JOURNAL OF INTERNATIONAL HEALTH SCIENCES AND MANAGEMENT

EVALUATION OF EFFECTIVENESS OF LEAN HOSPITAL TRAINING (Example of Health Sciences University Dışkapı Yıldırım Beyazıt TRH)

Prof.Dr. Murat Alper[1], Yeşim Akar[2], Uz.Dr.İbrahim Güven Kartal[3], Metin Aykutluğ[4], Münire Karaman[5], Meryem Hüser[6], Fatma Erduran[7], Hüseyin Gökbulut[8]

[1]Dışkapı Yıldırım Beyazıt EAH /Türkiye /muratalper70@gmail.com
[2] Dışkapı Yıldırım Beyazıt EAH /Türkiye /yesim44akar@gmail.com
[3]Dışkapı Yıldırım Beyazıt EAH /Türkiye /igk84@hotmail.com
[4]Dışkapı Yıldırım Beyazıt EAH /Türkiye /mbaran36@hotmail.com
[5]Dışkapı Yıldırım Beyazıt EAH /Türkiye /munire321@hotmail.com
[6]Dışkapı Yıldırım Beyazıt EAH /Türkiye /meryemhuser@hotmail.com
[7]Dışkapı Yıldırım Beyazıt EAH /Türkiye/fat.maerduran@hotmail.com
[8]Dışkapı Yıldırım Beyazıt EAH /Türkiye/huseyingokbulut@hotmail.com

ARTICLE INFO

Key words: Lean Hospital, Training, Radiology

ABSTRACT

Purpose: The purpose of this study is; to be able to measure the efficacy of Lean Hospital Training given to all employees in Dışkapı Yıldırım Beyazıt Training and Research Hospital Radiology Clinic through pre-test and post-test, to provide understanding of squandering and value concepts, and to gain a new perspective.

Material and Method: The universe of work; all the employees has been determined in Dışkapı Yıldırım Beyazıt Training and Research Hospital. The sample group is composed of specialist physicians, assistants, technicians, paramedics, nurses, secretaries and servants who work as permanent staff and through service procurement in the radiology clinic of the hospital. There are 173 employees in the sample group. In the study, 162 persons were pre-tested between 02.05.2017-31-05-2017, "Lean Hospital Practice Training" was given and the post-test was applied between 01.06.2017-30.06.2017.

Findings: As a result of the trainings it is possible to talk about a general increase in the level of awareness and the level of knowledge on Lean Hospital Practices. In the pre-test, 30 of the 162 respondents answered yes to the question "Are you familiar with the lean practices?", 24 of these 30 respondents said the level of knowledge is low. In the post-test, 148 of the 162 respondents answered yes to this question, and 148 of the respondents answered yes to 119 moderate level of knowledge. When the relationship between the demographic data and the areas where they think it is squandering was examined, it was found that there was a significant relationship between the labor force over 20 years and the waste of labor force , and a significant relationship between the waste of time and those over 46 years of age ($p < 0.05$).

Introduction

Health systems are under increasing pressure to increase performance,

productivity and patient satisfaction while providing more individual health care service processes (Trebble and Hydes, 2011). These include costs that exceed the budget, faults that affect patient safety, time spent by patients and general bureaucratic inefficiencies. However, from a lean point of view, these costs can be removed from health services, especially from hospitals. In addition, the application of lean thinking principles will ensure that patients wait less time between processes and start treating patients more quickly, deliver laboratory analysis results to doctors much faster, and treat more patients within a day and reduce costs (Yıldız and Salman, 2015) .

Lean; can be expressed as a series of systematic techniques to shorten the total operation time by removing the non-value-added activities in the customer value chain with continuous improvement activities (Apilioğulları, 2010).

