



**NEAR EAST UNIVERSITY**  
**INSTITUTE OF GRADUATE STUDIES**  
**BUSINESS ADMINISTRATION PROGRAM**

**POTENTIAL BENEFITS OF LEAN MANAGEMENT PRACTICES TO  
HOSPITAL ENTERPRISES AND AWARENESS OF HEALTH MANAGERS  
IN TURKEY**

**Ph.D. THESIS**

**Seval YETGİN**

**Nicosia**  
**February 2022**



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**Nicosia**

**February 2022**

## Approval

The thesis titled "**Potential Benefits Of Lean Management Practices To Hospital Enterprises And Awareness Of Health Managers in Turkey,**" prepared by **Seval YETGİN**, was accepted as Ph.D. THESIS in Business Management Department on 11/02/2022 regarding its compliance with quality standards in terms of scope and quality.

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### **Statement of Compliance with Ethical Principles**

I have obtained the data, information, and documents I have presented in this thesis within the framework of academic and ethical rules; I give all information, documents, evaluations, and results by scientific ethics and morals; I declare that I have made complete reference to all data, thoughts, results, and information that do not belong to me in this study, by scientific, ethical rules, and that I have cited the source.

**Seval Yetgin**

**11/02/2022**

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**Seval Yetgin**

## Özet

### **Yalın Yönetim Uygulamalarının Hastane İşletmelerine Potansiyel Yararları Ve Türkiye’de Sağlık Yöneticilerince Bilinirliği**

**Seval Yetgin**

**Doktora, İşletme Yönetimi Bilim Dalı**

**02,2022 158 sayfa**

Hastaneler çeşitli sağlık hizmetlerinin verildiği, yapısal olarak karmaşık, klinik hizmet yanında eğitim ve araştırmanın da yürütüldüğü maliyeti yüksek işletmelerdir. Sağlık sisteminin en önemli parçası olarak hastanelerin öncelikli hedefi, sağlık hizmetini toplumun bütün kesimlerince kullanılabilir halde tutmak ve beklenen sosyal faydayı sağlamaktır. Ancak bu karmaşık hizmet süreçleri birçok hataları da barındırmaktadır. Dünya Sağlık Örgütü her on hastadan birinin hasta bakım süreçlerinde tıbbi hatadan dolayı zarar gördüğünü belirtmektedir.

Hastane yönetiminde tıbbi hataların ve verimsizliklerin önüne geçmek için birçok yöntem önerilmektedir. Yalın yönetim uygulamaları bunların en umut vadedenleri arasındadır. Yalın kavram olarak, gereksinim duyulmayan her şeyden kurtulmaktır. Yalın düşünce herhangi bir hizmet sunumu veya ürün üretimi sırasında israfın önlenmesi ve verilen hizmette değerin ön plana çıkarılmasına dayanmaktadır. Yalın yaklaşım, ürün veya hizmet sunumunu düşük maliyetle, daha hızlı, kaliteli verimli müşteri bakış açısından değeri hedef olarak gerçekleştiren faaliyetlerin bütünüdür. Yalın hastane yönetimi, sağlık hizmetlerinin sunumunda yalın ilkelerin amaç edinilip uygulanmasıdır. Hastanelerde kaliteyi artırmak ve maliyetleri azaltmak için yalın yönetim en önemli stratejilerden birisi olarak kabul edilmektedir. Hastanelerde yalın düşünce ilk defa İngiltere’de ve Amerika Birleşik Devletleri’nde uygulanmaya başlamış, giderek sağlık hizmetlerinin her alanında yayılmıştır.

Yalın yönetimin benimsenmesinde ve uygulamaya başlanmasında ilk yapılması gereken, çalışanların ve işletme yöneticilerinin yalın yaklaşımı uygulayan işletmelerin yöneticilerinin görüşlerini öğrenmek ve işletmelerde yapılan yalın

faaliyetleri izlemek oluşturmaktadır. Hastanelerde hasta kayıt bölümü, kan alma bölümü, poliklinikler, acil servis, hastane eczanesi, ameliyathane, yoğun bakım ünitesi ve yatan hasta bölümü yalın yönetimin özellikle uygulanmasında yarar bulunan kısımlardır. Araştırmanın amacı, yalın yönetim uygulamaları ile hastane işletmelerine potansiyel yararları arasındaki ilişkiyi ortaya koymak ve halen yönetici olarak yalın hastanede çalışan, yalın hastane ile ilgili eğitim almış olan yöneticilerin konuyla ilgili bilgi ve tutumlarını tespit etmektir. Bu çalışma, yalın yönetimin olası faydalarını inceleyerek sağlık yöneticilerinin dikkatlerine sunmak ve iyi yönetim uygulamalarının benimsenmesine katkı sağlamak açısından yararlı olabilir. Türkiye’de halen yalın hastane uygulamalarını başlattığını öne süren hastanelerin üst düzey yöneticilerinin yalın yönetim ile ilgili bilgi ve tutumlarının tespit edilmesi saha araştırmasının kapsamını oluşturmaktadır. Araştırma Türkiye’de yalın yönetim tekniklerini uyguladığını deklere eden 5 hastanede gerçekleştirilmiştir. Bu hastanelerin üst düzey yöneticileri ile anket görüşmeleri gerçekleştirilmiştir. Bu yöneticilerin unvanları; hastane yöneticisi, başhekim, başhekim yardımcısı, idari ve mali hizmetler müdürü, idari ve mali hizmetler müdür yardımcısı, sağlık bakım hizmetleri müdürü, sağlık bakım hizmetleri müdür yardımcısı ve kalite direktörü şeklindedir.

Araştırmada, yalın yönetimin klinik alanlara uygulanması ile tıbbi hataların önlenmesi arasında; yalın hastane uygulamaları ile maliyetlerin azalması arasında; yalın yönetim uygulamaları ile hasta memnuniyeti arasında; yalın yönetim uygulamaları ile çalışan memnuniyeti arasında; yöneticilerin yalın hastane ile ilgili yeterli eğitimi almış olmaları ile yalın uygulamalara ilişkin tutumları arasında; yöneticilerin yalın yönetim uygulamalarını yapmayı isteyip istememeleri ile yalın uygulamalara ilişkin tutumları arasında anlamlı bir ilişkiler bulunmuştur.

Türkiye’de hastanelerin yönetiminde yalın uygulamasına geçilmesi önerilmiştir. Bu önerinin başarıyla uygulanabilmesi için Sağlık Bakanlığı düzeyinde ve hastaneler düzeyinde yapılması gerekenler vardır. Sağlık kuruluşlarında yalın farkındalığının istenildiği düzeye gelebilmesi için ise akademisyenlerce, özel sektör girişimcilerince ve mesleki kuruluşlarca katkı verilmesi gerekmektedir.

**Anahtar Kelimeler:** yalın yönetim, yalın hastane, hastane yöneticileri, potansiyel yarar.

## **Abstract**

### **Potential Benefits Of Lean Management Practices To Hospital Enterprises And Awareness Of Health Managers in Turkey**

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**Ph.D., Department of Business Administration**

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Hospitals are organizations that provide various health services. They are structurally complex and have high costs, where education and research are carried out and clinical services. As the most critical part of the health system, the primary goal of hospitals is to keep health services available to all segments of society and provide the expected social benefit. However, these complex service processes also contain many errors. The World Health Organization states that one out of every ten patients suffers from medical error in patient care processes.

Many methods are suggested to prevent medical errors and inefficiencies in hospital management. Lean management practices are among the most promising of these. As a lean concept, it is getting rid of everything unnecessary. Lean thinking is based on preventing waste during service delivery or production and emphasizing value in the service provided. The lean approach is the whole of the activities that perform the product or service delivery at low cost, faster, with higher quality, and by targeting value from the customer's point of view. Lean management is considered one of the essential strategies to increase the rate and reduce hospital costs. Lean thinking in hospitals was first applied in England and the United States and gradually spread to all areas of health care.

The first thing to do in adopting and implementing lean management is to learn the views of the employees and business managers of the organizations that implement the lean approach and monitor the lean activities carried out in the businesses. In hospitals, patient registration department, blood collection department, polyclinics, emergency service, hospital pharmacy, operating room, intensive care



unit, and inpatient department are the parts that are particularly beneficial in the implementation of lean management.

The research aims to reveal the relationship between lean management practices and their potential benefits to hospital businesses and to determine the knowledge and attitudes of the managers who are still working in the lean hospital as managers and who have received training on the lean hospital. This study can be helpful in terms of examining the possible benefits of lean management, bringing it to the attention of health managers, and contributing to the adoption of good management practices. Determining the knowledge and attitudes of the senior managers of the hospitals, who claim to have started lean hospital practices in Turkey, about lean management constitutes the scope of the field research.

The research was carried out in 5 hospitals in Turkey that declared to apply lean management techniques. Survey questionnaire interviews were conducted with the senior managers of these hospitals. These managers; hospital manager, chief physician, assistant chief physician, administrative and financial services manager, administrative and financial services assistant manager, health care services manager, health care services assistant manager, and quality director. In the research, between the application of lean management to clinical areas and the prevention of medical errors; between lean hospital practices and cost reduction; between lean management practices and patient satisfaction; between lean management practices and employee satisfaction; between the managers' having received adequate training on lean hospital and their attitudes towards lean practices; between the managers' willingness to implement lean management practices and their attitudes towards lean practices; significant relationships were found ( $p < 0.05$ ).

It has been suggested to switch to lean practice in the management of hospitals in Turkey. For this proposal to be implemented successfully, there are some things to be done at the level of the Ministry of Health and the group of hospitals. For lean awareness in health, institutions, academicians, private sector entrepreneurs, and professional organizations are required to reach the desired level.

**Keywords:** lean management, lean hospital, hospital managers, the potential benefit

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## Abbreviations

<b>3M</b>	: Muda, Mura, Muri
<b>ABD</b>	: United States of America
<b>BAKKA</b>	: Western Black Sea Development Agency
<b>DSÖ</b>	: World Health Organization
<b>EKG</b>	: Electrocardiography
<b>JIT</b>	: Just in Time
<b>KUZKA</b>	: North Anatolian Development Agency
<b>SDP</b>	: Health Transformation Program
<b>SPSS</b>	: Statistical Package For Social Science for Windows



## **CHAPTER I**

### **INTRODUCTION**

This section gives the problem, purpose, importance, limitations, and related research definitions.

Lean management is a management style that aims to eliminate waste in service delivery with lean techniques and aims excellence in value throughout the workflow (Deran & Beller, 2014; Gök & Arıcı, 2016; Özkan & et al., 2015; Çankır, 2010; Çetin, 2014; Turan, 2018). Lean management was first applied in 1950 by Eiji Toyoda and engineer Taiichi Ohno, who worked together as engineers at the Japanese Toyota company (Çetin, 2014). According to Graban, the lean approach is an effective healthcare institution management style that increases patient and employee satisfaction, prevents waste, reduces costs, supports employee participation, and increases productivity and quality (Solak, 2015; Savage & et al., 2016; Tay, 2016; Lindskog & et al., 2016). Over the past few decades, many hospitals in many countries worldwide have begun to adopt world-class approaches. Better health service delivery with a lean system is most important (Bucci & et al., 2016). Lean thinking in hospitals has started to be adapted to management practices for the first time in England. The United States and lean management practices have increased gradually in all areas of health services (Yıldız & Yalman, 2015). The lean approach has been a general understanding used in Swedish hospitals to improve patient care processes and reduce costs (Dellve et al., 2015).

The lean management approach, the most appropriate management model for hospitals, is applied in Norway, Sweden, Denmark, the USA, England, Australia, and Germany. A hospital located in a rural area in the United States has reduced the duration of patients by 44%, increased the number of patients by 10%, increased the level of patient satisfaction by 92%. Lean methods have increased the morale and motivation of employees (Derin, 2008). It has been discussed in various articles about education-related training, and the hospital for training for health education has not been considered (Yıldız & et al., Yaman, 2015; Andreamatteo & et al., 2015; Taşdemir & et al., 2021).

### **The Problem of Research**

In this research, the difficulties arising from the management style of hospitals with a complex structure, the significant increase in the elderly population in the society, the increase in treatment and medical care costs due to chronic diseases, and the methods applied by the hospital management are insufficient in preventing wastage in hospitals. However, hospitals cannot achieve different successful results because they use the same techniques, which are inadequate in the face of rapid change and development in health. For this reason, it has been focused on the necessity of lean management practices of hospitals to manage hospitals more simply and easily, prevent waste in hospitals quickly, follow the developments in health at low cost, and be successful. For this purpose, the problem statement of the research was formed about the problem identified above. Are there “potential benefits of lean management practices to hospital businesses”? Is there a significant relationship between "lean management practices and the managers' attitudes who are still working in the lean hospital and who have received training on lean hospital management"?

The purpose of the research is to reveal the relationship between lean management practices and their potential benefits to hospital businesses and to determine the knowledge and attitudes of managers who are still working in a lean hospital and who have received training on lean hospital about lean management. In this research, they have received training on; It is thought that it will be significantly effective in the successful implementation of the lean approach in hospitals, in identifying the obstacles in front of lean management and creating policies accordingly, in developing lean applications, in the adoption of lean management by managers, in spreading lean management practices in hospitals, and in examining the potential benefits of lean applications to hospital businesses.

### **Sub-Objectives**

The sub-purpose of the study is to investigate whether there is a significant difference between the demographic variables and the attitudes of the managers who are still working in the lean hospital and who have received training on lean hospital management towards lean management practices.

### **Limitations of the Research**

With hospitals in the provinces of Bursa (1. Private Medicabil Hospital/Bursa. 2.İnegöl State Hospital), Bartın (3. Bartın State Hospital), Konya (4. Konya Numune Hospital) Sinop (5. Sinop Atatürk State Hospital) which are attempting to implement lean hospital applications limited. In the research, 75 managers who are still working in a lean hospital and have been trained in lean hospital management; hospital manager, chief physician, assistant chief physician, administrative and financial services manager, administrative and financial services assistant manager, health care services manager, health care services assistant manager, quality director limited to. Definitions Lean Thinking: Getting rid of everything that is not needed. Lean Hospital: It is the management style followed by hospitals that aim and apply lean principles to deliver health services. This study can be helpful in terms of examining the possible benefits of lean management, bringing it to the attention of health managers, and contributing to the adoption of good management practices.

## CHAPTER II

### Conceptual Foundations and Related Research

This section gives conceptual explanations, definitions, and information on previous research in the literature related to the research.

#### Hospitals as a Business

##### Hospital Description

Hospitals; They are costly businesses that provide various health services equally to everyone, are structurally complex, and where education and research are carried out expensive companies (Ağırbaş, 2016; Yıldız & Yalman, 2015; Demir, 2016; Kılıç & Güdük,2018). The primary goal of hospitals, which is an essential part of the health system, is to provide social benefits due to the importance of health services (Şentürk, 2017).

##### Features of Hospitals

Features of hospitals were expressed by Demir (2016) as follows:

- Cases in hospitals are urgent and cannot be postponed.
- Applications made are risky and do not accept mistakes.
- Hospitals require specialization.
- Hospitals are complex organizations.

##### Activities of Hospitals

The activities of hospitals can be examined in four basic dimensions(Keskin, 2017; Demir, 2016):

**a) Treatment services:** One of the important goals of hospitals is to provide treatment services. They are businesses that provide health services on an outpatient

or inpatient basis.

**b) Protective and improving health services:**

They take an active role in protecting health from bad habits. Vaccination services play an important role in improving health.

**c) Educational services:** Consists of in-hospital education and public education.

**d) Research services:** Hospitals' research is carried out in medical sciences, and hospitals contribute to the study.

### **Classification of Hospitals**

According to Keskin (2017), the classification of hospitals is made as follows:

**a) Town hospital;** these hospitals integrate examination and treatment services, outpatient and inpatient medical interventions, and public health services, and patients are referred in cases requiring further analysis.

**b) Day hospital;** In many areas, at least five patients who are provided with health services without daily hospitalization are within the scope of a continuously operating health institution with a follow-up capacity.

**c) Normal hospitals;** They are costly businesses that provide various health services equally to everyone, are structurally complex, and where education and research are carried out (Ağırbaş, 2016; Yıldız & Yalman, 2015; Demir, 2016; Kılıç & Gütük, 2018).

**d) Private branch hospitals;** the follow-up, examination, and rehabilitation of exceptional cases are implemented.

**e) University hospitals;** They are general and private branch hospitals where medical specialists and subspecialties are trained.

### **Types of Errors Encountered in Hospitals**

There are many errors encountered in hospitals. The types of mistakes experienced in hospitals are listed by Özkan (2018).

- Mistakes made in the patient admission process
- Directing patients to wrong polyclinics
- Errors during the inspection
- Requesting unnecessary analyzes and examinations
- Errors that occur during surgery
- Misuse of drugs and materials
- Medical mistakes made in the treatment of inpatients
- Lack of drugs and supplies that are important for the emergency department
- Mistakes made in the follow-up of patients after surgery
- Errors related to patient safety
- Unnecessary stocking
- Errors in medical accounting transactions
- Mistakes made inpatient care services

World Health Organization (WHO) states that one out of every ten patients suffers from medical errors in patient care processes(Çavmak, 2018).

### **Characteristics of Hospital Managers**

A hospital manager is a person who ensures timely achievement of goals and objectives in the institution, correctly determines the need for resources for the realization of uses the allocated resources appropriately, and directs people precisely(Demir & Ballıoğlu, 2017).

In general, the characteristics of a successful manager can be listed as follows (Yüksel, 2015):

- Behaving impartially towards employees,
- Having strong persuasion skills,
- Continuity of personal development,
- Good communication with people,
- Taking responsibility,
- Having an understanding structure,
- Encouraging people to work in groups,
- Being able to treat people fairly,
- Being an effective trainer,
- Know your duties and powers,
- To be patient, determined, strong-willed, tolerant, and resilient.

