Improvement of Breast Cancer Patient Pathway Using EUSOMA Standards and European Guidelines

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Rezumat

Îmbunătățirea traseului pacienților cu cancer mamar folosind standardele EUSOMA și ghidurile europene

Cozile din spitale afectează în mod direct calitatea vieții umane și ar trebui să aibă prioritate în comparație cu alte tipuri de cozi. Scopul acestei lucrări este de a dezvolta o nouă hartă a fluxului de valoare în sistem și a traseului pacientului, pentru îmbunătățirea calității și diminuarea activităților cu valoare scăzută în îngrijirea bolnavilor de cancer de sân, care se adresează pacienților, doctorilor și asistentelor medicale din secția de radiologie a Spitalului Universitar de Formare și Cercetare din Kocaeli, Turcia. În zilele noastre, din cauza cererii crescute mult peste nivelul resurselor, avem în serviciile de sănătate, în special datorită calității scăzute, cozi lungi în timpul procesului de diagnostic și tratament. Pentru această lucrare datele sunt colectate cu ajutorul observațiilor personale, a sistemului informatic și a angajaților autorizați. Momentan sistemul de înregistrare și cel informatic sunt insuficiente pentru a arăta corect situația actuală. Lucrarea de față relevă situația din acest moment a hărții fluxului de valoare, arătând pas cu pas unde au loc obstrucțiile în cadrul fluxului precum și modul în care pe viitor acestea pot fi depășite și ce beneficii specifice vor aduce sistemului de sănătate. Având în vedere toate aceste rezultate se recomandă expres spitalului aplicarea Regulilor Europene pentru asigurarea calității în screening-ul și diagnosticarea cancerului de sân coroborate cu toate îmbunătățirile sugerate mai sus folosind aplicațiile „lean”.

Received: 30.03.2017

Accepted: 03.05.2017

Cuvinte cheie: harta fluxului de valoare, screening-ul și diagnosticarea cancerului de sân, regulile europene, EUSOMA, Turcia

Abstract

Queues in hospitals are directly affecting the quality of human life, which should have priority compared to other types of queues. The aim of this paper is to design a future value stream map of the system and patient pathway in terms of quality improvement in order to decrease the non-value added activities for breast cancer patients, doctors and nurses for a radiology unit in a Training and Research University Hospital based in Kocaeli, Turkey. Nowadays, the increased demand versus insufficient sources affect healthcare services due to poor quality with long queues during the diagnosis and treatment processes. For this paper, data were collected from personal observations, information technologies units and authorized employees. Moreover, data tracking and keeping systems are too poor for revealing the current situation. This paper provides an example of a current and future value stream map showing step by step where the bottlenecks are and how it can be improved and what specific benefits it will bring to the healthcare system. In consideration of all these outcomes, it is highly suggested that the hospital apply European Guidelines for quality assurance in breast cancer screening and diagnosis together with the mentioned above improvement suggestions using lean applications.

Key words: value stream map, breast cancer screening and diagnosis, european guidelines, EUSOMA, Turkey

Introduction

Healthcare is one of the trend topics in the world. The importance in standardization has been realized and there are attempts to apply it. Nowadays, the increased demands versus insufficient sources affect healthcare services due to poor quality with long queues during the diagnosis and treatment processes. Hospitals are the most important parts of healthcare service systems, as they are also the places where patients can wait for a long time just to be treated. There is a number of wastes considered in healthcare organizations, which should be eliminated or at least minimized. Queues are one of the most important wastes caused in hospitals which are known as non-value added tasks. Cancer has become a global issue, which has to be taken as first priority. There is a very rapid increase of cancer cases in the world, as well as in Turkey (1). Among cancer types, breast cancer is the most encountered type of cancer (1).

