most important and first steps towards a lean health care organization, the hospital approached the inventory of the entire work processes, introduced work standards and protocols in order to achieve increased or optimal process flow, implemented measures to reduce the amount of walking undertaken by staff, and switched to an electronic bedside nursing management system. All of these factors contribute significantly to improved and safer patient care, both in treatment and in nursing.

Method

A qualitative approach was used as the basis for the paper presented, as the data included were obtained on the basis of a result evaluation of the implemented systems introduced at the Sežana Hospital. The assessment was carried out by a group of employees together with the hospital management, who set up and implemented the system in direct practice as the first of its kind in the Republic of Slovenia. In particular, the appropriateness and effectiveness of the bedside information technology used to record nursing services by nursing staff were assessed, as well as the usefulness of the hospital tube mail for faster communication and other benefits of its use in the healthcare facility.

Findings



Figure 1: Nurse Table

1. The advantages of using an electronic nursing record system – the use of Nurse Table compared to classical recording:

- Electronic recording of the care plan and the nursing services provided in each hospital room and for each patient;
- Recording standardized procedures of the performed services;
- Entry is generally made immediately after the service is provided;
- only authorized staff with a special code can access the system;
- Simple and friendly to use;
- Correct understanding so that the same language is spoken;
- Time dynamics transparency: when, how many times – to the second;
- The collected information is available to all authorized users;
- traceability – for employees as well as for patients (who, for whom and what);
- the possibility of setting up an alert system in risky procedures;
- ongoing monitoring of nursing services provided to the patient;
- more reliable records – no subsequent amendments or corrections;
- more realistic records compared to those on paper;
- history review;
- central records;
- static overview;
- overview of the performance of individual contractors as a basis for remuneration;
- upgrade options.

2. The benefits of using tube mail:

All organizational units in the hospital are connected to the tube mail system, which allows individual consignments between units. The travel time of each consignment is from a minimum of two seconds to a maximum of four seconds to the most distant unit. The system is mainly used for:

- sending material to the laboratory (blood, urine and other samples);
- sending laboratory reports to hospital wards and outpatient clinics;
- sending health records;
- shipment of small material supplies, etc.

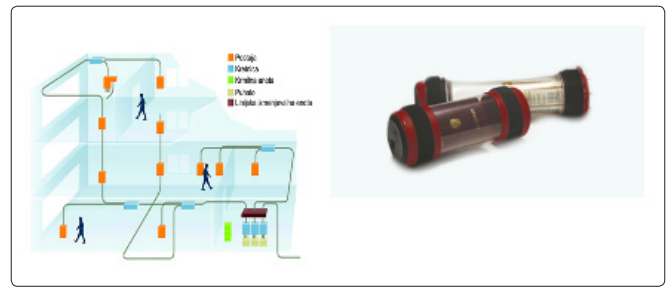


Figure 2: Tube mail system

Advantages:

- easy to use;
- reliable and friendly system;
- quick delivery or reception;
- reduction or near elimination of repetition of the work and wait process;
- improvement in interpersonal relationships: no delays, no disruptions in the work process, and no allocating blame, which otherwise often leads to conflicts.

Case study: sending blood samples to the laboratory:

- the sample is sent immediately after collection;
- the sample goes into immediate processing;
- the time from sample collection to lab report is reduced;
- electronic report delivery and control paper report delivery by tube mail.

Conclusion

The hospital started by changing the organizational culture from classical medical staff-centered care to patient-centered care, a process that has been underway for several years. The practice of solving problems in processes where they originate has been introduced, thus avoiding long meetings and discussions about allocating blame, which often result in overlooking the actual problems. The building of a lean organization culture commences intensively as soon as each new employee starts work. Other improvements have been introduced to identify and eliminate risky areas or processes, and to prevent time wasting and communication errors, such as various simple pictorial markings beside or for the patient. This is a long and demanding process that requires small changes at the beginning. Above all, it is necessary to want these changes, as they lead to the construction of a better and safer patient and employee system.

The electronic nursing management system, which has been in place for the past two years, enables better transparency with regard to the services provided and the work done by each individual nursing care staff member, as well as with regard to each patient. Above all, the hospital has gained an overview of the number of services performed and identified discrepancies between the planned and actually performed services.

Based on an analysis of certain data records, it was established, for instance, that, in May 2019, there was an 11.11 percent discrepancy between the number of planned and implemented nursing services. From the data printout on patient hydration for May 2019, it was evident that, compared to the planned hydration of 7 times per day, hydration had been performed 218 times, i.e., in 70 percent of

cases it was performed according to plan, but in 30 percent of cases hydration took place only 4–6 times per day, which was below the target. In the period from 1 February to 31 May 2019 (with 112 beds occupied), there were 48,394 hydrations/fluid intakes or 406 per day. During this period, a total of 232 fall risk assessments were made, an average of 3.41 per day. In cases where the intended objectives have not been achieved, the obtained data analysis results form the basis for the preparation of proposals for improvement.

The use of tube mail has largely prevented unnecessary walking for healthcare staff, who can thus stay by the patient, which is an important contribution to a better and safer care. Calculation of the time spent on services now undertaken by tube mail shows that, prior its introduction, this work required as much as five percent of nursing staff time alone.

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