The manager's main task is to ensure that the team working under her and the departments fulfill their responsibilities and direct her subordinates by the purpose of the enterprise(Yılmaz,2017). Character traits of managers directly affect the decision-making process, problem-solving abilities, ways of thinking, and communication skills (Alan & Baykal, 2018). Since health services have an irreversible feature, hospital managers must be influential and well-equipped people in the management process. (Yılmaz, 2017). Having medical science alone is not enough for hospital management. Must have holistic knowledge and equipment in administrative sciences, finance, and communication skills. (Yüksel & et al.,2016).

Since the health service provided in hospitals is directly related to human life, hospital management is quite different from other businesses in this respect(Kamer, 2018). Developments in health are changing rapidly, both medically and technologically. For this reason, hospital managers should have the potential to

follow and implement the results in health in the best way (Keklik, 2012).

### **The Importance of Operating Rooms**

Operating rooms are particular sections that contain many physical, chemical, psychological and biological factors, and sterility is of high importance (Fidan & et al., 2018; Kılıç & Taştan, 2016). General surgery specialist in charge of the management of operating rooms; He is directly responsible to the chief physician of the hospital for performing the surgeries without interruption, providing and protecting the necessary medical supplies, in-service training of the operating room personnel, and the active room order (Özkut, 2018). Operating rooms are critical hospital units in patient safety, employee safety, safe surgery, and expenditure conditions (Perger et al., 2013).

#### **A Method Proposal for Evaluating the Operating Room Efficiency**

While the method is recommended to evaluate the efficiency of the operating room, the Pabon Lasso Model, which is applied to determine the efficiency of the hospitals, is based. It is defined as follows by Yiğit and Esen (2017). Hipolito Pabón Lasso developed this model in 1986 to determine the efficiency of hospitals. Pabon Lasso produces it. It is a valuable model that has been accepted to evaluate the efficiency of hospitals or inpatient departments within the same conditions. The Pabon Lasso Model plays an essential role in determining countries' health policies (Yıldız, 2017).

According to Yiğit and Esene (2017), hospitals are evaluated in 4 regions in the Pabon Lasso model:

1. Region: The bed occupancy rate and bed turnover rate are low in this defined region. For this reason, this region is expressed as unproductive.
- 2: Region: The bed turnover rate is high, and the low bed occupancy rate.
3. Region: Bed turnover rate and bed occupancy rate are high. For this reason, this region is expressed as productive.
4. Region: The bed occupancy rate is high in this defined region and the a low bed turnover rate.



The primary focus in operating room efficiency is streamlining current steps in inpatient care before, during, and after surgery. These studies focus on how to improve the ergonomics and organization of the operating room, how to detect and eliminate delays in the operating room as a whole, and to establish a control mechanism whether the duration of a particular variable can be shortened in the operating room (Alicı & et al.,2014; Milewski, 2020).

### **The Importance of Evaluating Operating Room Efficiency in Hospitals**

From the hospital point of view, efficiency is to use the least costly inputs with maximum capacity in the health service production process without compromising the quality value of the output(Ağırbaş, 2016; Arakelian & et al.,2011). It is seen that it is more appropriate to evaluate the productivity in hospitals, both in the hospital and between the hospital units, and consider the units' characteristics (Fil, 2017). In the transition of hospitals to lean management, it may not be possible for all teams to make this transition simultaneously. It may not be possible for all units to make this transition simultaneously. In this respect, it is recommended to pass the essential sections for the management in order. Considering an example of one of them, operating room services, which are an important application place of hospitals, are mentioned. If a successful lean management application is made in operating room management, it will set an example for other departments (Güner, 2015).

#### **Factors affecting operating room efficiency:**

- Behaviors of managers,
- Organization culture,
- Laws,
- Behaviors of employees,
- Type of surgery,
- Characteristics of the people making the assessments (Güner, 2015).

Increasing productivity in hospitals is essential for hospital management, and it makes a significant contribution to the formation of health policies (Yıldız, 2017; Tripathi et al., 2016; Çekiç, 2015). Operating rooms are directly related to the increase decrease in productivity in hospitals. Operating table usage rates are an

essential indicator of hospital performance. For this reason, planning the effective and efficient use of operating tables is a critical study in hospital managers. (Öztaş & et al., 2015; Lehtonen & et al., 2013). Postponing emergency surgery may increase the patient's risk. Postoperative complications and morbidity waiting times depend on the speed of the operating room. Therefore, it is essential and necessary for the surgeries to be planned(Wullink & et al., 2007).

These studies ultimately have a significant effect on increasing the volume of surgery and increasing the operating room's efficiency. The uninterrupted workflow in the operating rooms increases efficiency and reduces medical problems in the operating room(Alicı & et al.,2014; Milewski, 2020; Gamble, 2020). Among the factors that ensure efficiency in the operating room are reducing the personnel cost per operation by at least 7%, postoperative complications and operation waiting times, and the acceleration of the chain-related procedures.(Lehtonen & et al., 2013; R.M, 2020). In terms of clinical effectiveness, it benefits, such as getting rid of the medical risks arising from the postponement of the surgeries (Wullink & et al., 2007).

While evaluating the efficiency of the operating room traditionally, qualitative criteria such as the elapsed Time between surgeries, postponement rates in planned surgeries, extended times in the scheduled operation times, the degree of compliance of operating room processes with efficiency principles, lean management approaches, as well as quantitative measures such as calculations made with the six sigma approach are used. The most frequently used criterion is the operating table occupancy rate since it can be easily calculated and is an objective criterion (Yiğit & Esen, 2017).

### **Adapting Pabon Lasso Hospital Efficiency Assessment Model to Operating Room Efficiency**

In this adaptation, the efficiency assessment is made through the linear relationship between operating table turnover rate and operating table occupancy rate.

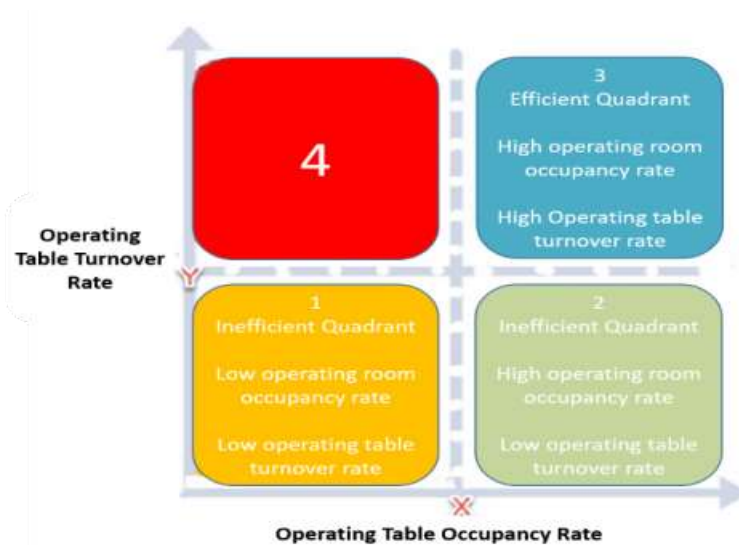
$$\text{Operating Room Efficiency} = \frac{\text{Operating Table Occupancy Rate}}{\text{Number of Operating Tables}}$$

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}}$$

**Operating Table Occupancy Rate:** It is calculated using the following formula: [(Total number of operations) / (Number of operating tables x Total number of days in the related month)] X 100. The operating table occupancy rate is a performance indicator showing the rate of the functional tables used in a month (Yıldız,2017).

**Operating Table Turnover Rate:** It is calculated using the following formula: (Number of patients undergoing surgery / Number of operating tables) It is a performance indicator showing how many times the operating table is used in a month (Yıldız,2017).

**Figure 1: Evaluation Quadrants for Operating Room Efficiency**



As shown in Figure 1, three regions to be obtained by adapting the model to the operating room are used to interpret the results. The fourth quadrant, shown as the red zone in the figure, cannot have any value in terms of efficiency because if the table occupancy rate is low, it does not matter how fast the operations are performed. Two of the other regions (first and second regions) show low productivity, while the third region offers high productivity. It means that the operating room inefficiency of

a hospital whose position is in the first region is caused by a low operating table occupancy rate and low operating table turnover rate together. For such a hospital to achieve the efficiency of the operating room, it will need to bring new patients to the hospital to provide working room services and put forward studies for more systematic and more rapid operations.

It is understood that the operating tables in the operating room of a hospital in the second region are filled to an acceptable extent. Still, the turnover rate of the surgeries is low. In other words, when the patient is taken into surgery, the procedures cannot be completed as quickly as necessary and sometimes pass with distraction. Improvement suggestions should be directed towards increasing the operating table rotation speed.

The third region shows the position where efficiency is reached at an acceptable level. Here, the operating table occupancy rate and operating table turnover rate have reached the desired points. It should not be forgotten that efficiency should not be evaluated forever with a specific and dull cut-off value. It is essential in continuous improvement that the hospital tries to narrow the mentioned third area on the scheme by setting new targets over Time. Hospitals should always have adopted the goal of reaching a more efficient point in the period ahead, regardless of their productivity level. It has been accepted as a high level by the Ministry of Health in Turkey that hospitals' bed occupancy rate and bed turnover rate exceed 70% (Ağırbaş, 2016). Based on this rate, both the X point shown on the x-axis and the Y point shown on the y axis in Figure 1 has 70% or more can be interpreted as the operating room working efficiently.

However, these points will change according to the targets set by each hospital for its operating room. For example, in the efficiency evaluation graph of a hospital that has determined the table occupancy rate of the operating room as 85% and the table turnover rate as 75%, the X point will be located at 85% and the Y point at 75%, that is, the 3rd Region area will be geometrically narrowed.

In practice, it is challenging to raise these rates above 90%, and it is recommended to leave a 10% share for emergencies in hospitals. Therefore, it is appropriate not to raise the targets above 90% for these ratios. In general, it is seen that these rates are 50% and above in the world. If we talk about a general

understanding, it can be said that the most common values are between 60% and 85% (Allen, 2020). However, it is known that these rates decrease to low levels during night shifts and weekend shifts, and during public holidays. In addition, seasonal differences affect the general operating room efficiency and differ according to the usage branches of the operating rooms (Öztaş & et al., 2015; Friedman & et al., 2006). For example, cardiovascular surgery operating room and pediatric surgery rates can increase and decrease in different seasons. Using moving averages based on the last three months is recommended to analyze these differences with a softer approach. In hospitals, evaluation systems should be established for the whole hospital in general and specific service units. Problems and solutions can be determined more accurately if more than one criterion is evaluated together, not one by one, in assessing the efficiency of the operating room. The use of an easy graphical analysis method is thought to accelerate the decision-making process of hospital managers and health policymakers. Infield applications;

- Emergency department,
- It is recommended to be used in intensive care units to evaluate efficiency.

### **New Approaches in Management Science in the Twenty-First Century**

#### **Digital Hospitals**

"Digital Hospitals" are being developed to reduce the time and money allocated to health services.(Aslan & Erdem, 2017). The concept of a digital hospital is hospitals where Time is shortened in business processes in which high technology is structured; human power is used less, all manual operations are carried out with medical and non-medical advanced technology, and do not use materials such as paper (Tüfekci et al., 2017; Bıkmaz, 2017).

#### **Green Hospitals**

Today, many hospitals are changing how they are managed and designing better quality services and sustainable activities. Green management, which means environmentally sustainable management, has emerged as a need for this change (Özkan et al., 2014). Benefits of green hospitals; getting better results from patients, employee safety and satisfaction, and increased productivity (Palteki, 2013).

The qualifications of environmentally friendly green hospitals are classified as follows by Hoşgör (2014):

**Energy Saving:** Minimizing consumption with usage measures.

**Environmentalist architectural structure:** Designing architecture suitable for the environment.

**Alternative Energy Generation:** To provide ideal energy ideal for working conditions.

**Food:** Providing clean food for workers and patients.

**Water:** Supply from clean sources. Not using unsuitable resources.

### **City Hospitals**

Definition of city hospitals; It is a hospital model in which the public and private health sectors act together economically, administratively, and organizationally (Gökkaya et al., 2018). City hospitals aim for profit. The high number of applicants is one of the success criteria (Cerrahoğlu, 2016). It is planned to build 34 city hospitals in 29 provinces across Turkey (Taş, 2018). This model's economic positive and negative aspects, which have been used in countries such as the USA, Spain, Ireland, Portugal, and England in recent years, are discussed (Cerrahoğlu, 2016).

### **Lean Management as a New Approach**

#### **Lean Management Concept**

A lean concept is eliminating everything unnecessary (Türkan, 2010). The lean approach is a deep reasoning, continuous improvement, a culture, and a long-term perspective (Savage et al., 2016; Andersen, 2015). Lean is a philosophy of development and change (Smith, 2016). Lean allows us to correct mistakes that we cannot see (Barnas, 2016). Lean thinking prevents wastage during any service delivery or product production and brings value to the fore in the service provided (Özkan, 2018; Drotz & Poksinska, 2014; Parkes, 2015; Çilhoroz & Arslan, 2018).

Lean management requires strict discipline. It needs leaders and leadership (Kadarova & Demecko, 2016). Lean management aims to eliminate waste. With this

feature, it contributes to organizations (Işık & Işık, 2016; Kwiatkowski et al., 2016; Aydın, 2015). Lean work is systematic and completely process-oriented (Barnas, 2016). Lean management has significant potential to increase productivity and improve the lean organization (Andersen, 2015).

Liker's 4P model identifies four key aspects of lean:

1. Philosophy
2. Process
3. People
4. Problem-Solving (Gemmel & et al., 2019).

Lean management; aims to eliminate products and activities that do not add value to the workflow in businesses. It ensures that the workflow in industries is harmonious, high-quality, and efficient (Özer et al., 2021).

Lean management philosophy aims to simplify business structures. Lean management is built on a 5-pronged approach:

1. The approach to predicting the future
2. Sensitivity approach
3. Holistic approach
4. Dynamic approach
5. The frugal approach (Derin, 2008).

The lean approach is the whole of the activities that perform the product or service delivery at low cost, faster, with higher quality, and by targeting value from the efficient customer point of view (Çakıroğlu, 2018). One of the most critical features of the lean approach is that the work is completed first and in the desired time frame (Batumlu, 2021). Lean philosophy is also an effective management style that consists of certain principles and techniques and ensures customer satisfaction,

which is the only goal, and employee satisfaction (Özkan et al., 2015). For lean management to be implemented in enterprises, enterprises should abandon the existing management style in all processes while performing product production and service delivery(Tanyıldızı,2020).

Businesses have increased their performance and continuity by using lean techniques and lean management principles (Özer et al., 2021). Lean management provides quick solutions to problems in a short time. In the lean approach, the development of employees and the improvement of processes are carried out in a balanced way. With this balance achieved, the value to the customer is presented at the stage of excellence (Batumlu, 2021). Being holistic is one of the stakeholders that make up lean management philosophy. Lean businesses achieve the business-related target in the required Time by spending less, increasing quality, and eliminating waste in the workflow (Tanyıldızı, 2020).

### **History of Lean Management**

Japan, as a country, is a small country in terms of surface area, which is located on land that does not have enough surface, has a dense population, and has few non-artificial resources (Turan, 2018). Principles that form the basis of lean management, II. World War II and Toyota's philosophy reach the last place. The resources in Toyota's hands were destroyed to a maximum extent after the war (Çakıroğlu, 2018).

Japanese engineers Taiichi Ohno and Eiji Toyoda, who worked at the Toyota factory, which attempted to recover due to heavy losses after the war, created the principles and techniques of lean management in 1950. Lean approach principles and methods have gradually advanced over Time (Bulut, 2017; Turan & Turan, 2015). ; Gürer, 2017; Spagnol et al., 2013; Parkes, 2015). Taiichi Ohno defined unnecessary activities and products in the workflow as waste (Kılıçarslan,2016). With lean management in Japan, businesses in Japan quickly came to the top. This rise of the Japanese has attracted the attention of companies worldwide. The Japanese did not want to share and report their success in their businesses with lean management. However, in 1991, Womack and Jones announced to the world the achievements of the Japanese with a lean approach, with the book titled "The Machine That Changed the World," which was written in five years (Tanyıldızı,2020; Taşdemir et al.,2021).

Lean management principles and techniques were used very narrowly until



1980 (Bodur, 2021). 2015). Lean management started in Turkey in 1990. The lean transformation has begun to operate in various sectors (Nihal et al., 2015). The lean approach has been increasingly used successfully in businesses working in multiple departments since 2000 (Bodur, 2021).

Japan has learned best to deal with many difficulties in the historical process. They took new methods from Europe to improve the management system, but they used the latest techniques while preserving the characteristics of their traditions. This thought made them successful. The Japanese downsized big companies. They did not allow people to work in large companies. They put customer satisfaction at the forefront. Japan is a country that attaches great importance to the elimination of waste. It has been a pioneer in the world in this regard. Destruction is forbidden in Japanese culture. In the long run, businesses have significantly benefited by eliminating waste. In Japanese, people's doing valuable work is evaluated to benefit society. The Japanese have a vital infrastructure in the emergence of lean management (Derin, 2008).

### **Goals of Lean Management**

Lean management aims to simplify all planning, organization, execution, coordination, and audit processes, which are the management functions of businesses, and focus on core competencies (Aslan & Pekcan, 2016). The most important purpose of lean management in business management is to manage the complex business structure by making it the most unadorned, most straightforward, and most accessible (Bodur, 2021). The primary purpose of lean management is to reduce costs by reducing non-value-creating activities (Rohani & Zahraee, 2015).

The primary purpose of lean management is to create value at the level of perfection for the customer by improving the processes in the enterprises with lean technique and lean principles, developing the people, and providing balance. Businesses are organized and managed by dividing them into fewer departments. Enabling employees to participate in business processes and share their ideas is among the aims of lean philosophy (Bulut, 2017).

### **Principles of Lean Management**

Lean management principles include universal rules applicable to all

businesses that produce services such as production, health logistics, and local governments (Çetin,2014; Özkan et al., 2015; Burgess & Radnor, 2016).

**Figure 2: Principles of lean management**  
(lean.org.tr)



Five principles of lean management; value consists of the value stream, continuous flow, pull, and the last stage, perfection (Escobar et al., 2015; Türkkantos, 2012; Maraşlı et al., 2016; Smith, 2016; Lopez et al., 2015).