Lean, is the name given the purpose of thought and regime with all the systems and techniques applied; in the process of producing products and services, focusing on the concept of value from the beginning (raw material) to the end (product/service delivery), destroying squandering (wasted resources, loss) and maintaining the value with minimum interruption during this process, delivering to the final customer in a fast way, (Solak, 2015).Lean is removal of goods or services that do not provide value for production, unnecessary material and labor movements, stocks, mistakes and long preparation time. (Kavrakoğlu, 1998). The lean management system is better, faster and cheaper; It is a system that removes wasteful applications, which require fewer spaces, inventions, working hours. (Morgan and Liker, 2007).The Toyota Production System that Toyota has put into practice is the foundation of the lean production system. The revolution, Sakichi Toyoda started in hand weaving looms, was developed and transformed into automation to increase productivity, reduce wastage, increase respect for human beings and finally improve quality by Kiichro. (Solak, 2015) Problem solving in Toyota culture is indispensable concept between human and product value flow. Likert described the product and human value stream as an organizational DNA, problem solving as connective code of the two in the book. (Liker, 2011) If we talk about lean hospital; A lean hospital does not see employees as a cost to be reduced; they are real sources of value in terms of patients and hospital. Senior leaders guarantee that lean improvements will not lead to dismissal. A lean hospital helps its employees to understand that all activities do not add value. Instead of defining squandering as "our work", everybody will be able to eliminate squandering and focus more time on the patients. A lean hospital includes every employees to the efforts of improvement of the work, supports the desire to provide excellent care to patients. Leaders help employees to understand their works' place in the value stream and collaborate on kaizen. A lean hospital does not force employees to do more work than can be done with high quality and does not push employees to work harder or be more cautious as a way of quality, safety or productivity. (Graban, 2011). when minimizing the squandering in the system and directing the resources to create more value with lean thinking applications, not only the profitability of the companies increase but also the customers can find more appropriate, cheap, quality products and services. (Nick, 2004).

Acceptance of all employees that such an approach is necessary on the road to the future is key to creating self-sustainable lean businesses (Womack and Jones 2012)

Removing the squandering reduce costs, provide more services, improve quality and improve employee satisfaction and this is a

good thing for all our hospital stakeholders. (Marchwinski, 2011). The creation of a long-term philosophy and the unification of employees around this philosophy are the most important and essential steps to be taken in the transition to lean governance (Liker, 2015). For this reason, it is necessary and important to provide lean hospital trainings to employees.

MATERIAL METHOD

Purpose of the research

The purpose of this study is; To be able to measure the efficacy of Lean Hospital Training given to all the employees serving in Radiology Clinic of Dışkapı Yıldırım Beyazıt Training and Research Hospital of Health Sciences University through pre-test and post-test, to provide understanding of squandering and value concepts and to gain a new perspective.

The Universe of Research and Sampling

The universe of work; all the employees has been determined in Dışkapı Yıldırım Beyazıt Training and Research Hospital. The sample group is composed of specialist physicians, assistants, technicians, paramedics, nurses, secretaries and servants who work as permanent staff and through service procurement in the radiology clinic of the hospital. There are 173 employees in the sample group.162 people were included in the study. In this way, 93.6% of the sample group is reached.

Data Collection Method

The data collection tool is a survey form prepared to be applied to the radiology clinic employees.

Pre-Test & Post Test questions consist of; demographic data on employees' awareness of lean hospital practices, lean hospital knowledge levels and 22 questions measuring squandering perceptions.

The questionnaire forms were filled with face-to-face interview techniques. In the study, 162 persons were pre-tested between 02.05.2017-31-05-2017, "Lean Hospital Practice Training" was given and the post-test was applied between 01.06.2017-30.06.2017. The study was conducted with the consent and support of the hospital management.

Statistical Analysis

The level of significancy was determined as 0.05 in statistical analyses. Analyses were performed using SPSS 24.0 statistical package program.

Training Subjects

Trainings given to radiology clinic employees include the following topics.

- What is Lean?
- Lean in the world and Turkey
- What is squandering?
- What are the 7 basic squandering?
- What are the causes of squandering?
- Lean Application Tools
    - -Standardization
    - Value Stream Mapping (VSM)
    - -Kanban
    - Single minute Exchange of Die (SMED)
    - -JIT
    - -Pok-Yoke
    - -Kaizen
    - -Total Efficient Maintenance (TPM)
    - -Jidoka

FINDINGS

When the survey was applied, questions were asked to the radiology staff about demographic data that questioning the occupation, age, sex, educational status, year of study at the institution. The data for the responses are shown in table 1 below.