In Turkey, the Ministry of Health has begun to perform improvement and transformation projects in healthcare since 2003 (2,3). There are two main institutions which plan and organize services to battle cancer, gather country wide data and prepare precaution plans; they are The Department of Cancer with the Public Health Institution of Turkey and KETEM (Cancer Early Diagnosis, Screening and Treatment Center) (4-10). However, there are numerous problems in the area of oncology (11-14). All those problems cause delays in diagnosis and treatment. A study about delay in breast cancer diagnosis among developing countries was conducted and it showed that most of the delay for breast cancer diagnosis is caused by healthcare systems (15). Although the delay time of Turkey is above the average, Turkey is still behind developed countries (16) (*Table 1*). Additionally, reliability of results is important as much as on time results. According to studies, women may become anxious, which

Table 1. Comparison of delay times in breast cancer diagnosis among countries (6)

Country	Number of Patients	Delay of Patients	Delay of System	Total Delay
Turkey	1.031	4.8	10.5	13.8
Poland	1.000	3.6	9.5	11.5
Croatia	250	4.9	10.2	13.4
Russia	2.059	4.8	12.4	15.7
India	268	6.1	24.7	29.4
Average	6.238	4.9	12.9	12.6

causes even more serious physiological problems (17). The European Society of Breast Cancer Specialists has established requirements for

standardized and qualified breast cancer diagnosis as mentioned in *Table 2* (18-20).

The aim of this paper is to design a future

Table 2. EUSOMA breast cancer standards (9)

Radiographic Staff	TARGET
Technical Repeat Rate	< %1
Acceptable examination (positioning and exposure)	> %97
Studies by radiographer per week	> 20
Women informed about method and time scale for receiving results	%100
Radiological Staff	
Minimum mammograms to be performed yearly	1000
Comply with physic-technical protocol:	European Guidelines
Have dedicated equipment	e.g. mammography system with magnification ability
Radiographer, technologist or staff member for mammography examination	>40h of training, quality schemes
Employ a trained radiologist with	>60h of training, >500 mammograms per year
Diagnostic Imaging Clinic	
High contrast/spatial resolution	>10 lp/mm
Optical density	1.4-1.8
Mean glandular dose per film	<2 mGy
Daily processor control maintenance	100%
Breast Assessment Center	
% of image-guided FNAC procedures with an insufficient result	Min. std. <25% Ideally <15%
% of image-guided FNAC procedures from lesions subsequently proven to be malignant having an insufficient result	<10%
% of women with breast cancer having a preoperative diagnosis of malignancy	Min. std. >70% Ideally >90%
Mammograms to be performed yearly	>2000
Employ a trained radiologist who is reading at least targeted amount of mammograms	>1000
Surgical Aspects	
Proportion of wires placed within 1 cm of an impalpable lesion prior to excision	>90%
Proportion of impalpable lesions successfully excised at the first operation	>95%
Proportion of benign diagnostic biopsies on impalpable lesions weighing less than 30 g	>90%
The rate of benign to malignant operations performed for diagnostic biopsy purposes	0.5:1
No frozen section performed if tumor diameter <10 mm	95%
Anxiety and Delay	
Delay between mammography and result	<5 w.d.
Delay between result of imaging and offered assessment	<5 w.d.
Delay between assessment and issuing of results	<5 w.d.
Delay between decision to operate and date offered for surgery	min std. <15 w.d. ideally <10 w.d.
Percent of women who should receive full and adequate assessment in three appointments or less	95%
Percent of women with symptoms and signs strongly suggesting the presence of breast cancer should be seen within two weeks of referral	80%

value stream map of the system and patient pathway with Lean Healthcare application tools in terms of quality improvement in order to decrease the non-value added activities for breast cancer patients, doctors and nurses for a radiology unit in a Training and Research University Hospital based in Kocaeli, Turkey

Material and Method

With the aim of decreasing the non-value added activities and increase patients and health care workers' satisfaction by applying lean healthcare to the Breast Center of a Training Hospital which is settled in Kocaeli in Turkey and the leading one of Breast Center which is a member of Breast Center Network (www.breastcentresnetwork.org). Thus, in order to be able to develop such a sophisticated lean model and improvement methods in mammography and ultrasound fields of our Breast Center, a current system for the given fields was observed in place via time study methods and face to face interviews were done with radiologists, technicians and even with breast surgeons to make sure the process is well understood. After mapping the current situation, the bottlenecks and non-value added activities were found and analysed. Key performance indicators were determined, improvement suggestions were discussed and the best option was decided altogether with a focus group formed entirely from radiologists, breast surgeons and technicians. The EUSOMA checklist was used to observe the pathway of patients and to compare the current system with well-known standards. Finally, the non-value added tasks were figured out, removed and a new pathway was proposed for the radiology department regarding mammography and breast ultrasound division.