**Value:** The product or service's potential to benefit from the customer's point of view (Lopez et al.,2015). The most fundamental part of lean management is value. The value is expressed in terms of the wishes of the last requester. The product or service should be presented in the required amount, within the time necessary, and quality (Derin, 2008). The most important part of the lean approach is the correct definition of value. Knowing what is demanded in the product or service is critical to ensure that value is accurately expressed. Since there is diversity in the production of value as a product through various mechanisms, each production location determines the value according to its purposes, which is the biggest obstacle to good value. There is no integration between the person requesting the product or service and the factory. The value should be viewed and created by the person requesting the product or service (Çakıroğlu, 2018). The value must be done the first time correctly. Producing the wrong product or service with the correct methods is a waste (Aloğlu, 2018).

Value is also the willingness and satisfaction of the person requesting the

product or service to pay (Kılıçarslan, 2016). In the long run, value for lean management is a beneficial principle (Denizli, 2020).

**Value Stream:** All the processes not required in service delivery or product production (Smith, 2016). When the value streams in the works are determined in detail, it has been determined that the results that do not represent value reduce the Time and warehouses by a significant amount. It will prevent a substantial decrease in the required materials in this period and warehouses by providing the value flow. Other value-creating jobs will continue after the value has been determined and all non-essential jobs in the value stream have been eliminated. Ensuring value flow constitutes the second important principle of lean management (Çakıroğlu, 2018).

By expressing that they will remove the unnecessary ones in the production of services and products with the people who request products or services and that they will do this by spreading it to all transactions, businesses establish healthy and strong communication with the people who demand products or services by aiming to ensure the flow of value in work done. This approach becomes the philosophy of the business (Denizli, 2020). The value stream is a principle of lean management that works in identifying what is not essential in business processes. It is of great importance in detecting non-essential activities in the workflow in hospitals. Unnecessary activities, unfair practices, delays, and errors in patients' diagnosis and treatment processes are eliminated with the value stream, the principle of lean management.

**Hospitals have three workflows.**

1. The current workflow
2. Preferred workflow
3. Workflow determined to be mandatory (Aloğlu,2018).

Value stream significantly enables us to understand better the beneficial and harmful aspects of activities in business processes. They see the business as a whole by identifying the positive and negative aspects of the movement in the business with the value stream (Derin, 2008).

**Continuous Flow:** It removes processes that cause waste in service delivery or product production and moves to the next stage (Lopez et al., 2015). Steady flow constitutes the third important principle of lean management. It aims to eliminate all unnecessary activities for the customer in business processes (Bodur, 2021).

It is necessary to produce all the work done in the enterprises in the required amount without waiting and to ensure a continuous flow by eliminating the activities that are not needed in the presentation of the product or service, and this can be done with the constant flow, which is one of the principles of lean management. In the hospital environment, patients do not wait for their surgeries. When necessary, they have their examinations done by providing timely and correct intervention to emergency cases, ensuring a continuous flow in hospitals (Çakıroğlu, 2018).

With the continuous flow, which is the principle of lean management, an improvement of 90% has been achieved in the workflow in the enterprises. A healthier, more efficient, high-quality, and low-cost workflow has been achieved in businesses by eliminating unnecessary processes in providing unnecessary products or services at the required Time without interrupting the work done (Aloğlu,2018). Providing only needed products and services is among the purpose of continuous flow. All non-essential transactions are excluded from the business process (Batumlu, 2021).

**Pull** The degree to which the required product or service reaches its purpose (Maraşlı et al., 2016). It is aimed to carry out the activities carried out with the pull principle of lean management by looking at them from the customer's point of view. Thus, unnecessary works are removed from the system (Bodur, 2021). In the current management approach, the product or service is presented to the requester without considering the positive and negative aspects. However, the lean management approach attracts people who demand products or services from non-essential activities to the required product or service. With the pull system, the efficiency is increased by eliminating the waste in the enterprises by preventing overproduction, the over-provided service, unnecessary waiting, and the unnecessary workforce in the enterprises (Tanyıldızı, 2020).

In simple terms, withdrawal is not providing raw materials or services without people's requests. With the withdrawal method, the storage process ends and is not needed. Businesses do not store unnecessary products; they do not provide the service that is not required, thanks to the withdrawal method. Since the person requesting the product or service knows that unnecessary activities are eliminated, continuity in demand is ensured (Çakıroğlu, 2018). The activities that are important to be carried out are not transferred to the next stage, and the activities are carried out on time, with the fourth principle of lean management. In hospitals, the pull system can be done more efficiently and simply by preventing patients from waiting for the wrong outpatient clinics and directing them to suitable outpatient clinics. Patients are referred to the polyclinic necessary for examination (Soba et al., 2018).

**Excellence:** The last step in lean management principles is excellence. Improvement in processes occurs with change (Escobar et al., 2015; Smith, 2016; Lopez et al., 2015). Businesses need perfection, the fifth principle of lean management, to gradually eliminate waste in their departments (Çakıroğlu, 2018). Companies express value appropriately, identify the entire value stream in business processes, and ensure the continuous flow of value-creating stages due to the necessity of certain raw materials. Excellence is not an instantaneous principle. Excellence can be achieved due to the successful implementation of the four principles of lean management (Aloğlu, 2018).

To prevent unnecessary operations in business processes, value is created in the entire workflow, and perfection is reached. Excellence, the fifth principle of lean management, contributes to the continuous realization of the works and ensures that the people who demand products or services are endless (Batumlu, 2021).

The lean management approach provides both the development of employees and the improvement of business processes in a balanced way. It presents value to the customer as perfection, which is the last principle of lean management, constitutes the purpose of lean management (Tanyıldızı, 2020). The aim is to establish the fifth principle of lean management in all business processes of the lean approach, so excellence is required in lean management (Bodur, 2021).

In lean management, it is pointed out that perfection in terms of Time is necessary. In hospitals, it is important to be fast and identify priority cases in all

processes related to human life. The necessity of achieving excellence in lean management is the most needed principle in the health system (Denizli, 2020).

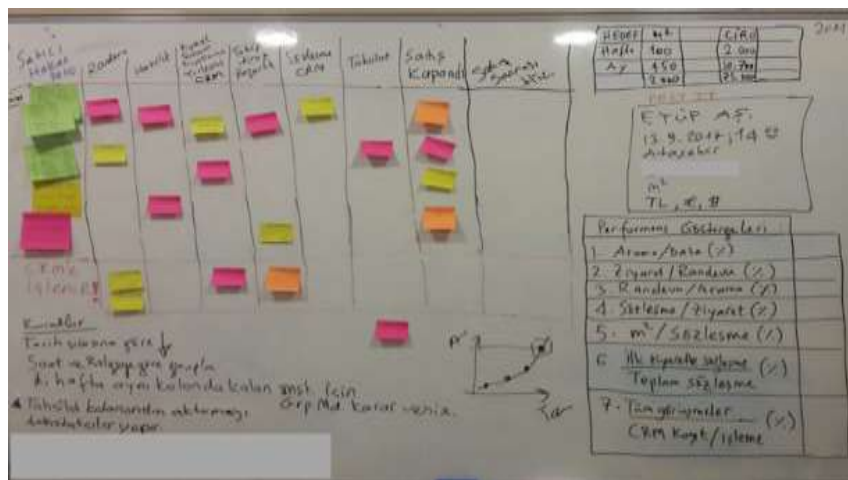
### Lean Management Techniques

Lean management practices consist of operational levels. Elements that make up the operational level consist of lean application techniques. Lean management techniques are universal (Özkan, 2018; Kadarova & Demecko, 2016). This part of the thesis will discuss the most used lean management techniques in hospitals. Methods of the most commonly used lean approach in hospitals; value stream mapping, five dimensions in the workplace environment, continuous improvement, single-piece flow, just-in-time production, A3 Report, 3M (Muda, Mura, Muri), Job rotation, kanban, and pull system, poka-yoke, brainstorming technique, standardized work. Lean management techniques are universal. Hospital businesses have achieved significant gains by applying lean management techniques (Kovacevic et al., 2016).

**Value Stream Mapping:** Value stream mapping is the visual expression of information and workflow related to product or service delivery for the customer (Özkan, 2018).

**Image 1: Value stream mapping example**

(lean.org.tr)



Visual management means making mistakes public (Barnas, 2016). Value stream mapping studies examine the process from the starting point to the end of a product or service activity based on customer demands (Özkan, 2018). "Value stream

maps; It allows us to see the waste in the value flow paths, to combine the production processes in a common language, to show the relationships between information and material flows, to see where we need to focus on making the flow uninterrupted" (Ilkım & Derin, 2016, p.481).

Value stream mapping essentially allows managers and employees to see unnecessary business processes, problems, and abnormal conditions. Value stream mapping aims to find solutions by creating problems instead of hiding problems and revealing the positive aspects of activities. Visual management is primarily applied in hospitals to determine patients' monitoring stages or needs. However, value stream mapping is also used to draw attention and identify problems beforehand (Soba et al., 2018).

The visual management method is the only approach that explains the process of tools and equipment and what needs to be known within the scope of the enterprise. Visual management forms the primary basis within the flow of business activity and provides a valuable foundation for the formation of value processing. Based on the method, the method explains the determination of the necessary or non-essential works and reasons within the scope of transferring the raw material and the things that need to be known of the ongoing flow from the draft stage to the last customer. In their research, Rother and Shook (1999) described visual management practices in detail for the first time and created an approach that has not been seen before for lean management flow (Denizli, 2020).

The visual management technique is the technique that allows determining the process of all the tools and equipment within the scope of the hospital. The visual management method is based on the product production flow and is applied to create the necessary product process. The main reason is to determine the tools and equipment made up of the primary substance and the essential works and non-essential works within the scope of the information (Bodur, 2021). With the help of schematic maps that can be put into business divisions with the value stream mapping technique, the interviews within the scope of the officials in the enterprise are formed in a practical, transparent, and rapid manner. Therefore, the need for files

in which information about jobs is written and presented is unnecessary (Tanyıldızı, 2020).

**5S Practice in the Workplace Environment:** Lean management practices consist of operational levels. Elements that make up the operational level consist of lean application techniques (5S) and one of these techniques (Özkan, 2018; Kadarova & Demecko,2016). The five factors in the expansion of 5S are the first stage that enables all process improvements to be made successfully, and the improvements begin (Gürer, 2017). The 5S technique allows business officials and business managers to demonstrate their skills and advance their views, knowledge, and attitudes. It significantly supports the strengthening of cooperation and time use in the most beneficial way (Taşdemir et al., 2021).

**Classification:** the separation of what is necessary from what is not

**Arrangement:** Everything can be used harmoniously in the field.

**Cleaning:** Cleaning

**Clean and purified Standardization:** A standardized service or good.

**Continuous activities Discipline:** It creates a discipline that ensures continuity (Ilkım & Derin,2016).

The "5S" method was first found in Japan. The "5S" method, in the best-integrated businesses, ensures that the Time used unnecessarily and the product is eliminated by expressing the applied task based on patience and trust, ensures that it is very effective and allows the work to be completed on time by using the Time effectively. and strengthens the sense of belonging to the institution (Akgün,2015). "Many lean applications have a 5S method that is compatible with the principles applied to create a stable operating division" The 5S method highlights the preference for implementing the lean approach in enterprises (Bodur, 2021).




 <b>kastamonu 5S AYIKLAMA KARTI</b>			Kart No: <input type="text"/>
Bölüm / Yer / Makine			
Malzeme Adı		Malzeme Miktarı	
Sınıflandırma	Hammadd / Yarımamul / Memu Sarf Malzemesi Makine / Ekipman Makine Parçası Yardımcı Aparat	Alet / Edavat Özel Eşya / KKD Temizlik Malzemesi Ofis Malzemesi Diğer .....	
Ayıklama Sebebi	Gereksiz Hurdası Ne Olduğu Bilinmiyor	Başka Proses Ait Diğer .....	
Önerilen Aksiyon	Hurdaya Atılsın Depoya Gönderilsin	Başka Yerde Kullanılsın ..... Diğer .....	
Kart Asma Tarihi	Kart Asan Personel	İmza	
Aşağıdaki alan 5S Malzeme Değerlendirme Komitesi tarafından doldurulacaktır.			
Karar	Geri Gönderilecek Başka Yerde Kullanılacak ..... Depolanacak	Hurdaya Atılacak Elden Çıkarılacak Diğer .....	
Açıklama			
Değerlendirme Tarihi	Değerlendiren Personel	İmza	
		Gerekli İşlem Yapıldı.	

Image 2: 5S Extraction Card

<http://www.adaso.org.tr/WebDosyalar/Sayfalar/Sunumlar/Mart%202019/5S%20UYGULAMALAR>  
I.pdf

**Kaizen:** Kaizen, which is used in continuous improvement, is an approach formed by combining the words kai (change) and zen (good) in Japanese and based

on a change to achieve the better.

Kaizen, which is one of the most important methods among lean management techniques, consists of continuous improvement activities that cover all employees and processes of the organization (Özkan, 2018; Lopez et al., 2015; Turan & Turan,2015).

**Figure 3: Kaizen Umbrella**  
(app.emaze.com)



The kaizen umbrella is shown in Figure 3; customer orientation, total quality control, use of robots, quality control circles, suggestion system, discipline in the workplace, automation, total efficient maintenance, kamban, quality improvement, just-in-time production, zero defect, small group activities, worker-management cooperation efficiency improvement includes new product development. Kaizen is expressed as continuous improvement. One of the lean approach techniques contributes to businesses' story, progress, and growth by reducing costs and eliminating waste. Kaizen recommends that companies not make significant and general changes but provide continuous gradual developments to increase the performance of businesses (Bodur, 2021).

It has been stated that Kaizen is not a method that needs to be applied only in institutions. It is known as the behavior attitude that includes the whole process of human life. The definition of continuous improvement is for determining the workflow. If it is demanded to improve the work results, developing the workflows that contribute to the work results is necessary. Another feature is to ensure that all employees participate in the business process. However, Kaizen is a method of continuous improvement in all stages of life in its field (Derin, 2008). To ensure the development of the constant improvement technique created by the Japanese, the employees in the enterprises are asked to explain their views on business development activities within specific periods. One of the lean management techniques, the continuous improvement technique, owes its success, not to gradual developments but ongoing developments at thousands of levels (Çakıroğlu, 2018).

**The Principles of the Kaizen Technique are:**

- Identify the problem. Believe that the problem exists.
- Implement low-cost activities,
- Don't put making a profit financially as the first goal,
- Identify the current situation, make preliminary assessments and measurements
- Organize, implement, supervise, take action (Aloğlu,2018).

Masaaki Imai found Kaizen, one of the lean management techniques. It contributes to the elimination of activities that are not necessary for the workflows of the enterprises, to the correct use of Time and effort, to employee satisfaction, and to the increase of productivity in the enterprises (Turan & Tuan, 2015).

**One-Piece Flow:** In activities in the form of huge sections, sections occur in the form of extra sections at the level of all processes within the flow scope. Within the scope of the activities carried out in different areas, a job does not go to the next stage without examining all the works within the scope of the activities. It causes economic damage to warehouses or warehouses and creates stocking. In product activities in the form of processes, all worked products are delivered to the next stage without delay. With the method, products are just waiting in the flow for consideration. What is desired is a single part flow where storage is not required

during job changeovers. Reducing business processes is expressed as reducing acquisition times. Quality problems and undesirable situations are visible within the workflow scope, and immediate solutions to quality problems, unwanted conditions, and delays are provided. While a single flow is procured, there are attempts to destroy a wide variety of non-essential things in coordination (Tanyıldızı, 2020). The activities are carried out without any delay (Bırakmaz, 2013).

**Just in Time (JIT):** Providing many products or services within the required Time (Bırakmaz, 2013). Competitive method and approach is the thinking and technique of lean management. As soon as JIT occurs, its primary purpose is to eliminate unnecessary things. To make profit in the advanced stages; focused on more communication with product or service buyers, getting things done more quickly to people who demand products or services, and executing activities. It is a technique that Japanese enterprises do to continuously improve the supply of raw materials or services, increase efficiency, use materials and equipment in the right way and on Time, making the control of business activities mainly applied to the workers of the enterprise, and making a profit from space and Time by constantly setting the storage levels low (Derin, 2008).

Just in Time is also a lean management technique that can supply more and high-quality raw materials with the lowest resource, and when needed, in the required Time during the workflows and at the predicted times to the extent determined to be required (Türkyılmaz, 2020). Many businesses are faced with advanced payment process problems. For this reason, it arises that the buyer has to pay the product fee in excess before and after the preparation of the entire product. This Time is significantly reduced (Çakıroğlu, 2018).

**A3 Report:** One of the methods within the lean approach is A3 Reporting. It is a widely used lean approach technique in hospitals. A3 Report is a simple, easy, and fast method for eliminating process-related problems. At the same Time, it is seen that it is applied in the organization, execution, coordination, and supervision of business activities. It differs from other methods because it emphasizes the workflow and what the employees think (Bodur, 2021).

A3 Problem Solving Report		Start Date:		Team Member:	
Project:		Date Originated:		Date Reported:	
Process:		Team Name:		Report Team Name:	
Plant:		Owner:		Report Owner:	
1. Identify the Problem		4. Root Cause Analysis		5. Why, Why, Why, Why, Why, etc.	
Background:					
Current Situation:					
GAP (Problem Statement):					
Proposed Solution:					
Short Term Implementation Action:	Who/What/When:	Due Date:			
1					
2					
3					
4					

**Image 3: Example of A3 Report**

(sigmacenter.com.tr)

A3 approach and reporting flow is a lean management technique that is applied. It allows business managers to make correct, safe, and fast decisions to correct the problems and ensure that the issues are seen where the problems occur. It is applied as a method in which concerns, examination, observation, and work organization are reflected on a large piece of paper by performing them exactly with drawings. In lean management, A3 reports have been created as the most used method that aims to solve the problems as quickly as possible, explains, interprets, and organizes information and visual management about existing activities (Aloğlu, 2018).