Table 1: Demographic Data

VARIABLES		**Frequency**	**Percentage %**
Working status at the institution	Permanent Employees	109	67
	Service Procurement Staff	53	33
Age	18-25	21	13
	26-35	51	31
	36-45	43	27
	46-55	35	22
	56+	12	7
Gender	Women	87	54
	Men	75	46
Educational Status	Secondary	1	0,6
	High School	37	23
	Associate Degree	59	36,4
	Undergraduate	36	22
	Post graduate	7	4
	Phd	22	14
Year of Study at the Institution	0-5	63	39
	6-10	25	15
	11-15	12	8
	16-20	17	10
	21+	45	28
Occupation	Doctor	34	21
	Technician	36	22
	Paramedic	34	21

	Nurse	13	8
	Secretary	20	12
	Other	25	16

When the above table is examined, it is seen that 67% (109) of the radiology clinic employees are permanent staff, 51 of them are in the age range of 26-35, 54% (87) of the employees are female, 36% (59) are associate degree graduates, 39% have been working in the institution since 0-5 years, and 22% of the employees are serving as radiology technicians.

Table 2: Lean Hospital Awareness Pre-Test-Post Test (Yes responders were tabulated) N = 162

Questions	**Pre-Test**		**Post-Test**		**Post- Test - Pre-Test Difference (%)**
	n	**%**	**n**	**%**	
Are You familiar with Lean Manufacturing?	30	18.5	137	84,5	66
Do you think that is there any squandering in your working area?	37	22,8	106	65,4	42,6
Do you think that is there any waste of time in the unit you work on?	38	23,4	94	58	34,6
Do you think that is there any waste of medical device in the unit you work on?	7	4,3	38	23,4	19,1
Do you think that is there any waste of consumable material in the unit you work on?	10	6,1	39	24	17,9
Do you think that is there any waste of unnecessary test in the unit you work on?	32	19,7	126	77,7	58
Do you think that is there any waste of workforce in the unit you work on?	24	14,8	84	51,8	37

When the pre-test and post-test questionnaires are compared with the answers given to the questions of lean hospital awareness level; to the question "Are you familiar with lean production?" 30 employees answered yes in the pre-test and 137 employees answered yes in the post-test. To the question "Do you think that is there any squandering in your working area?", 37 people answered yes in the pre-test and 106 people answered yes in the post-test. To the question "Do you think that is there any waste of time in the unit you work on?" 38 people answered yes in the pre-test and 94 people answered yes in the post-test. To the question "Do you think that is there any waste of medical device in the unit you work on?" 7 people answered yes in the pre-test and 38 people answered yes in the post-test. To the question "Do you think that is there any waste of consumable materials in the unit you work on?" 39 people answered yes in the pre-test and 10 people answered yes in the post-test. To the question "Do you think that is there any waste of unnecessary test in the unit you work on?" 32 employees answered yes in the pre-test and 126 employees answered yes in the post-test. To the question "Do you think that is there any waste of workforce in the unit you work on?" 24 people answered yes in the pre-test and 84 people answered yes in the post-test. Mentioning waste of electricity and water as squandering in the pre-test while mentioning the waste of time and workforce in the post-test shows that training reaches its purpose. When the

relationship between the demographic data and the areas where they think it is squandering was examined, it was found that there was a significant relationship between the employees work over 20 years and the waste of workforce, and a significant relationship between the waste of time and people over 46 years of age ($p < 0.05$).

DISCUSSION AND CONCLUSION

Lean applications are used with the purpose of preventing or reducing errors that may develop in service delivery and eliminating activities that do not add value.

There are many improved studies using lean hospital practices. Lean initiatives in health care can affect employees and the working environment. For this reason, employees can increase their productive attitudes to solve their problems and attention to the syllabus (Poksinska, 2010). In addition, employees can increase their morale and reduce their stress by implementing lean health services (Rexhepi and Shrestha, 2011). Some of the gains from lean work done at the Virgina Mason Medical Center are as follows. Efficiency has increased by 36%, moving distances of people have been reduced by 44%. (Yuksel 2012) "Lean studies at the same hospital also significantly reduced the walking distance of nurse and nursing staff. Nursing steps have been reduced from 5818 to 846 and patient care officers from 2664 to 1258. (2012) In comparison with the stocking which was left by Solak (2015), and the new working systems which resulted from the lean practices resulting from the personnel work load (time direction) related to this, the walking distance was reduced to the most frequently used materials and thus the unnecessary movement time of the personnel was shortened. From all these studies, working in the radiology department; that lean hospital practices have a positive effect on the working environment and that movement distances can be significantly

reduced. These studies have been shown as examples to employees.