Results

In the radiology department of the breast center, there is one mammography device for the entire hospital. Additionally, there are two breast and two general radiologists and residents for breast-ultrasound. However, they

are not just covering breast pathologies, but are also accepting and analysing all other types of patients. Each month, an average of 547 patients are analysed through mammography in this selected hospital. Under the current conditions, it is hard to manage so many patients and examine them in the correct way.

As seen from the health system data 08:30-09:30 and 13:00-14:00 are the peak hours for registration. Some patients wait for their turns in the hospitals while others go outside and sometimes miss their turn. Uneven work load causes unqualified health service. It increases waiting time of patients and errors in scanning. The process starts with clinical examination. In our center, according to March 2015 data, 68 % of mammography patients are referred from the department of surgery, while radiation oncology follows the department of surgery with a 10 % share. The duration of the current process is shown in *Table 3*. Observing all these processes helps us analyse the bottlenecks and non-value added activities. From the patient entering the hospital until being discharged from the ultrasound room, the process consists of many stages, which increase the anxiety level of patients and treatment delay. The process starts with the patient making an appointment with the call center and continues with the patient's examination in the polyclinic. A gynaecologist or breast oncologist may refer to mammography. The patient goes to the Patient Registration Desk and gets an appointment. The same day or few days after, the patient comes back for mammography. While waiting in the queue, interns call her for filling up a follow-up form and gives her a registration barcode. When her turn comes, the technician shouts her name and the patient enters the room. The patient takes off her clothes in the scanning room; at the same time the technician prepares the equipment, such as using the right apparatus according to the patient's breast type. The technician takes shots and checks for the convenience of images. If it is required, the technician takes more shots. Then the patient dresses back up, while the intern prepares her envelope. The patient goes back to the physician

Table 3. Observed Duration of Patient Flow in Kocaeli Training and Research University Hospital

Main Process Names	Responsible	Duration
Patient gets appointment from MHRS system	Patient	1-2 min
Patient gets barcode from registration desk	Patient	40 sec
Breast Surgery& Gynecology Examination	Breast Surgeon	10 min
Doctor redirects patient to mammography	Breast Surgeon	1 min
Patient goes to mammography registration desk	Patient	5 min
Mammography test date is given to patient	Radiology Admission Staff	2 min
If the test is not on same day, patient comes back again to hospital on test date	Patient	3-4 work day
Patient goes to registration desk	Patient	1-2 min
Barcode label paper is given to patient at admission desk	Admission Staff	30 sec
Patient finds the test room	Patient	3-5 min
Patient waits in the queue	Patient	depends on peak hours
Intern takes the barcode label paper and creates patient file before test time	Intern	10 sec
Intern fills patient follow up form and report date card	Intern	2-3 min
Patient is called for the test while waiting in the corridor	Technician	10 sec
Patient enters the test room	Patient	30-60 sec
Patient takes off clothes for test	Patient	2-4 min
Technician prepares rectangular box for breast type	Technician	1 min
Technician leads patient and the machine	Technician	1 min
4 different screening images are taken	Technician	3-4 min
If not adequate, technician takes up to 2 extra images	Technician	2-3 min
Patient file is prepared	Technician-Intern	1-2 min

in approximately 10 days (whenever the radiologist writes the report) and he/she decides whether she needs an ultrasound or not. If it is required, a new registration process starts. The only difference in the process concerns reporting. The physician dictates the report to a secretary and the report is written simultaneously. After the patient goes to the physician to learn if further investigation is required, the process ends for screening.

After system and process analysis, for a more efficient and qualified process it is necessary to measure performance. In that regard, quantitative indicators should be listed; current and target numbers should be indicated. While performance indicators are defined, measurable and ameliorative processes are taken into consideration. Data are collected from personal observations, information technologies units and authorized employees. In order to measure subprocesses, some qualitative data are transformed into quantitative data via authorized

employees' experiences. Moreover, data tracking and keeping systems are too poor for revealing the current situation. There is no data registry for the pathway of patients in the hospital system. The staff at the desk have no information on whether the mammography machine is being used or not. There is no screen showing the availability. This causes the staff to delay the appointments for further days even though the machine is available at that moment. There is uneven workload during a day, between 9:00-10:00 and 13:00-14:00 the number of patients is peaking. Although appointments start at 8:30, the patient who comes at that hour waits for many hours because admission starts earlier. No peak hour's management. There is no existing queue management; patients are wait in the queue for much longer than expected due to the delays.