**3M (Muda, Mura, Muri):** 3M: The Japanese invented the 3M method. This method represents what is not required in the workflow. It is explained as follows;

**Muri:** Too much action. Over-activity refers to the over-production of products.

**Muda:** Anything that is considered unnecessary in the business process.

**Mura:** All of the disproportionate activities (Derin,2008).

Unnecessary operations are the set of things that we do not benefit from and that are determined to be empty. Eliminating unnecessary processes, which consist of the basic foundations of lean philosophy, significantly increases the lean management perception and adoption stages of the officials and managers within the scope of the enterprise. Thanks to the elimination of muda, the work environment changes and becomes more efficient. It is a simple and easy method to meet the wishes and needs of the buyers when the planning is done targeting the buyers. As peace, calmness, morale, motivation, quality, efficiency, and employee satisfaction increase in the enterprise, the belonging of the business officers and business managers will increase significantly (Batumlu, 2021).

The occurrence of mudan occurs in the form of the failure of the workflows in the enterprises, the negativities in the work methods, the long periods between the levels, the weak information and unnecessary human movement, the excessive storage, the waiting for more production, and all kinds of mistakes (Türkyılmaz, 2020).

**Job Rotation:** Shojinka is applied to provide comfort in the numerical ratio and characteristics of the employees in the enterprises by finding answers to the types of requests. In other words, shojinka, one of the lean management techniques, is the design of the numerical ratio and characteristics of the employees according to the exchanges in demand. Comfortable working conditions are the working capacity that can create the movements in the will. Reasons that can provide comfortable working conditions are expressed as a harmonious working environment, well-equipped business knowledge that completes its various development, diversified and authorized business concepts, supervision of continuous activities, and renewal in case of need (Tanyıldızı, 2020).

**Kanban:** The kanban technique, used for the first Time by David J. Anderson in 2000, is a modified technical tool that includes a systematic approach whose functional qualities are inspired by lean management techniques. The kanban carrying in the concept of cardboard paper supports the occurrence of the activities that should take place in the required time. Thus, the warehouse rate is wholly canceled in the workflows. Kanban is an effective communication method that includes different activity elements and pictorial tactics (Tanyıldızı, 2020).

Kanban is a lean management technique that detects the number of products in the workflow. To achieve the purpose of an empty warehouse, the need for plan tools at various stages of the development is to attract as much as needed. It expresses the Japanese signal definitions—the name is given to the storage control method. The significant benefit of kanban is reducing sourcing multiple products or warehouses. The kanban aims to produce only the requested item when the request is made and the number of products. Kanban is a sign, a written notice, or an instrument of artificial material due to the utensil and storage process. Specifies the duration of the request, determines from which person and to what extent; simultaneously, it happens in a technological signal transmitted by an article or a technical device (Aloğlu,2018).

It is not correct to see the kanban method is a technological approach. The administration must differentiate its way of thinking against all undesirable actions. The benefit of this method will increase with the effort spent. Occasional use of kanban will cause some problems and will not benefit the business. The necessary condition for helping from kanban is to apply to the previous flow to request the required items related to the applications that the subsequent flow will create (Özkan, 2018). The definition of kanban lean management technique is named according to the job and target they are applied to. Generally, there are two types: towing kanban and production kanban (Kılıçarslan, 2016).

In lean philosophy, the goal is to supply the process. However, warehouses should be used when the process cannot be realized because the flow is provided under normal conditions, and stability is achieved. The control of the warehouses, created due to the continuity and control of the flow, is done with kanban. Kanban is a valuable technique based on lean management to reduce storage levels (Bulut, 2017).

**Poka-Yoke:** In 1960, for the First Time by Shigeo Shingo, expressing the concept of preventing mistakes, Poka Yoke was applied as a technique aimed at avoiding the mistakes of employees in workflows in businesses. One of the lean management techniques eliminates unfair practices during work. Its goal is to prevent employee mistakes and verify or show errors before they happen. This method is necessary to realize the most economical and continuous remedies (Aloğlu, 2018).

In Japanese, Poka means error, Yoke prevention. Poka-Yoke is based on three

principles.

1. Supervision in works;
2. Measurement activities;
3. They have foreseen transactions. It aims to have no problems and minimal cost damage (Turan & Turan, 2015).

**Brainstorming Technique:** The brainstorming technique is a method that allows employees to generate ideas based on their imagination, develop their thoughts, and aims to share them. This technique is done in businesses to reveal various beliefs about the pointed problem or related activities. Brainstorming is a lean management technique applied within the scope of a small audience (Aloğlu,2018).

**Standardized Business:** Another of the techniques of the Lean approach is the continuous application of methods that can realize demands within the context of highly advanced and up-to-date conditions and make them a rule. In this way, managers are trying to turn the activities implemented and their employees into a specific workflow because of standardizing their belonging to the actions (Denizli, 2020). In other words, the standardized job is to ensure the design of the process stages and make the work done by the whole of the officers constantly active. The action that explains the fixed operating principles seen so evident in the field is expressed as standard work. The fact that the regulations are generally located in the regions further from the workplace causes the officials not to approach these principles and orders. Thus, it becomes tough to predict the future within the scope of the process stages. By transforming the time into a standard form, performing the ongoing works and applying the traditional work technique, the officers will be guided within the scope of the characteristics of the fixed work and thus will ensure that the activities are of higher quality, on time, and efficient (Kılıçarslan, 2016).

The standard work technique is the lowest stage of the work done before and positively affects the work to be done in the future. It facilitates and promotes changes. Making changes in the workflows due to doing better work makes the activities more efficient. By making a business plan that provides this arrangement, the results are standardized. Standard work technique ensures that production



harmony and employee satisfaction increase significantly (Bulut,2017).

### **Comparison of Lean Management and Non-Lean Management Approaches**

There have been significant innovations in management approaches since the second half of the 20th century. At the same time, with the emergence of the complex structure in the management stages, efforts have gained importance according to the renewal of the management philosophy, modern management approaches have been created. One of the contemporary management approaches is the lean management approach (Bodur, 2021).

Considering the current management concept, when this management style is evaluated in terms of hospital management and time efficiency, more problems occur in the workflow. Lean management philosophy has also shown itself as an alternative to the current management and has been accepted. When the significant difference between lean management and current management is examined, it is seen that lean management adopts a more realistic management approach. The departments where the lean approach's activities are expressed financially and superior to the current management (Denizli, 2020).

The most distinctive features of Taylor's and Classical Period managements differ significantly in the lean management approach. In lean management, unnecessary products and storage are expressed as waste. Lean management develops a method suitable for businesses with the principles, techniques, and financial expenses free from extreme and ideal for current conditions with the philosophy of continuous development. What makes the lean approach different from all classical methods is the idea of doing business with a reduced storage volume from all the activities and suggestions presented as suggestions, which are expressed as the main components of lean management. The most crucial point is that it differs from Taylorism, which argues that there should be storage put forward within the scope of classical management (Türkyılmaz, 2020).

In the current management approach, it is seen within the framework of hard work that those in charge of the enterprise show high performance in continuous

work. In the lean management philosophy, the same situation is expressed as the product or service offering of the workers with the potential to provide benefits defined in terms of the customer. It is recommended that the activities be carried out in the required time and amount. Lean management has been preferred because of the success and change in direction in enterprises (Tanyıldızı, 2020).

**Table 1. Comparison of lean management and traditional management**

<b>Lean Management Approach</b>	<b>Traditional Management Approach</b>
The business plan is determined together with the employees and the manager.	The manager sets the business plan
Jobs require extensive knowledge and skills.	Jobs are narrowly defined.
Much of the information is shared by everyone.	Only administrators have access to most of the information.
He has a team-oriented working style. Awards are based on team success	He has a personal working style. A reward is based on individual achievement.
Stock-free production is adopted.	Stocked production is adopted
Everyone contributes to improving processes.	Management determines the best form of governance.
There is a participatory management approach.	There is an observer manager mentality.

It is seen that the lean management approach is superior to the traditional management approach. Lean management and traditional management are compared in Table 1 (Yerlikaya, 2015). In his studies that contributed to lean management, Peter Drucker pointed out that the current management approach consists of a complex structure and processes that are difficult to manage and revealed that simplification is at the forefront in the lean management approach. Thus, businesses with a complex system are easier and faster to manage (Denizli,2020).

The lean approach significantly differs from the contemporary practice in solving problems. Preventing the rise in economic costs and considering the evaluations at the next stage of the activities shows the privileged side of the lean approach that makes it superior. The method followed to solve the problems is not

from the top down. As seen in contemporary practice, it is seen as the effect of lean philosophy that reveals that it is more successful (Bodur, 2021).

Rewarding the employees in the enterprises, ensuring their promotion in their duties, and job rotation are the values that add superiority to lean management. One of the important differences of lean thinking is to offer the required amount of products just in time to the buyers who request a product or service. Applying the best techniques to increase productivity, quality, and employee satisfaction in enterprises points to the superior aspect of lean management (Bodur, 2021). It makes a big difference with lean management in that the Fordist and Taylor approach treats people as workers like robots. The basic philosophy of lean management is respect for people. He evaluates the human being with all his qualities (Turan,2018).

Japanese managers did not find this management style appropriate because there are too many management levels in the American management style, and they aim to make more products than necessary. The fact that this disapproval is based on the lack of flexibility, overtime work, and overproduction has revealed that this management style cannot achieve successful continuity for the future (Denizli, 2020). One of the most important factors in implementing the lean approach is the continuous improvement in the performance of the enterprises (Bodur, 2021). The superior side of lean thinking is that the managers carry out work-related activities without any problems, as it allows the employees to take controlled risks, thanks to their problem-solving abilities, without giving detailed information about the work to their employees, and by eliminating unnecessary steps in a hierarchical structure (Bulut, 2017).

Lean management is the most important approach that eliminates waste in businesses in business processes. Lean philosophy should be preferred as a philosophy of life in every institution and organization in our universe whose resources are decreasing day by day (Temür,2019). The lean approach is explained by Derin (2008) within the framework of management functions as follows:

**1. Planning:** In lean businesses, the people in the managerial staff are not responsible for the management of all the work. Employees share responsibility.

**2. Organization:** An organization is independent of the lean approach's management levels. Management levels have been reduced.

**3. Coordination:** Employees provide their coordination. In achieving this, the most important factor is taking responsibility for the job and using authority.

**4. Execution:** Execution in Lean Management is based on decentralization or delegation of authority. Top managers have delegated their responsibilities to their employees.

**5. Control:** The systematic study of the gains obtained by making the necessary efforts to reach the desired goals. The control function in Japanese businesses reflects the lean management approach.

## **Hospitals and Lean Management**

Lean hospital management is the management style followed by hospitals that aim and apply lean principles in the delivery of health services (Özkan, 2018; Roemeling et al., 2017; Kılıç et al., 2016). Lean management is one of the most essential strategies to increase quality and reduce hospital costs, and hospitals need to implement this strategy (Nihal et al., 2015; Yalçın et al., 2018). The lean approach can be applied as a holistic approach in clinical and non-clinical areas of hospitals (Özkan et al., 2015). The lean course provides managers with reliable, accurate, and timely information in decision-making (Rohani & Zahraee, 2015).

The implementation of lean management in hospitals is based on two basic principles:

**1.** There is no difficulty in implementing lean principles. Therefore, it can be easily understood and applied by hospital staff.

**2.** Lean management aims to eliminate all kinds of waste. (Durr, 2018).

The management styles of hospitals play a role in the fact that health is significantly effective both at the individual stage and at the universal set. For this reason, hospitals need to provide health services with quality, speed, and low cost in treatment and diagnosis (Gök, 2021). Thanks to lean management, hospitals spend

their necessary expenses appropriately (Taşdemir et al., 2021). Lean thinking in hospitals was first implemented in England and the United States, and lean management practices increased in all areas of health services (Yıldız & Yalman, 2015). The lean approach is frequently used in Swedish hospitals. It is a general concept for improving patient care processes and reducing costs (Dellve et al., 2015). Germany, Norway, Australia, and Denmark should also be counted among the countries that have adopted lean hospital management. With lean management practices in the hospital, located in a rural area of America, the patients' length of stay was reduced by 44%, and the number of patients increased by 10%. Patient satisfaction increased by 92% (Derin, 2008).



**Image 4: Lean Global Network**  
([lean.org.tr](http://lean.org.tr))

The most important factor in adopting and implementing lean management is learning the views of the employees and business managers of the companies that implement the lean approach and monitoring the lean activities in the enterprises (Akgül,2020).

When unnecessary hospital activities were prevented, a significant speed was achieved in the flow of patients who applied to the hospital and the interventions made during the admission phase. Since the health sector is directly related to human life, wrong attempts made here lead to essential consequences and endanger individual and public health. Research on waste elimination and lean hospital

management in hospitals is not sufficient. Lean management is the most effective approach that realizes efficiency and quality in the long run. Lean techniques do not aim to produce solutions in the short term. In hospitals, patient satisfaction, employee satisfaction, low financial expenditures, prevention of medical errors, unnecessary waiting, and hospital infections are also critical hospital performance criteria (Yılmaz, 2017).

There is a need for a management style that will improve the employees and improve the process simultaneously, and provide these two simultaneously. Lean management practices are the most important management strategy that simultaneously makes human development and process improvement. Hospitals must implement this strategy (Bulut,2017). With the widespread application of lean approach techniques in hospitals as a business, it is seen that the satisfaction of hospital staff, hospital managers, patients, and patient relatives increases, the safety of the hospital, patients, and employees increases, financial transactions are provided at a more economical level, vital dangers are prevented, and activities are ensured to be continuous. For this reason, lean management practices are more critical in terms of hospital businesses than other businesses (Bodur, 2021). (Solak, 2015; Savage et al., 2016; Tay, 2016; Lindskog et al., 2016).

In recent decades, many hospitals have begun to adopt world-class approaches. Better health service delivery with a lean system is one of the examples of this (Bucci et al., 2016). Before explaining the vision of the lean hospital, it would be appropriate to define the image. The image is to express opinions explaining the proactive actions of hospitals as a business. It gives us information about what it aims at in the long term and the expected target. It helps us define the hospital better. In this definition, we understand what lean hospitals strive for, their priority, and their different aspects from other hospitals (Özkut,2018). There is no lean hospital without errors. For this reason, the vision of the lean hospital is to manage the hospital with lean activities that are constantly changing and developing (Graban, 2011).

## Lean Transformation in Hospitals

Lean transformation in hospitals requires an understanding and cultural change (Ilkım & Derin, 2016; Asnan et al., 2015). Starting lean practices depends on the hospital's needs, culture, and current situation. Many hospitals start from production-oriented services (Grabau, 2011). Lean practices in hospitals can be created in various departments (Işık & Işık, 2016; Smith, 2016).

Lean management is applied in hospitals based on four principles as a business.

1. Putting the patient first.
2. Putting the patient first.
3. Building a skilled patient care team.
4. To ensure the patient's participation in the care process (Kılıçarslan, 2016).

Kurt (2018) explained how the lean transformation should be implemented in hospitals as follows; Lean management's philosophy should be taken from a lean expert consultant. Lean office workspace where lean activities are organized in hospitals should be provided. Hospital staff should produce participatory lean transformation projects and regularly organize in-service training on lean activities (Maraşlı et al., 2016). “Lean transformation projects are not just about rapid improvements; it also focuses on lasting success and continuous improvement” (Grabau, 2011).

Lean process operation in hospitals is explained by Nyström et al. (2018) as follows;

- Analysis of the current situation,
- Identifying areas to be improved and determining priorities,
- Monitoring, measurement, evaluation and action planning,
- The realization of change,
- It should be in the form of ensuring and disseminating sustainability.

Sağlık sektöründeki gelişmeler ve sağlık hizmetine ihtiyaç duyanların bu hizmeti alanların gereksinimlerinde artışın olması ve buna karşılık hastanelerde çalışan sağlık personelinin sayısında gereken artışın olmaması, hastanede kullanılan

kaynakların azalması, maliyetlerin yükselmesi sebebiyle süreç odaklı olan yalın dönüşüm hastanelerdeki süreci iyileştirmektedir, hastanenin performansını önemli ölçüde artırmaktadır(Deniz & diğ., 2021).

Lean transformation in hospitals starts from the settlement of the hospital, that is, from the architectural stage. It should be suitable for simplification in constructing the internal parts of the hospital and the external settlement. Places with unnecessary movement space for patients and healthcare personnel should be removed. The basis of lean health is the rapid, high quality, and high level of satisfaction. In hospitals with lean transformation, inefficient time, treatment, and diagnosis stages are realized (Yılmaz et al., 2017).

Activities that will contribute to the realization and adoption of lean transformation cannot be implemented without the leader's approval. The change and the continuity of progress should be extended to the long term; business officials who will perform their duties using lean techniques in line with lean management principles should be supported in this regard. Leaders organize what is necessary to eliminate resistance to change to ensure harmony and healthy communication among employees (Akyüz & Çetin, 2009).

### **Lean Application Areas in Hospitals**

Lean management application areas are applied in clinical and non-clinical areas in various hospital departments, considering the current situation, culture, priority, and urgency in multiple units in hospitals. Precisely, lean approach; Integrated management areas such as pharmacy, operating room, outpatient treatment, nursing management, financial management, human resources management, and hospital culture change constitute the areas where lean management is applied (Gao & Gurd,2019).

The most common areas of lean management practices in hospitals are as follows.

- Polyclinics
- Emergency



- Accounting
- Chemist
- Operating room
- Intensive care unit
- Blood collection department
- Inpatient department
- The patient registration department is (Grabau, 2011; Işık & Işık, 2016).

The principles and techniques of Lean management, implemented in different sectors and achieved success, have gained significant gains by applying them in an integrated manner in hospitals. Unnecessary work has been eliminated, and health services that can benefit are provided from the patient's point of view (Aloğlu, 2018). In the face of innovations in the health system, advancing technologies, and diseases that threaten human health significantly, they ensure the continuity of the service quality with lean management practices, in line with the needs of the hospitals and by evaluating the requests of the hospital applicants (Deniz et al., 2021).