“Thanks to e-prescribing, previous activities that resulted in waste of time, paper, in the need
for excessive storage which slowed the workforce have been replaced with improvements in
all of these areas. In hospitals, the employee satisfaction among pharmacists has increased and the process has gained speed due to e-prescribing” (Kılıç et al., 2014). During the lean hospital trainings, other than the radiology clinic, the patients were provided with a good understanding of the subjects in their work with examples of successful practice in other units of the hospital.

The health sector is a service sector with complex structure. It is very difficult but necessary to increase the satisfaction of patients and employees while avoiding the squandering in this sector where cost, input and expectancy are quite high. In this context, studies were started in the radiology clinic of the hospital, it is aimed to evaluate the knowledge levels of the employees before and after the training and the perspectives of the patients on the squandering have been evaluated.

As a result of the trainings it is possible to talk about a general increase in the level of awareness and knowledge on Lean Hospital Practices. When paying attention to the questions that are questioning the level of lean hospital awareness, it is clear that there is an increase in the number of questions answered yes in the post-test and the yes response given to the issues they mentioned squandering in the pre-test. With this increase it is possible to deduce that there has been change in employees' perception of squandering and perspective.

When the amount of increase between pre-test and post-test are examined, it has been seen that it has increased 66% in the question " Are you familiar with lean production?", 42.6% in the question " Do you think that is there any squandering in your working area?", 34.6% in the question "Do you think that is there any waste of time in the unit you work on?" % 17,9% in the question "Do you think that is there any waste of unnecessary test in the unit you work on?" 58% in the question " Do you think that is there any waste of medical device in the unit you work on?" % 19,1 in the question " Do you think that is there any waste of consumable materials in the unit you work on?” 37% in the question “Do you think that is there any waste of workforce in the unit you work on?" There are serious differences in the answers given to open-ended questions as pre-test and post-test.

As a result, it is necessary to say that the purpose of the trainings on lean hospital applications given to radiology clinic staff is reached and radiology employees are aware of lean hospital practices .With the training provided, there is a difference in the perspectives on squandering of the employees. After the training, many suggestions were made from the staff of the radiology clinic about the amendments that can be made in their study areas. These proposals, aimed at increasing the activities that removed the squandering and add value, revealed that trainings reached their goals.

REFERENCES

Apilioğulları L. (2010), "Lean Transformation", Sistem Publishing, Istanbul,:8-36

Graban M. (2011), "Lean Hospital", Optimist Publications, Istanbul, 29-47

Kavrakoglu, İ., (1998), "Total Quality Management", Kalder Publications, Istanbul: 9

Kılıç T, Bostan S, Şahin G., (2016), "Example of Lean Management in the Health Sector;

E-Prescription Application", Int Journal Of Health Manag And Tourısm 1(1), 29-40

Liker J.K and Hoseus M. (2011), T"oyota Culture", Optimist Publications, Istanbul,:5-20

Liker, J. (2015) "Toyota Style". Optimist Publications, Şensoy (çev.) Istanbul:15-30, 2nd Printing.

Marchwinski C. (2011), "Dictionary of Lean Concept"s, Optimist Publications, Istanbul, 90

Morgan, M.J. and J. Liker. (2007), "Toyota Product Development System". A.Yılmaz (trans.). Istanbul: Farba Publications, 19

Nick, K. (2004), "Declaration on Lean Thinking Development, Lean Summit Congress", Istanbul, 10-26

Poksinska, B., (2010), "The Current State of Lean Implementation in Health care: Literature Review," Manage Health Care, vol. 19, no. 4, pp. 319-329,

Rexhepi, L. and Shrestha, P., (2011). "Lean Service Implementation in Hospital: A Case study conducted in University Clinical Centre of Kosovo, Rheumatology department", Master Thesis, Umea School of Business, Umea University, Sweden.

Solak A. (2015), "Investigation of Lean Hospital Application in a Private Hospital in Antalya" Okan University Graduate School of Health Sciences Department of Health Management Graduation Thesis,:4

Trebble, T.M., T. Hydes (2011), "Redesigning Services Around Patients and Their Doctors: the Continuing Relevance of Lean Thinking Transformation", Clinical Medicine, Vol. 11, No 4, August, pp. 308-310.

Womack J.P. and Jones D.T. (2012), Lean Thought, Optimist Publications, Istanbul, 52-76

Yıldız T. and Yalman F. (2015), "A General Lıterature Revıew On Lean Implementatıons In Health Instıtutıons", International Journal Of Healt Management and Strategies Research, Volume:1, Issue:1,:1-16