Mammography appointments are arranged as 5 minutes each, but take 15 minutes on average. Mammography appointments lengthen out

because patients undress and dress in the scanning area, and there are no private dressing places. The intern filling follow up forms stays in the mammography test room and creates greater chaos in terms of crowdedness. On the other hand, there is no privacy for the patient.

Both ultrasound and mammography are requested by specialists during examination, although mammography is enough for fatty breasts. So an unnecessary workload is created by the physician.

For mammography reporting, the doctor creates a voice recording while reporting and then the secretary types it later on. There is no standardization about secretary's typing time, it depends on her/his workload. Then, the doctor re-checks the report to control its content. That creates double workload. There is no tumor registry standard in the hospital, so calling and informing the patient depends on the experience and skill of the technician. There is a high possibility of missing the importance of the issue. Ultrasound scanning is delayed because the mammography report is issued in 10 working days, although one report takes 1 to 5 minutes. New technician assignments increase the inexact scanning and create higher number of recalls. There is no database for better diagnosis and tracking performance of patient recall rates, tracking cancer patients.

Discussion

With the Value Stream Mapping (VSM) tool, it was possible to have a clear view of the patient's actual steps to get an accurate diagnosis. It was therefore easier to detect the major wasteful points on the map, and the main waiting times. Through VSM it was quickly understood that excessive tests and waiting time for their response, along with patients' movements between different units and the lack of training for surgeon, nurses and navigators were the main problems. The total patient flow time was too high when compared to the high performance hospitals in the European Union, especially in Germany (21-23).

After this analysis, together with the

suggestions from the focus group and SENATURK and EUSOMA guidelines, it has been possible to develop the new map that, through the fusion of different phases, elimination of Non-Value activities such as unnecessary registrations and excessive visits in different days, could help to drastically reduce the total patient flow time to 4 days or even less in case of serious patients. Other important key points have been identified in surgeon training, so that different tests could be performed by just the same person and teamwork with nurses, navigators and secretaries (18,19,24,25).

In addition, the EUSOMA Standards and the European Guidelines for quality assurance in breast cancer screening and diagnosis (2015) state that new, more effective, screening tests must be encouraged and the long-term effects of the various methods of treatment and provision for positive subjects studied for the center. Research must be further developed to answer the numerous social, ethical, legal, medical, organizational and economic questions, as well as psychological problems raised by screening, on which evidence is incomplete (18,19).

Quality assurance should be conducted into the effectiveness of the various screening tests, the practical arrangements for screening, the measures to increase participation, the means of improving test efficiency, follow-up to and provisions for those screened positive, an assessment process and all the economic aspects. Information gathered during screening should be available for the purpose of scientific research, for the improvement of health services, and for the benefit of future screening, taking into account full respect of autonomy and confidentiality and the protection of personal privacy.

Continued with the same European Guideline the general remarks should be as follows (26):

1. It is particularly important that political decision-makers and target groups should be kept informed of the current state of knowledge about the value of screening for particular diseases. Improved communication should be encouraged.
2. Governments should promote the research

and evaluation necessary for assessing the value of both new and existing programs. This form of research necessarily means large scale research which, in some instances, may be designed as international collaborative studies. Scientific evaluation is the only way in which the positive and negative effects of screening can be assessed in order that a rational decision can be taken on whether a screening program should be implemented and what resources should be allocated.

Conclusion

To conclude, literature and studies related to Mammography and Ultrasound fields and Lean Hospital Applications have been carefully examined and several observations, time studies, discussions and meetings are in progress with surgeons, specialists and radiologists at Kocaeli University Training and Research Hospital. According to the collected data and the findings of the literature reviews, it has been recognized that applying lean applications in healthcare plays a crucial role in today's world, since it eliminates non-value added processes, improves healthcare quality, increases both patients' and hospital staff's satisfaction, and decreases the costs. Since breast cancer patient pathways have been our focus study area, medical knowledge related to the field and breast cancer types deeply benefit thanks to the doctors who we have worked together, apart from the literature reviews. The most effective solution for a better process is that, given the qualifications of radiologists are met, it would be better practice to scan a patient by ultrasound and mammography on the same day. All in all, an improved flowchart is created, which eliminates non-value added processes of the current flowchart. In consideration of all these outcomes, it is highly suggested that the hospital apply European Guidelines for quality assurance in breast cancer screening and diagnosis together with the mentioned above improvement suggestions using lean applications.

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