The lean follow-up form is used as a directive in lean management. This form includes the following questions (Grabau, 2011):

Current situation assessment:

What are the priority things to do?

What solution is there?

What is the foreseen situation?

Which elements were evaluated?

- Security
- Quality
- Job Completion Time
- Cost

Who was informed about the new situation?

Planned time until pilot change:

What are the measurement and evaluation results?

Are the results accepted?

- Informing all units:
- How were the activities to be done communicated to everyone? The lean follow-up form of the hospital implements the lean transformation.

### **The Role of the Manager in the Lean Hospital**

As a concept, the manager is the person who removes the obstacles in front of the activities that show a specific route, supports the employees to have the integrity of ideas, and to act accordingly, as the targets are efficient and of high quality, and directs the masses that ensure employee satisfaction. Historically, it has been an ongoing need because of the need to be a manager in the group and guide people when they come together (Yılmaz, 2017). In the lean approach, business managers significantly identify the developments, competition, and advantages outside and within the business. The goal of managers in firms is workflows. After examining the workflow in the enterprises, they identify the positive and negative sides of the next level workflow with visual management technique, eliminate the negative flow in the workflow, further improve the positive workflow, and develop it with the understanding of participatory management together with the employees in the enterprise. Managers allow employees to use their problem-solving skills in solving business-related problems, and they are significantly successful in solving problems. Business managers must have the knowledge and skills during the implementation of the entire lean approach and must participate in the workflow processes (Temür, 2019). The role of managers in lean hospital management is explained by Özkan (2018) as follows: Managers play a crucial role in hospital management. For this reason, the managers' attitudes in the implementation of lean thinking, their thoughts about lean management, and their willingness are critical in implementing lean management in hospitals.

#### **The critical role of hospital administrators in management is as follows;**

- Breaking the resistance to change,
- Aiming to be process-oriented in hospital management,
- To meet the needs of the employees and to support them,
- To create a working environment that facilitates learning,
- It is to develop policies that predict and eliminate obstacles in lean

management practices. For lean management to provide potential benefits to hospitals, managers must adopt a lean philosophy (Thomas et al., 2021).

### **Barriers to Lean Management Practices in Hospitals**

There are many obstacles and difficulties related to implementing lean management in hospitals. In implementing the lean approach, which includes Japanese traditions and language, there are resistances in adapting to rules and terminology (Temür,2019). Adopting the lean system creates an obstacle to implementing lean management, as the employees get the idea that they will have to leave their jobs. At the same time, the personnel working in the hospital think that lean principles and lean management techniques will increase their workload, and they see the implementation of lean management in hospitals as a workload for them (Bulut, 2017).

The obstacles encountered during lean management practices in hospitals are classified as follows by Durur (2018):

- Lack of managerial support,
- Communication problems,
- Lack of motivation,
- Incompatibility with strategies,
- Perception,
- Terminology,
- Skills of health workers,
- Lack of information,
- It is resistance to change.

To remove unnecessary activities from the workflow, all hospital personnel and managerial staff will state that extreme activities are not detected in their workflow. They will inform that all procedures are applied to ensure the comfort of those who use the hospital. The complexity in the supply of medical equipment and equipment in emergency interventions causes emergency cases to be endangered; Therefore, being in order and organization that will ensure rapidity in emergency cases will ensure the satisfaction of health workers and a healthier response to emergency cases. This is possible by applying lean management principles and lean techniques in hospitals(Özkan,2018). When the satisfaction of all personnel and managers working in the hospital, those receiving treatment and hospitalization increases, the safety of the hospital, employees, and patients increases, unnecessary activities in the hospital are prevented by more than 35 percent, medical errors are reduced significantly, workflows in the hospital are accelerated, productivity and quality increase and hospitals that implement lean management principles and techniques are in the concept of the lean hospital (Temür,2019).

The characteristics that define the lean hospital are as follows:

- Half of the medical errors
- Half of the health personnel
- Half of the waste
- Half of the area

It is considered as half of the complaints of patients and healthcare professionals. Some hospitals reduce their mistakes by half every year by performing the lean transformation (Kılıçaslan, 2016).

### **The Importance of Lean Management Practice in Hospitals**

In the last ten years in the management of hospitals, the lean management approach has been accepted as one of the most critical approaches that have the potential to solve problems. Instead of complex, lengthy and labor-intensive processes, the administrative costs of workflows that are simplified and removed from unnecessary activities decrease, results are obtained in a short time, all kinds of

difficulties for patients and their relatives are reduced, services become patient-friendly, the registration of service processes in information systems, and improvement in information processing and analysis processes. Is provided. One of the potential benefits of lean management is undoubtedly the hope of significantly reducing medical errors caused by our complex subsystems and processes (Yetgin & Sur, 2017).

Hospitals have faced increasing pressure to improve medical quality and operational efficiency (Gao&Gurd,2019). Hospitals are businesses that provide health services to benefit society. Due to the increase in health problems and the increase in the rate of people in need of care, the number of applications to hospitals is high, but hospitals cannot carry this burden. The economic power of hospitals cannot afford the necessary financing for treatment, diagnosis, and high technology. Lean management practices can solve these problems (Taşdemir et al., 2021). Lean approach, which is an essential strategy for hospitals, to be able to integrate easily with all developments in the advancing medicine and health field, in the face of management difficulties, to improve patient, employee, hospital safety, satisfaction, prevention of medical errors, the performance of the hospital in the most appropriate economic way and to strengthen the management of the hospital. They should apply (Temür,2019). Hospitals, like other businesses and institutions, have to go forward constantly. Some hospitals reduce their mistakes by half every year with the gains of the lean approach (Kılıçarslan, 2016).

In the world, most people in hospital management apply lean management approaches in hospitals to eliminate unnecessary activities in the workflow of healthcare professionals and hospital applicants, to make medical treatments fast and trouble-free, to increase employee motivation, and at the same time to ensure long-term quality improvement in the financial field (Özer et al. Hospitals have adopted lean management to eliminate unnecessary waiting for patients, to provide long-term solutions to the problems in the hospital, to prevent all kinds of activities that contain repetitions or deficiencies, to prevent the movement distance from being excessive within the hospital, and to evaluate the abilities or strengths of the personnel. et al., 2021).

It is vital for patients that emergency interventions are of the required quality and timeliness. Emergency cases are intervened professionally with lean management principles and techniques. Hospital-acquired infections, one of the

significant problems for hospitals, are prevented significantly by using lean techniques with a precautionary patient care approach. As medical errors are prevented, patient satisfaction and employee satisfaction will increase, and costs will decrease significantly. For these reasons, hospitals especially need lean management to improve the quality of patient care, increase efficiency, and ensure that hospitals provide quality health services (Soba et al., 2018).

Lean management provides hospitals with effective administration to eliminate waste without much economic expenditure. Lean philosophy has led to high gains in hospitals. Lean thinking has a structure that can quickly adapt to development and change. For this reason, hospitals can adapt the products and advances in the field of health to the hospital in a short time (Yıldız & Yalman, 2015). Lean management has a significant potential to improve the performance of hospital businesses (Andersen,2015; Rosaria et al., 2016; Türkkantos, 2012).Hastaneler; yapısal olarak karmaşık ve maliyetli işletmelerdir (Ağırbaş, 2016; Yıldız & Yalman, 2015; Demir, 2016; Kılıç & Güdük,2018).

Errors, deficiencies, and complications in treatment and diagnosis cause disruptions in workflow and management since hospitals are functionally complex businesses (Çelik & Öztürk, 2021). Cases in hospitals are urgent and cannot be postponed. Applications made are risky and do not accept mistakes. Hospitals require specialization (Demir, 2016). Since health services have an irreversible feature, hospital managers should always be practical and equipped with people in the management process (Yılmaz, 2017). Since the health service provided in hospitals is directly related to human life, hospital management is quite different from other businesses in this respect (Kamer, 2018).

Developments in health are changing rapidly, both medically and technologically. For this reason, hospital managers should have the potential to follow and implement the results in health in the best way (Keklik, 2012). Increasing productivity in hospitals is essential for hospital management, and it makes a significant contribution to the formation of health policies (Yıldız, 2017; Tripathi et al., 2016; Çekiç, 2015). Due to the increase in population, there is an increase in hospital applications. At the same time, the burden of hospitals in the provision of health services is increasing due to the rise in the rate of older adults, the increase in

people in need of care, and the increase in chronic diseases. These negative increases cause a decrease in the quality of treatment, diagnosis, and patient care services of patients (Tanyıldızı, 2020).

Hospitals should organize the activities to provide health services with low cost and high-quality value and have proactive thinking. An unsuccessful organization will put a heavy burden on hospitals (Bulut, 2017). Improvement of processes in hospital management is achieved with a good management style (Etesaminia & Akbaş,2020).

## **8 Wastes in Lean Hospital Management**

Health systems have four essentials: equity, effectiveness, people-orientation, and efficiency. The definition of waste in hospitals is mainly related to efficiency and effectiveness targets (Ceviz, 2021). The perspective of lean management in hospitals is about eliminating waste (Nihal et al., 2015). The main goal of lean management is to develop employees and improve processes in a balanced way and provide the patient with a level of excellence with this balance. All methods that do not create value in the workflow of hospitals cause waste for the patient (Kılıçarslan, 2016). After examining the causes of waste in hospitals, lean techniques target lean management principles to eliminate the processes that do not create value. It is ensured that the hospital provides the most efficient, effective, and quality health services from the patient's admission to the hospital to the stage of leaving the hospital. For this reason, unnecessary activities that cause waste should be removed from all processes (Temür,2019)—listed under eight headings.

**Errors:** Having the wrong idea about the tasks that need to be done, the job, unnecessary time spent during the audits of the works. These are jobs that contain rework or are incomplete—giving the wrong prescription to the patient, hospital-acquired infection resulting from incorrect medical practices in the post-operative patient follow-up, giving inaccurate blood test results to the patient. Directing the patient to the wrong polyclinic examination and mistakes made during the patient registration process are among the errors in the hospital (Kılıçarslan, 2016).

Mistakes in every institution also occur in hospitals that provide uninterrupted health services. Inadequate management approaches in hospitals, decreased motivation of employees, unnecessary activities in the processes, inappropriate communication cause errors in hospitals (Temür, 2019).

**High Amount Production:** The excessive use of medical support increases the needs of the patients and does not benefit the patients. Mostly, the application of unnecessary activities in hospitals, as a business, the application of medical tools and drugs necessary for treatment, X-ray film, tomography, medical blood tests for diagnosis that are not needed, and it is a waste for the hospital. Overproduction is the realization of production before the required time and more than the necessary amount (Temür,2019).

**Unnecessary Material Movement:** It is defined as the movement distance is more than necessary. The distance between the nurse treatment room and the emergency patient monitoring room is too long. It was routinely cleaning the patient's bed even though it is not needed in the inpatient treatment unit of the hospitals, supplying both sterile and non-sterile medical equipment at different times rather than separating them as a whole, taking the necessary drugs for the treatment to be applied to the patient in the service not from the nurse treatment room each time. It is considered an excessive material movement that causes waste in the hospital (Aloğlu, 2018).

**Waiting:** Delays in the workflow. Planned surgeries in the operating room do not occur when they should, so they wait too long for the surgery (Çakıroğlu,2018). Before the tomography is taken, the patient to be examined by the doctor is waiting for the doctor, which causes the delay of the planned medical operations since the doctor arrives much later than the expected time without a valid excuse or an emergency case (Aloğlu, 2018).

I am waiting unnecessarily to realize the work at another stage and make the workflow wait unnecessarily (Çakıroğlu,2018). Although it is essential, it is a crucial waste for the hospital (Yetgin & Sur, 2017).



**Excess Stock:** Costs rise due to unnecessary storage—medical materials that have expired in the hospital (Çakıroğlu, 2018). Storing medical tools and equipment that are not needed in the inpatient treatment unit in the hospital, in the intervention rooms, in the pharmacies, in the outpatient clinics, in the radiology department is an unnecessary stocking process. It is a waste for hospitals (Yetgin & Sur, 2017). Too many warehouses in hospitals supplying more than necessary are unnecessary operations of critical importance. Lost drugs or medical supplies cause economic damage in the hospital at significant costs (Özkan, 2018).

**Unnecessary Human Movement:** Unnecessary human movement in hospitals occurs when employees are in too much activity due to a large area. An example of this is that pharmacy workers act more than necessary due to the wrong architectural structure in the hospital (Çakıroğlu, 2018). When unnecessary empty spaces are made in the hospital environment, it causes a loss of time and effort for healthcare professionals. Employees in the hospital consume excessive attempts to provide health services and cannot provide timely and quality health services to patients (Özkan, 2018). Due to the ample space in the radiology unit, there is more human movement than necessary, as patients and healthcare professionals walk in the ample space every day (Soba et al., 2018).

**Unnecessary Operation:** It is the whole of unnecessary procedures for patients. An example of this is asking the patient to take an x-ray film, which is superfluous (Çakıroğlu, 2018). The need for the medical supplies returned from the clinical departments of the hospitals and their preparation for reuse are the extra activities that should not take place in the hospitals (Bulut, 2017).

**Human Potential:** The fact that managers do not evaluate employees by ignoring their abilities or work inclination, enthusiasm, and thoughts weakens employee motivation and sense of belonging, causing a decrease in productivity at work (Soba et al., 2018). Showing compassion and willingly smiling face to patients is seen as "value" in lean management practices. Providing health services by experienced and willing health personnel will increase the quality of the health service offered. For this reason, the belonging of the personnel to the job, morale, motivation, and taking their opinions about the position plays an essential role in evaluating the human potential (Aloğlu, 2018).

The decrease in the motivation of the hospital staff and the inability to develop their skills reduce their work performance. Developing employees' skills is vital for the success of the lean approach and increasing hospital performance (Grabau, 2011).

### **Managerial Approaches and Lean Management in Hospital Management**

Increasing chronic diseases and the need for patient care emerge with the increase in the aging population. To find solutions to medical innovations, technological changes, and the increasing demands of society regarding health services, hospitals have aimed to change their current management and apply different management approaches (Taşdemir et al., 2021). Hospital managers use various management approaches in hospitals to increase quality and efficiency.

The management approaches used in hospitals are as follows;

- Six sigma
- Total quality management
- System approach (Özkan,2018).

**Six Sigma:** Motorola Company developed Six Sigma. The goal of six sigma is to organize the activities in the workflow. It is a statistical method. It shows what is variable in the workflow, how wrong is done, how much damage is done, and the standard deviation. Six sigma is a statistics-based method that increases the activities' performance (Kuman, 2019). In the six sigma method, the improvement in the workflow is determined by the sigma level (Etesaminia & Akbaş, 2020).

Tasks in Six Sigma are listed by Özkan (2018) as follows:

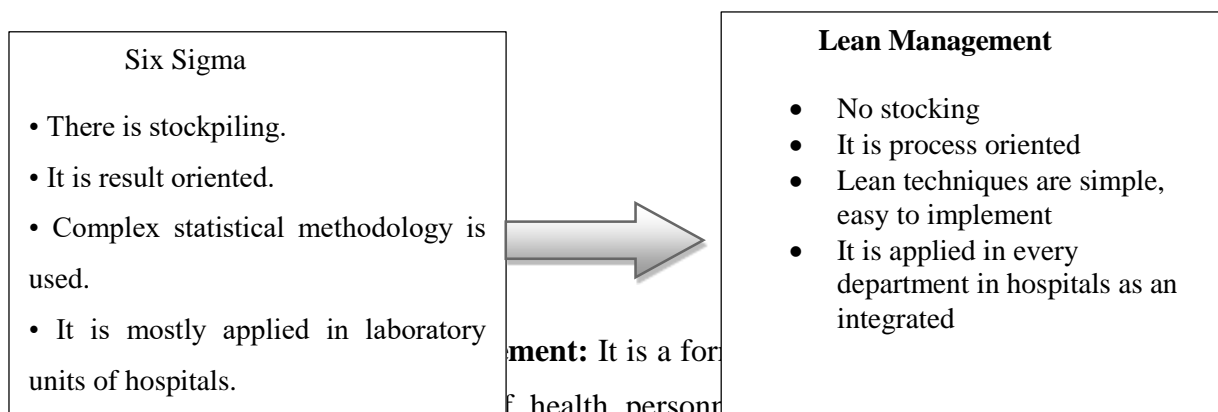
- a) Yellow Belt:** Group members who support projects, ensure continuity in improvements and offer proposals.
- b) Green Belt:** Project leaders who take part in the realization of change.
- c) Black Belt:** The project leaders support the green belts, guiding and supporting the champion generations.

**d) Expert Black Belt:** They are the leaders who provide consultancy and support to the management of the black belts and do projects according to the company structure.

**e) Champion:** People who provide solutions to problems, disseminate projects, and are the leader and organizer of six sigma

**Figure 4: Comparison of six sigma and lean management**

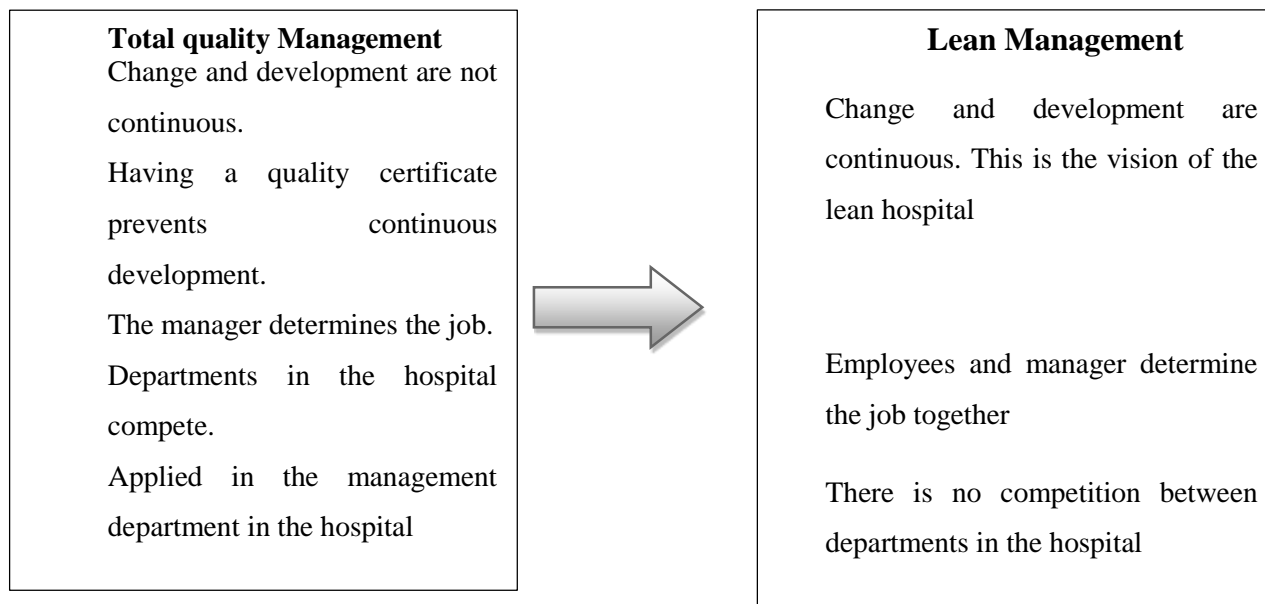
(Özkan & diğ., 2015).



services in an efficient and high-quality manner (Çelik & Öztürk, 2021).

**Figure 5: Comparison of total quality management and lean management**

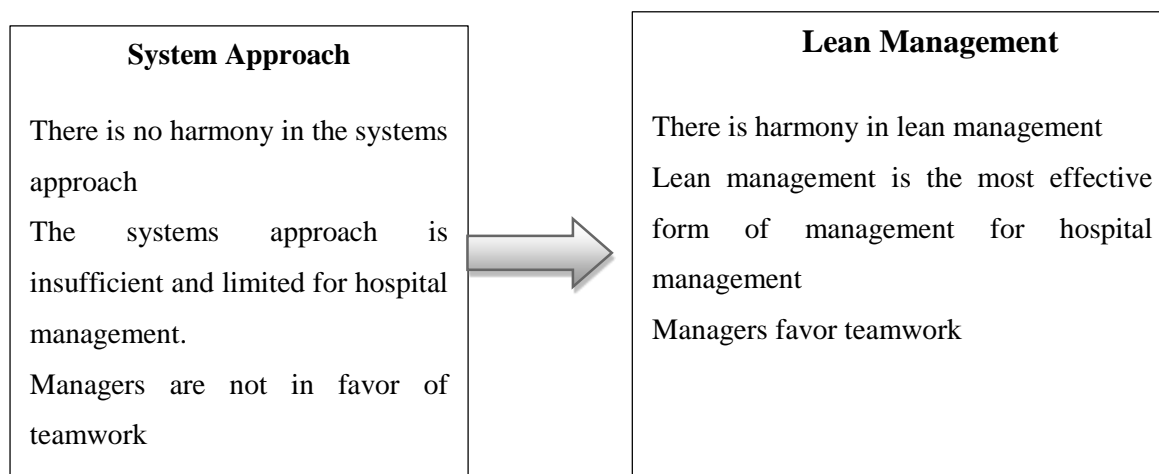
(Grabau, 2011)



**System Approach:** The system approach in hospitals is a method that aims to solve the problems experienced from a different perspective (Tecim, 2004). System approach; It is an approach that evaluates the events in the surrounding science fields and all aspects of the social problem and focuses on the interaction between departments (Akkuş & İzci, 2018).

**Figure 6: Comparison of the systems approach and lean management**

(Aslan & Pekcan, 2016)



Although the methods applied by the managers in hospitals aim to make the work done faster, higher quality, and lower cost simultaneously, it isn't easy to achieve all of them at the same time. The methods applied in hospitals are generally suitable for doing only two of these three simultaneously. On the other hand, Lean management can do all three simultaneously. One of the most important reasons for the success of lean management is that employees are significantly effective in management. This reveals the superior aspect of lean management (Aydın,2018). Lean hospital practices have proven beneficial in the European Union, such as the Institute for Healthcare Development in the United States, and organizations like the United Kingdom the Innovation and Improvement Agency (Andreamatteo et al., 2015). Hospitals have achieved many benefits by adopting the lean philosophy. Güleriyüz (2012) listed these benefits as follows:

- The treatment processes of the patients are accelerated
- Wastes have been primarily eliminated
- Patients' waiting times are reduced
- Productivity has increased

- Lean principles are standardized
- Employee and patient satisfaction increased.
- Communication and teamwork among employees have improved
- Increased patient safety

With the lean principles applied in hospitals, the infection rate of patients decreased by 90% (Yılmaz et al., 2017). Hospitals adopt a lean approach to implement high-quality and cost-effective treatments (Bharsakade et al., 2021; Çakıroğlu, 2018; Çavmak, 2018; Rosaria et al., 2016). The lean management philosophy is the elimination of wasteful practices in the healthcare delivery of hospitals. It is a management style that transforms hospitals' point of view into the primary goal of satisfying the patients by removing them while increasing productivity, quality, and employee satisfaction (Dellve et al., 2015).

### **Lean Management Practice Examples in Hospitals around the World**

Lean management, which improves hospitals' performance, increases their competitiveness, and thus ensures long-term success, is increasingly applied in hospitals. When we look at the rate in countries that implement lean hospital management, it is seen that 57% of this is in the United States of America and 29% in England. 4% apply Australian lean management in hospitals (Çilhoroz & Arslan,2018; Tekman,2021). Examples of lean hospital practices worldwide are explained by Özkan (2018) as follows. In 2002, Virginia Mason Hospital implemented the lean hospital philosophy. The number of infected patients at Virginia Mason Hospital fell from 35 to 4 during the year. Mortality rates after heart surgeries have decreased from 4% to 0%.



### **Image 5: A view from Virginia Mason Hospital**

(Viriniamason.org)

In 2004, Thedacare Medical Center started to implement and develop lean principles. Patient satisfaction has increased with lean management practices while saving financially, patient waiting times have also decreased. In the case of Pittsburg, in the lean hospital applications, patient infections in intravenous applications decreased by 63%. Patient diagnosis and treatment times have decreased. Patient satisfaction has increased. In Mayo Clinic, treatment times have been shortened with a lean approach. In the emergency department of Iowa University hospital, the length of stay of the patients in the emergency department was reduced with lean methods. With lean management practices in the hospital, located in a rural area of America, the patients' length of stay was reduced by 44%, and the number of patients increased by 10%. Patient satisfaction increased by 92% (Derin, 2008).

With the lean methods carried out in Kosovo Hospital, patients' time for treatment and diagnosis has been shortened. Factors that negatively affect the motivation of health workers have been eliminated. Patient satisfaction and hospital safety have increased (Temür,2019). In Alegent hospital, the completion time of the patients' laboratory results was reduced by 60% without adding health personnel and medical devices, with lean practices. The time to clean and sterilize medical instruments at Kingston hospital has been reduced by more than 70%. In Allegheny hospital, patient deaths from nosocomial infections decreased 95% (Grabau, 2011).

Lean activities at Ohio Hospital and revenue from in-hospital surgeries increased by \$808,000. The duration of laboratory examinations decreased by 60% without the need for extra healthcare workers and the addition of medical equipment in the laboratory department of the hospital (Temür,2019). In Missoula Medical Clinic, the number of patients was increased from 4 to 5, resulting in a 25% improvement. In Boston Hospital, there was a 33% reduction in patients' time in the treatment process and a 42% reduction in paperwork time (Taşdemir et al., 2021).

Lean management approach was carried out in the eye diseases outpatient clinic of Mid Yorkshire hospital in England and eye operations. As a result, patients' waiting time who undergo a process for eye diseases has decreased by 60%. The

examination sequence and workflow in the eye outpatient clinic have been improved (Aloğlu,2018).

Sheridan Healthcare's lean practices are explained by Tanyıldız (2020) as follows:

**Emergency Department A:** The physician's seeing the patient decreased from 12 minutes to 6 minutes.

**Emergency Department B:** The patient's follow-up time in the emergency department was reduced from 250 minutes to 179 minutes by 28.4%.

**Department of Anesthesia:** The postponement rate of surgery decreased from 19% to 5% per day.

The lean method was used while designing the architecture of Park Nicollet Hospital. It has been ensured that healthcare professionals and patients reach the polyclinic departments in a 73% shorter time (Aloğlu,2018). When the patient medical care procedures were carried out with lean methods in Montague General Hospital, the rate of hospital-acquired infections was reduced by 90%, thereby protecting from disease. It was carried out to protect patients and healthcare workers by preventing infection (Taşdemir et al., 2021). İpbüken (2018) mentioned for the first time that the Toyota Production System, where lean thinking, which has not been expressed before in the literature, was born, was implemented in the "Toyota Memorial Hospital" as follows: Toyota Memorial Hospital was established in 1938. The primary aim of the hospital is to provide the highest quality service. There are 1000 staff and 150 doctors working in the hospital.

The hospital has 500 beds and has 457-bed occupancy every day. Lean hospital management practices became operational under the lean consultancy of Hiroya Kamada-san. Kamada stated that starting from the hospital managers, doctors, nurses, technical and administrative personnel should adopt the lean management philosophy and be applied to the hospital's activities by all staff. Long meetings hospital management from the manager's rooms were ended. Simple visual "standard work" was performed to help patients better understand the purpose and process of their examination.



## Japan Gemba Visit: Toyota Memorial Hospital Tour

**Image 6: A view from Toyota Memorial Hospital**

(kbjanderson.com)

Lean hospital practices in China are described by Gao and Gurd (2019) as follows:

*“Since the mid-1990s, as China's medical reform deepened, hospitals have faced increasing pressure to improve medical quality and operational efficiency. Some Chinese hospitals have implemented lean management to improve their performance. Lean practices in hospitals in China For the first time in 2009, it is a worker's hospital of China's largest automobile manufacturing group. Taihe Hospital and Nanfang Hospital are the leading hospitals that perform lean practices.”*

### **Lean practice areas in hospitals in China**

Specifically, the lean approach; has also been applied in integrated management such as pharmacy, operating room, outpatient care, nursing management, financial management, human resources management, and hospital culture change.

### **Lean practice results in hospitals in China**

- Medical quality control has been improved
- Positive results were obtained in indicators related to business processes and reduced waiting times.



- Patient satisfaction has increased
- Employee satisfaction has increased
- Hospital cost efficiency has increased
- Hospital work efficiency has increased
- Hospital management has improved
- Communication and teamwork between employees has improved
- Hospital safety has increased

While lean management is emphasized as patient-centered, the significant impact is that lean is used in hospitals in China to increase operating efficiency and reduce operating costs.

### **Lean Management Approach in Hospitals in Turkey**

Lean hospital practices in Turkey were expressed by Kurt (2018) as follows: Lean hospital practices in Turkey started in 2011 at “Uludağ University Faculty of Medicine and Private Medicabil Hospitals.” Since 2015, lean techniques have been put into operation in "Some Public Hospitals affiliated to the Bolu Province Public Hospitals Association."



**Image 7: Private Medicabil Hospital**

(medikalakademi.com.tr)

It has been stated by the Bartın Provincial Health Directorate (2018) that training will be given on Lean Hospital Applications in Bartın State Hospital, and field applications will be made in the emergency room and operating room of the hospital. Konya Provincial Health Directorate (2018) announced that the "Mevlana Development Agency gave lean Hospital Applications Training" in Konya Numune Hospital. Lean practices in Sinop Atatürk State Hospital were expressed by Özşahin (2017) as follows: "The "Lean Hospital Project" was prepared by the Sinop Public Hospitals Association and Sinop Atatürk State Hospital managers were provided with the training.

According to the statement made by Adana Provincial Health Directorate (2021), "Lean Hospital Training Project in Combating Pandemic" was implemented within the scope of the Çukurova Development Agency Technical Assistance Program. It was stated that after the "Lean Hospital System and Practices Training" held by Bilecik Provincial Health Directorate (2021) with health managers and health workers, studies would be carried out to adopt lean hospital management as a philosophy, culture, and management in hospitals.

Surgical instruments supplied at Bursa Private Medicabil Hospital were reduced by 33%, and the agencies returned by 52%, while the number of surgical procedures increased by 6%. With the lean practices in the sterilization labeling section, 45% of packaging costs were saved. In the warehouse section, 56.9% of the time was held in the emergency service when access to materials with lean transformation. There was a 9.19% reduction in the mean delay time in the pre-surgical processes and a 5.60% decrease in the post-operative delays. (Antep, 2020). In the lean practice at Bolu İzzet Baysal Mental Health and Diseases Training and Research Hospital, 67 drug items were reduced to 24, to reduce the amount of non-essential medical supplies by applying five work-size methods, and the satisfaction of health personnel increased from 57% to 93% (Ilkim & Deep,2015).

Lean practices in Private Bukhara Hospital were explained by Ilkim and Derin (2016) as follows: The hospital started lean practices by giving an awareness training on lean philosophy. The 5S-Visual hospital team and employees have personally initiated the reorganization process to prevent movement and time wastage and

manage their stocks in the best way by reconsidering the positioning and storage of all materials and other equipment. Private Medikal Hospital applied the lean hospital approach they realized for health institutions to İnegöl State Hospital as well” (Medikal Lean Health Institute, 2019).

Lean approach activities were implemented in Bolu İzzet Baysal Dental Health Center. Lean transformation activities have been implemented in clinical activities, including patient appointment processes. The number of people receiving health services has increased (Tanyıldızı, 2020). The lean approach applied by Kurt (2018) in Uludağ University Medical Faculty Hospital was involved in 3 ways.

**1. Polyclinic Improvement Process:** The patient's waiting time in outpatient clinics was reduced by 46%, resulting in improvement. The number of people who applied to the hospital increased by 34%. Patient satisfaction increased by 7%, and health personnel satisfaction by 9%.

**2. Pharmacy Service Improvement Process:** The waiting time in drug supply processes has been shortened. Drug regulation procedures were carried out with fewer health personnel. Health personnel satisfaction increased by 6%.

**3. Improvement practices in accounting:** The time spent in accounting practices related to hospitalization and discharge of patients has been reduced. Patients are prevented from waiting for accounting transactions. Physicians' time to write detailed reports about inpatients and inform the patient has been reduced in the workflow. Improvement was achieved by achieving savings with lean practices in financial management.

The causes of mudan in the radiology department of Sakarya Training and Research Hospital were determined, and lean approach methods were applied as a solution. By using lean practices, waiting times in the outpatient clinics and operating rooms are shortened, making treatment, medical care, and diagnosis more efficient for the patient (Temür, 2019).

In the application of patients who received physical therapy with the lean

methods carried out in the İzzet Baysal Rehabilitation Center, the number of patient applications was higher at the rate of 46%, thanks to the patient satisfaction achieved with the lean-approach. Patient waiting times are reduced. Medical errors were largely prevented (Özkan, 2018). By applying lean methods in Kayseri Training and Research Hospital, the patient's length of stay in the patient monitoring room was reduced, resulting in an improvement of 75% in the workflow. A 20% gain was achieved in the efficiency of responding to emergency cases in the hospital (Aloğlu, 2018).

Medikal Park Hospital, which applies lean principles, has ensured that patients receive quality, efficient health care in the time from their admission to the hospital until their exit process. The hospital's safety and the patients' health workers were ensured (Malkoç, 2019).

Ankara Gazi Mustafa Kemal State Hospital has also adopted lean management philosophy. With lean management practices, the treatment processes of patients have accelerated, waste has been largely eliminated, patient waiting times have decreased, productivity has increased, employee and patient satisfaction have increased, communication between employees has strengthened, and patient safety has increased (Soba et al., 2018).

## CHAPTER III

### Method

In this section, information about the research model, the research study group, the collection and analysis of data, and how the findings are reported are given.

**The subject of Research:** The potential benefits of lean management practices to hospital businesses and the awareness of health managers are investigated. The reason for choosing the research topic; The difficulties arising from the management style of hospitals with a complex structure, the significant increase in the elderly population in the society, the increase in treatment and medical care costs due to chronic diseases, and the methods applied by the hospital management are insufficient in preventing wastage in hospitals. However, hospitals cannot achieve different successful results because they use the same techniques, which are inadequate in the face of rapid change and development in health. For this reason, the necessity of lean management practices of hospitals to manage hospitals more simply and easily, prevent waste in hospitals quickly, follow the developments in health at low cost, and be successful is the reason for choosing the research topic.

### **Purpose of the research**

The research aims to reveal the relationship between lean management practices and their potential benefits to hospital businesses and to determine the knowledge and attitudes of the managers who are still working in a lean hospital as a manager and who have received training on the lean hospital.

### **Sub-Objectives**

The sub-purpose of the study is to investigate whether there is a significant difference between the demographic variables and the attitudes of the managers who are still working in the lean hospital and who have received training on lean hospital management towards lean management practices.

The fact that hospital managers work in a lean hospital and have received training on lean management; It is thought that it will be significantly effective in the

successful implementation of the lean approach in hospitals, identifying the obstacles to lean management and creating policies accordingly, developing lean applications, adopting lean management by the managers, spreading lean management practices in hospitals, and examining the potential benefits of lean applications to hospital businesses.

In this research, the difficulties arising from the management style of hospitals with a complex structure, the significant increase in the elderly population in the society, the increase in treatment and medical care costs due to chronic diseases, and the methods applied by the hospital management are insufficient in preventing wastage in hospitals. However, hospitals cannot achieve different successful results because they use the same techniques, which are inadequate in the face of rapid change and development in health. For this reason, it has been focused on the necessity of lean management practices of hospitals to manage hospitals more simply and easily, prevent waste in hospitals quickly, follow the developments in health at low cost, and be successful. For this purpose, the problem statement of the research was formed with the problem identified above.

Are there “potential benefits of lean management practices to hospital businesses”?

Is there a significant relationship between "lean management practices and the managers' attitudes who are still working in the lean hospital and have received training on lean hospital management"?

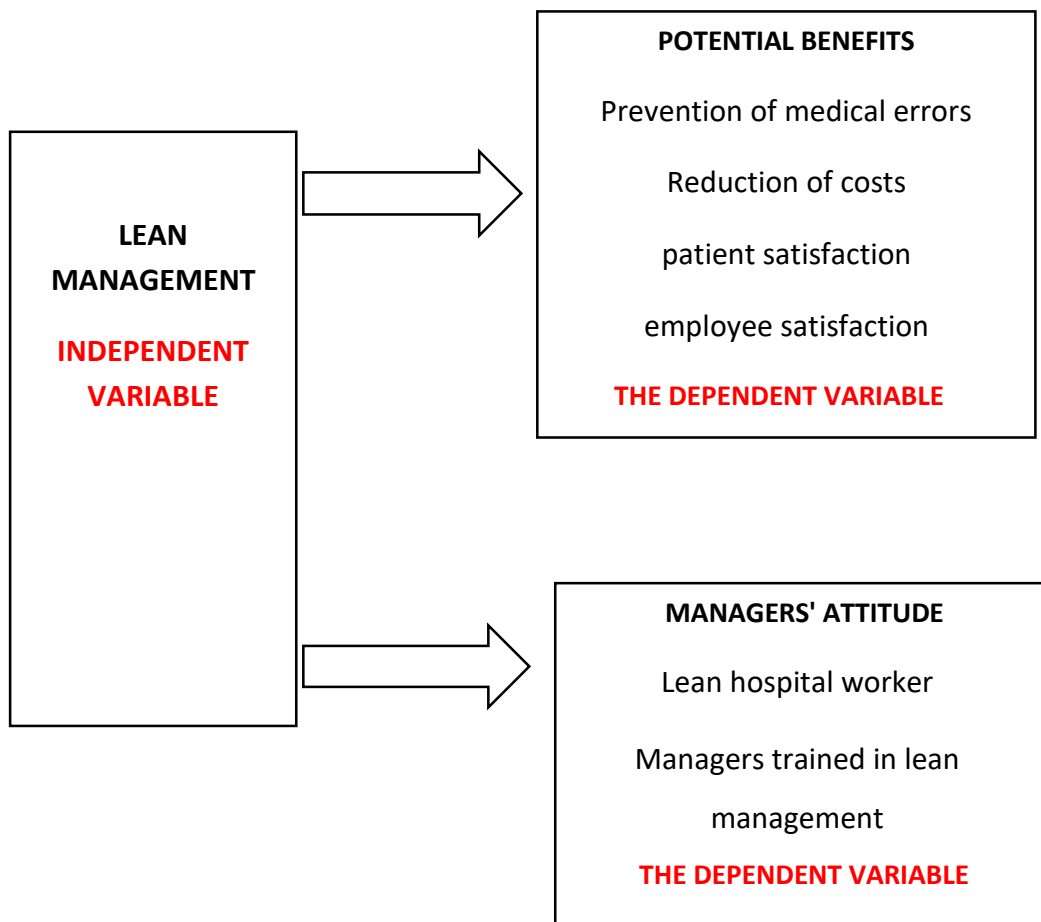
**Sub Problems:** The attitudes of the managers who are still working in the lean hospital and who have received training on lean hospital management towards lean management practices.

- a) Age
- b) Educational status
- c) Gender
- d) Does it differ significantly according to the types of hospitals they work in?

### **Research Pattern**

The research design was created based on the variables used in the research as a result of the literature research. As a result of the literature research, the research design determined by the purpose of the study is shown in Figure 7.

**Figure 7: Pattern of the Research**



### **Research Hypotheses**

Based on the problems used in this study, some hypotheses have been developed.

**H1:** According to the age of the managers, there is a significant difference between taking a leadership role in the implementation of lean management in the hospital.

**H2:** There is a significant difference between the managers' belief that lean management practices will increase patient satisfaction according to their age.

**H3:** According to the education level of the managers, there is a significant difference between the leadership role in the implementation of lean management in the hospital.

**H4:** There is a significant difference between the administrators' beliefs that lean management practices will increase patient satisfaction according to their education level.

**H5:** According to the gender of the administrators, there is a significant difference between taking a leadership role in the implementation of lean management in the hospital.

**H6:** There is a significant difference between the managers' beliefs that lean management practices will increase patient satisfaction according to their gender.

**H7:** There is a significant difference between the managers taking a leadership role in implementing lean management in the hospital according to the hospitals they work in.

**H8:** There is a significant difference between the managers' beliefs that lean management practices will increase patient satisfaction according to the types of hospitals they work in.

**H9:** There is a significant relationship between applying lean management to clinical areas and the prevention of medical errors.



**H10:** There is a significant relationship between lean management practices and cost reduction.

**H11:** There is a significant relationship between lean management practices and patient satisfaction.

**H12:** There is a significant relationship between lean management practices and employee satisfaction.

**H13:** There is a significant relationship between the managers' having received adequate training about the lean hospital and their attitudes towards lean practices.

**H14:** There is a significant relationship between managers' willingness to implement lean management practices and their attitudes towards lean practices.

### **Explanation of the Hypotheses of the Research with Theoretical Support**

To investigate the relationship between lean management practices, prevention of medical errors, reduction of costs, increased inpatient and employee satisfaction, adequate training of managers about the lean hospital and their attitudes towards lean practices, whether managers want to implement lean management practices and their attitudes towards lean practices, hypotheses based on the literature are presented. As a result of applying lean methods in infected patients in hospitals, the number of infected patients decreased by 90% (Yılmaz et al., 2017). With the improvement activities implemented at Virginia Mason Hospital, the number of patients infected by respiratory equipment decreased from 35 to 4 per year. The death toll from heart disease has dropped from 4% to 0%. In the Mayo cardiology clinic, simple methods were applied, and people who came with emergency heart diseases were intervened as soon as possible (Kurt, 2018).

Based on these findings, the H9 hypothesis was formed.

**H9:** There is a significant relationship between applying lean management to clinical areas and preventing medical errors.

The primary purpose of lean management is to reduce costs by reducing non-value-creating activities (Rohani, 2015). High prices in the provision of health services, waste; Due to waiting, losses, overstocking, excessive operations, and errors, it has become mandatory to apply the lean approach in hospital enterprises (Nihal et al., 2015; Yalçın et al., 2018).

Within two years, Virginia Mason Hospital reduced inventory costs by 53%, space utilization by 41%, timely work by 65%, human transportation by 44%, material handling by 72%, and set-up time by 82%, while increasing productivity by 36%. Another health institution that implements lean management is Thedacare Medical Center. Thedacare saved 3.3 million US\$ in 2004 after lean practices, and patient care costs decreased by 30% with the joint care unit created (Kurt, 2018).

Part of Providence Health Care, St. As a result of the lean activities at St. Paul's Hospital, more than 30% of the reports were completed in 1 day and approximately 60% in 2 days. In addition, the employees' waste of time and movement has been reduced by the improvements in the plan and general design of the laboratories and the review of the processes (Özkan, 2018). Patient visit times were reduced by 34% and patient medical care and treatment times were reduced from 20 minutes to 15 minutes, and four more patients were treated (Özkan, 2018). Based on these findings, the H10 hypothesis was developed.

**H10:** There is a significant relationship between lean management practices and cost reduction.

Thedacare has succeeded in increasing patient satisfaction rates after its lean work. Reducing the average hospital stay from 6.3 days to 4.9 days, reducing the cost of coronary bypass by 22%, reducing the patient waiting time from 14 weeks to 31 hours in orthopedics from the first examination to surgery are

examples of gains offered by lean practices to Thedacare. With the lean transformation in Uludağ University Medical Faculty Hospital, patient waiting times in the polyclinic decreased by 46%; the number of patients examined by the physician daily was 34%; patient satisfaction increased by 7% (Kurt, 2018).

Based on these findings, the H11 hypothesis was developed.

**H11:** There is a significant relationship between lean management practices and patient satisfaction.

As a result of the lean practices carried out to increase the efficiency of the Chemotherapy Unit at the Netherlands Cancer Institute-Antoni Van Leeuwenhoek Hospital, the number of treatments increased by 24%, employee productivity by 12%, and overtime of employees was reduced by 81%. Employee satisfaction increased by 9% with lean transformation at Uludağ University Medical Faculty Hospital (Kurt, 2018). Employee satisfaction increased from 57% to 93% in the lean practice carried out in Bolu İzzet Baysal Mental Health and Diseases Training and Research Hospital (Ilkim & Derin, 2015). Lean management is a philosophy and management concept based on the excellence of the value offered to the customer in the product or service creation process (Özkan, 2018; Drotz & Poksinska, 2014; Parkes, 2015; Çilhoroz & Arslan, 2018). Based on these findings, the H12 hypothesis was created.

**H12:** There is a significant relationship between lean management practices and employee satisfaction.

To form a lean management culture, employees and managers must receive training on lean philosophy (Özer et al., 2021; Çavmak, 2018). Lean training should be taken from a lean management expert consultant (Kurt, 2018).

Hospital staff should always be regularly trained on lean principles and their benefits (Maraşlı & diğ.,2016). Based on these findings, the H13 hypothesis was formed.

**H13:** There is a significant relationship between the managers' having received adequate training about the lean hospital and their attitudes towards lean practices.

The positive effects of lean practices on the managerial processes of hospitals have been demonstrated by many studies (Özkan et al., 2015). Managers play a crucial role in implementing, succeeding, and developing lean management (Özkan, 2018). Lean management needs leaders and leadership (Kadarova & Demecko, 2016).

Based on these findings, the H14 hypothesis was created.

**H14:** There is a significant relationship between managers' willingness to implement lean management practices and their attitudes towards lean practices.

With hospitals in the provinces of Bursa (1. Private Medicabil Hospital/Bursa. 2. İnegöl State Hospital), Bartın (3. Bartın State Hospital), Konya (4. Konya Numune Hospital) Sinop), (5. Sinop Atatürk State Hospital), which are attempting to implement lean hospital applications. Is limited. In the research, 75 hospital managers chief physicians are fixed. In the study, there are 75 hospital managers, top physicians, administrative and financial services manager, administrative and financial services assistant manager, health care services manager, health care assistant manager, health care services manager, health care services assistant manager, a quality director who are still working in a lean hospital and have received training in lean hospital management limited to the administrator.

### **Contribution of the Research**

The benefits of lean management practices for hospital businesses have been identified in the literature as gains obtained by applying lean management techniques to hospitals. According to the method of researching the potential benefits of lean management practices to hospital enterprises, survey research was carried out in 5 hospitals that adopt lean approach techniques throughout Turkey, adopting lean management principles. It was carried out in 5 hospitals that adopted lean management principles and applied lean approach techniques throughout Turkey. It

is thought that the research will make the following contributions both in theory and in practice: Identifying the potential benefits of lean management practices for hospital businesses will be a strong incentive for hospital managers to implement lean techniques. It will contribute to the formation of health policies by examining the potential benefits of lean management practices, which are significantly effective in developing individual, society, and global health. It has been observed that the knowledge and attitudes of "managers working in a lean hospital who have received training in lean management," which is an essential variable in the surveys about lean hospital management, about lean management practices are not examined. In this research, it is thought that the managers who work in the lean hospital and have received training on lean management have a significant impact on the decision-making of the managers who will implement lean management in their hospitals.

### **Type of Research**

According to the research approach; It is applied research.

According to the research purpose; It is descriptive research.

According to the research method; It is survey research.

According to research data analysis; It is quantitative research.

According to the philosophical way of thinking, the research is purely developmental (from the general to the specific).

### **Ethical Dimension of Research**

Necessary permission for the research was obtained from the ethics committee of Near East University. Afterward, essential licenses were obtained from the hospitals included in the scope of the study to carry out the survey studies. Survey and scale permissions were obtained. Survey and scale permissions were obtained.

### **Place and Time of Research**

The place where the research was conducted is in Bursa (1. Private Medicabil Hospital/Bursa. 2. İnegöl State Hospital), Bartın (3.Bartın State Hospital), Konya (4.Konya Numune Hospital) Sinop (5.Sinop Atatürk State Hospital) Provinces. They are hospitals. Data began to be collected in February 2019.

## **Population and Sample of the Research**

The universe of the research, which applies the lean hospital approach in Turkey; Senior managers still operating in hospitals in Bursa (1. Private Medicabil Hospital/Bursa. 2.İnegöl State Hospital) Bartın (3. Bartın State Hospital), Konya (4. Konya Numune Hospital) Sinop (5. Sinop Atatürk State Hospital) forms. The reason why these hospitals were included in the study is that they have implemented lean practices. It is announced in the literature that hospitals implement the lean approach and in writing by the Ministry of Health of the Republic of Turkey. Data were collected from all the units in the universe using the integer method, which is the data collection method. No sampling was done. Who agrees to participate; The research was conducted with 75 managers: hospital managers, chief physicians, deputy chief physicians, administrative and financial services manager, administrative and financial services manager, health care services manager, health care services assistant manager, and quality director. Hospital managers were included in the study because they have an essential role in implementing and developing lean management activities.

### **Data collection method**

A questionnaire consisting of 30 items suitable for the research was chosen as the data collection method. Among the reasons for selecting the survey method, which is used as a data collection method, are the fact that the sample of the research consists of hospitals that implement lean management throughout Turkey and that they are located in a vast geography, taking into account the heavy workload of the people who will answer the survey, they can be expanded in their environment without being faced with time constraints. It can be listed that this method is less costly than other methods, taking into account the low research budget. It can be listed as the fact that people are asked to fill out the questionnaire comfortably in the broader period in their environment without being faced with time constraints. The cost of this method is less than other methods, taking into account the scarcity of the research budget. However, the most helpful criterion for attitude measurement is a questionnaire. It presents numerical data it can be easily applied to all kinds of scales (Antep, 2018).

The items in the questionnaire evaluate the managers' knowledge and attitudes

about lean management. Most things are Likert-type, cascading between “strongly disagree” and “strongly agree.” In the research mainly; The classification scale, which can group the data according to a name, and the Likert scale, which can rank the data at equal intervals. There are two reasons for using the Likert scale. The first of these is the necessity of learning the thoughts of the people included in the research sample to realize the purpose of the research. The other reason is that the Likert scale was preferred in attitude measurement studies because it used descriptive statistics techniques (Antep, 2018). Other questions include demographic information such as the number of hospital beds, type of hospital, job title of hospital administrators, education level, age, gender.

After obtaining the questionnaire and scale permission, the questionnaire form used by Akarin (2014) in his master's thesis on "Total Quality Management in the Health Sector, Quality Understanding of Health Managers (Ankara Province Example)" was used. The questionnaire form was developed based on the literature and research hypotheses. Validity and reliability analyzes of the questionnaire were made. Before the questionnaire was applied to hospital managers who did lean practices, it was used to 61 hospital managers in a pilot study in 5 hospitals that did not implement lean techniques. According to the results of this pilot application, the questionnaire was given its final shape and applied. Validity and reliability analyzes of the questionnaire were made.

The questionnaire was applied to the people who are still working as managers by interviewing them face to face by the researcher at their place of duty.

### **Analyzing Data**

Findings of the study, Pearson correlation, chi-square analysis, and Kolmogorov Smirnov test showed that the data distribution was normal. Results were evaluated with 95% confidence and 5% significance level. The data obtained in the research were analyzed using the SPSS (Statistical Package for Social Sciences)

25.0 package program.

### **Reasons for Using Tests**

**The Kolmogorov Smirnov test** is the most known and used test to determine whether the data are suitable for normal distribution.

**The Chi-square test** is used to test whether there is a relationship between two variables. The most known and used test is the chi-square test.

**Correlation Analysis:** It is a statistical analysis that reveals whether there is a relationship between two or more variables and, if there is, the severity of this relationship.

**Correlation Coefficient:** It takes values ranging from -1 to +1. A positive correlation indicates a linear relationship between the variables, and a negative correlation indicates an inverse relationship.

**Pearson Correlation Coefficient:** It requires two variables to be continuous and show normal distribution together.

### **Validity and Reliability Analysis of Data Collection Form**

For the validity and reliability of our questionnaire, six people who are known to be interested in lean management and lean hospital management experts were interviewed, and what lean management could cover in the hospital was discussed. At the end of the discussion, a questionnaire form was distributed to these managers, and their opinions were asked. A high Cronbach's Alpha coefficient level was obtained in the pilot test related to lean management applied to 61 people.

### **Table 5: Reliability Analysis Results**



Cronbach's Alpha Coefficient	Cronbach's Alpha Coefficient based on standardized items	Number of items
0,861	0,878	24

Cronbach's Alpha coefficient for lean management = 0.861. The mean values of all questions are four and above. Their standard deviations are less than 1. They range from 1-0.5. The average is four and above in all. . In the analysis of the correlation of item scores, (+) and (-) positive and negative coefficients were obtained consistently.

**Table 6: Item Analysis**

	Scale Mean When Item Is Deleted	Scale Variance when Item is Deleted	Item-All Correlation Should be Corrected	Cronbach's Alpha Coefficient when item is deleted
Will continue to evolve in the industry	90, 0164	52, 183	0,206	0,865
Lean consultant needed	89, 5902	52, 913	0,181	0,864
same with my philosophies	89, 7869	50, 570	0,471	0,855
into non-clinical areas	89, 7049	49, 778	0,592	0,851
It will operate in clinical areas	89, 6557	49, 963	0,587	0,851
I am willing to offer the energy	89, 7541	48, 355	0,553	0,851
Increases the level of service	89, 5738	50, 149	0,551	0,852
It's a temporary fad	92, 1148	60, 203	-0,394	0,896
I want to join	89, 6393	50, 068	0,451	0,855
Must be involved in activities	89, 6557	50, 430	0,528	0,853
Quick solution to quality problems	89, 8197	49, 684	0,538	0,852
Works well together as a team	89, 7213	49, 138	0,645	0,849
It is a process that requires constant commitment to lean.	89, 6230	49, 105	0,654	0,849
I would like to take the leading	89, 7213	49, 904	0,503	0,853
Requires cultural change	89, 5410	49, 219	0,666	0,848
Lean health care lowers costs	89, 5574	48, 117	0,674	0,847
Lean prevents medical errors	89, 6721	48, 157	0,613	0,849
Lean increases patient satisfaction	89, 5738	49, 215	0,635	0,849
Lean increases customer satisfaction	89, 6066	49, 043	0,601	0,850
Lack of admin support is a hindrance	89, 4918	50, 287	0,506	0,853
Resistance to change is simply an obstacle	89, 4098	52, 446	0,320	0,859

Lack of knowledge and motivation is an obstacle	89, 4590	53, 519	0,171	0,863
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A scale is a measurement tool consisting of questions that measure personal knowledge, attitudes, and behaviors. Likert-type scales are primarily used in social sciences. Validity and reliability are two critical features that must be present in the ranking. Reliable and valid scales enable us to reach accurate results. Validity is the ability to accurately measure the concept or feature intended to be measured without confusing it with other concepts and features. The scale used is valid if it accurately distinguishes the feature from other features. There are many types of validity, such as criterion, aspect, structure, and scope. Many of these types are used during scale development and adaptation studies to different cultures (Antep, 2018). Validity; It is the degree to which the measuring tool serves its purpose, to measure accurately without confusing the feature that the measuring instrument aims to measure with another part. The questionnaire's appearance, scope, structure, and criterion validity were determined to be at an appropriate level by evaluating it by six people known to be interested in lean management and hospital management specialists.

The following questions were asked on behalf of the appearance, scope, structure, and criterion validity of the questionnaire:

- Overall, did you get the impression that the functions of a lean hospital can be distinguished from this questionnaire?
- Do you think that the lean management approach in the hospital is handled with all its dimensions?
- Did you notice a structural flaw in the general setup of the questionnaire and the transition from question to question?
- If we say that the situation where a lean hospital works perfectly is 100 percent success, to what extent is our survey capable of guiding this as hospitals get closer to this ideal?

**Plan of the Study****Research Subject**

- Determining the research topic
- Purpose and sub-objectives of the research

**Literature research**

- Examining the literature on the subject
- Identifying deficiencies in the literature
- Revealing the originality of the research

**Method**

- Research pattern
- Research hypotheses and theoretically supportive explanations
- The sample and universe of the research
- Data collection method
- Analysis of data
- Reliability and validity analysis

**Plan of the Research**

- Research time
- Research permissions and ethics committee permission
- Fieldwork

## CHAPTER IV

### Findings and Comments

In this section, the findings reached in the light of the data collected for the study questions are mentioned.

**Table 2: Distribution of Managers by Descriptive Characteristics**

Introductory Features	Variables	Frequency (n)	Percent (%)
	Hospital Manager	4	5,3
	Surgeon General	5	6,7
	Deputy Chief Physician	21	29,2
	Financial Servis Manager	5	5,4
	Deputy Director of Financial Services	18	24,0
	Health Care Services Manager	5	6,7
	Deputy Director of Health Care Servis	12	16,0
<b>Jop Titles</b>			
	Quality Director	5	6,7
	Licence	29	38,6
	Graduate	17	22,7
	Uzm.Dr.	27	36,0
<b>Education</b>			
	Prof.Dr.	2	2,7
	25-36.9	14	18,7
	37-49.9	37	49,3
<b>Age</b>	50+	24	32,0
	Female	34	45,3
<b>Gender</b>	Male	41	54,7
<b>Total</b>		<b>75</b>	<b>100,0</b>

The distribution of the essential characteristics of the managers included in the research is shown in Table2. Considering the distribution of job titles of lean hospital managers, it is seen that 5.3% (4) Hospital manager, 6.7% (5) Chief Physician 29.2% (21) Deputy Chief Physician, 5.4% (5) Administrative and financial services manager, 24.0% (18) assistant manager of administrative and financial services, 6.7% (5) Health care services manager, 16.0% (12) Deputy health care services manager, 6.7% (5) are quality directors. When we look at the distribution of the managers according to their educational status, 38.6% (29) of them are undergraduate, 22.7% (17) are postgraduate, 36.0% (27) are Masters. Dr., 2.7% (2) of Prof. Dr.'s level of education was found. Considering the age group distribution of the managers, 18.7% (14) are 25-36. It was determined that in the nine age group, 49.3% (37) were in the 37-49.9 age group, and 32.0% (24) were in the 50+ age group. It is seen that 45.3% (34) of the managers are female, and 54.7% (41) are male.

**Table 3: Distribution of Managers by Descriptive Characteristics**

<b>Variables</b>	<b>Sıklık (n)</b>	<b>Yüzde (%)</b>	
<b>Number of Hospital Beds</b>	101-200	13	17,3
	201-300	15	20,0
	301-400	14	18,7
	401-500	16	21,3
	501-600	17	22,7
<b>Hospitals</b>	A	13	17,3
	B	15	20,0
	C	14	18,7
	D	16	21,3
	E	17	22,7
<b>Hospital Type</b>	Public Hospital	62	82,7
	Private Hospital	13	17,3
<b>TOTAL</b>	<b>75</b>	<b>100,0</b>	

The distribution of the managers included in the study according to the characteristics of the hospitals they are assigned to is shown in Table 3. Considering the distribution of the hospitals where the managers are given according to the number of beds, 17.3% (13) are 101-200-bed hospitals, 20.0% (15) are 201-300-bed hospitals, 18.7% (14) are 301- It is seen that there are 400-bed hospitals, 21.3%(16) are 401-500-bed hospitals, 22.7% (17) are 501-600-bed hospitals. Considering the distribution of the managers according to the hospitals they are assigned to, 17.3% (13) A: Private Medicabil Hospital/Bursa, 20.0% (15) B: Sinop Atatürk State Hospital/Sinop, 18.7% (14) ) C: İnegöl State Hospital/Bursa, 21.3% (16) D: Bartın State Hospital/ Bartın, 22.7% (17) E: Konya Numune Hospital/Konya hospitals. When the proportional distribution according to State Hospital-Private Hospital)

**Table 4: Distribution of Managers' Views on Lean Management Practices**

<b>Lean Applications</b>		<b>F</b>	<b>(%)</b>
It will lead to an increase in service quality.	undecided	8	10,8
	agree	23	32,5
	agree at all	44	56,7
Continuing to evolve in the maintenance industry will.	undecided	15	20,0
	agree	25	33,3
	agree at all	35	46,7
Need for outside consultants has	I don't	13	17,3
	agree at all		
	I disagree	20	26,7
	undecided	17	22,7
	agree	12	16,0
Adequate training in lean management I bought	agree at all	13	17,3
	agree	20	26,7
	agree at all	55	73,3
Lean management philosophy personal management same as my philosophy	agree	21	28,0
	agree at all	54	72,0
Lean applications to non-clinical areas will be transferred and processed	I disagree	2	2,7
	undecided	24	32,0
	agre	22	29,3
	agree at all	27	36,0
Lean applications to clinical areas will be transferred and processed	agreee	31	41,3
	agree at all	44	58,7



**Table 4:** *Distribution of Managers' Views on Lean Management Practices*  
(continued)

<b>Lean Applications</b>		<b>F</b>	<b>(%)</b>
Running the lean management process For am willing	undecided	4	5,3
	agree	24	32,0
	agree at all	47	62,7
Services offered by hospitals help them raise their level	undecided	1	1,3
	agree	27	36,0
It is a management tool that will	agree at all	47	62,7
The future in the healthcare industry	I don't agree at all	55	73,3
Popularity and use in 5 years	I disagree	18	24,0
it's a temporary fad that will fade	undecided	2	2,7
Lean at my hospital as a manager participate in management practices I would like	undecided	10	13,3
	agree	26	34,7
	agree at all	39	52,0
Lean management daily management should be involved in their activities	agree	22	27,7
	agree at all	53	72,3
Lean management hospital quality Is a quick solution to your problems	undecided	1	1,3
	agree	26	34,7
	agree at all	48	64,0
Management at my hospital as a team works well	agree	29	38,7
	agree at all	46	61,3
Leaders must always be lean	undecided	1	1,3
	agree	28	37,3
	agree at all	46	61,3
Lean management in my hospital take a leading role in the implementation I would like	I disagree	1	1,3
	undecided	23	30,7
	agree	18	24,0
	agree at all	33	44,0

**Table 4:** *Distribution of Managers' Views on Lean Management Practices (continued)*

<b>Lean Applications</b>		<b>F</b>	<b>(%)</b>
Implementation of lean management	agree	20	26,7
requires cultural change	agree at all	55	73,3
Lean management practices	undecided	1	1,3
total health care cost	agree	23	30,7
will lower their	agree at all	51	68,0
Lean management practices	undecided	1	1,3
medical errors significantly.	agree	23	30,7
will prevent	agree at all	51	68,0
Lean management applications	I don't agree at all	2	2,7
patient satisfaction	I don't agree	10	13,3
will increase	undecided	25	33,3
	agree	31	41,3
	agree at all	7	9,3
Lean management applicationsworking doctor	I don't agree	1	1,3
will increase	agree	21	28,0
	agree at all	53	70,7
Manager's support	undecided	1	1,3
lack of lean management	agree	12	16,0
hinder the implementation	agree at all	62	82,7
change resilience lean management	agree at all	75	100,0
hinder the implementation			
Lack of knowledge and motivation	agree	15	20,0
in the implementation of lean management	agree at all	60	80,0
is an obstacle			
<b>TOTAL</b>		<b>75</b>	<b>100,0</b>

The distribution of the opinions of the managers included in the research about lean management is shown in Table 4. 10.8% of the managers participating in the survey remain undecided, 32.5% agree, and 56.7% fully agree with the idea that "Lean practices operating in my hospital will lead to an increase in the quality of the service provided in the long run."

"Lean management process will continue to develop in the health care industry in the next ten years," 20.0% of the managers surveyed remain undecided, 33.3% agree, 46.7% fully agree. "There is a great need to use consultants outside the hospital to help implement the lean approach in hospitals," 17.3% of the managers who participated in the survey did not agree at all, 26.7% did not agree, 22.7% remained undecided, 16%, 0 agree, 17.3% fully agree. 26.7% of the managers participating in the survey agree with the opinion that "I received sufficient training on lean management concepts and methods to take on a leadership role in the implementation of lean management in my hospital," and 73.3% fully agree. 28.0% of the managers who participated in the survey agree with the idea that "Management philosophies related to the lean management process are in line with my management philosophies" and 72.0% fully agree. 2.7% of the managers who participated in the survey disagree, 32.0% remain undecided, 29.3% agree, 36%, 0 fully agree. 41.3% of the managers who participated in the survey agree with the idea that

"Lean management practices, which are widely used in the manufacturing industry, will be transferred to the clinical areas of the hospital and will work," and 58.7% agree. 5.3% of the managers surveyed are undecided, 32.0% agree, and 62.7% agree with the idea that "As a member of the management, I am willing to offer the time and energy required to run the lean management process." 1.3% of the managers who participated in the survey were undecided, 36.0% agreed, and 62.7% ultimately agreed with the idea that "Lean management is a management tool that will help hospitals affiliated to the Ministry of Health increase the level of service they offer."

“Lean management is a temporary fad whose popularity and use will decrease in the next five years in the health care industry,” 73.3% of the managers surveyed disagree, 24.0% disagree, and 2.7% are undecided. As a manager, I would like to participate in implementing lean management in my hospital” 13.3% of the managers participating in the survey are undecided, 34.7% agree, and 52.0% agree. “Lean management should be integrated into day-to-day management activities.” 27.7% of the managers participating in the survey agree with the opinion, 72.3% agree.

Lean management is a "quick solution" to the quality problems of hospitals. 38.7% of the managers participating in the survey agree with the idea that “The management at my hospital works well together as a team,” and 61.3% agree. Lean management is a process that requires corporate leaders to demonstrate their commitment to the lean approach constantly. 1.3% of the participating managers remain undecided, 37.3% agree, and 61.3% fully agree. I want to take a leading role in implementing lean management in my hospital" 1.3% of the managers who participated in the survey do not decide, 30.7% are undecided, 24.0% agree, 44.0% agree. The idea of “The implementation of lean management requires cultural change” is decided by 26.7% of the managers who participated in the survey, and 73.3% agree. Lean management practices will reduce the total health care costs”, 1.3% of the managers who participated in the survey remain undecided, 30.7% agree, 68.0% agree. Lean management practices will significantly prevent medical errors” 1.3% of the managers participating in the survey are undecided, 30.7% agree, 68.0% agree. Lean management practices will increase patient satisfaction. Fully participates.

1.3% of the managers who participated in the survey disagree, 28.0% agree, and 68.0% fully agree with the idea that "Lean management practices will increase employee satisfaction."The lack of support from the manager is an obstacle to the implementation of lean management” 1.3% of the managers participating in the survey are undecided, 16.0% agree, and 82.7% agree.

“Resistance to change is an obstacle to implementing lean management; 100% of the managers who participated in the survey completely agree. 20.0% of the managers who participated in the survey agree with the idea that “lack of knowledge and motivation is an obstacle to the implementation of lean management,” and 80.0% agree.

**Table 6: Average of data on lean management**

	n	Average	Std. Sapma	Minimum	Maksimum
Lean management average	75	4,3700	0,24392	3,63	4,88

In the table above, descriptive findings of lean management scores are given.

**Table 7: Comparison of the Beliefs of the Managers That They Want to Take a Leader Role in the Implementation of Lean Management in My Hospital and that Lean Management Practices Will Increase Patient Satisfaction According to Their Ages**

		Age (n %)			X <sup>2</sup>	P
Variables		25-36	37-49	50+		
I would like to take a lead role in implementing lean management in my hospital	undecided	7 (50,0)	9 (24,3)	8 (33,3)	3,106	0,212
	agree	7 (50,0)	28 (75,7)	16 (66,7)		
	I don't agree	2 (14,3)	5 (13,5)	5 (20,8)		
Lean management practices will increase patient satisfaction.	undecided	4 (28,6)	14 (37,8)	7 (29,2)	1,112	0,892
	agree	8 (57,1)	18 (48,6)	12 (50,0)		

• Chi-square test

As can be seen in the table, as a result of the chi-square test performed to determine whether the proposition "I would like to take a leading role in the implementation of lean management in my hospital" and "Lean management practices will increase patient satisfaction" is dependent on the age variable, the dependence between the variables was not statistically significant. ( $X^2=3,106$ ;  $p>0.05$ ) ( $X^2=1,112$ ;  $p>0.05$ ).

**Table 8: A Comparison of the Beliefs of the Managers That They Want to Take a Leader Role in the Implementation of Lean Management in My Hospital and that Lean Management Practices Will Increase Patient Satisfaction According to Educational Status**

Variables		Educational Status ( %)			X <sup>2</sup>	P
		Licence	Degree			
I would like to take a lead role in implementing lean management in my hospital	undecided	15 (51,7)	9 (19,6)	8,454	0,005	
	agree	14 (48,3)	37 (80,4)			
	I disagree	4 (13,8)	8 (17,4)			
Lean management practices will increase patient satisfaction.	undecided	9 (31,0)	16 (34,8)	0,408	0,815	
	agree	16 (55,2)	22 (47,8)			

• Chi-square test

As can be seen in the table, as a result of the chi-square test performed to determine whether the proposition "I would like to take a leading role in the implementation of lean management in my hospital" is dependent on the variable of educational status, the dependence between the variables was found to be statistically significant ( $X^2=8.454$ ;  $p<0.05$ ). ).

As can be seen in the table, as a result of the chi-square test performed to

determine whether the proposition "Lean management practices will increase patient satisfaction" is dependent on the education level variable, the dependence between the variables was not statistically significant ( $X^2=0.408$ ;  $p>0.05$ ).

**Table 9: Comparison of Managers' Beliefs That They Want to Take a Leader Role in Implementation of Lean Management in My Hospital and that Lean Management Practices Will Increase Patient Satisfaction According to Gender**

		Gender (n %)				
Variables		Female	Male	$X^2$	P	
I would like to take a lead role in implementing lean management in my hospital	undecided	11 (32,4)	13 (31,7)	0,004	0,952	
	agree	23 (67,6)	28 (68,3)			
	I disagree	6 (17,6)	6 (14,6)			
Lean management practices will increase patient satisfaction.	undecided	10 (29,4)	15 (36,6)	0,456	0,796	
	agree	18 (52,9)	20 (48,8)			

- Chi-square test

As can be seen in the table, as a result of the chi-square test performed to determine whether the proposition "I would like to take a leading role in the implementation of lean management in my hospital" and "Lean management practices will increase patient satisfaction" is dependent on the gender variable, the dependence between the variables was not statistically significant. ( $X^2=0.004$ ;  $p>0.05$ ) ( $X^2=0.456$ ;  $p>0.05$ ).

**Table 10: A Comparison of the Beliefs of the Managers That They Want to Take a Leader Role in the Implementation of Lean Management in My Hospital and that Lean Management Practices Will Increase Patient Satisfaction According to the Hospital Types They Work**

		Hospital Type (n %)			
Variables		Public Hospital	Private Hospital	X <sup>2</sup>	P
I would like to take a lead role in implementing lean management in my hospital	undecided	19 (30,6)	5 (38,5)	0,302	0,745
	agree	43 (69,4)	8 (61,5)		
	I disagree	2 (3,2)	10 (76,9)		
Lean management practices will increase patient satisfaction.	undecided	24 (38,7)	1 (7,7)	43,44	0,000
	agree	36 (58,1)	2 (15,4)		

• Chi-square test

As can be seen in the table, as a result of the chi-square test performed to determine whether the proposition "I would like to take a leading role in the implementation of lean management in my hospital" is dependent on the hospital type variable, the dependence between the variables was not statistically significant ( $X^2=0.302$ ;  $p>0.05$ ). ).

As can be seen in the table, as a result of the chi-square test performed to determine whether the proposition "Lean management practices will increase patient satisfaction" is dependent on the hospital type variable, the dependence between the variables was found to be statistically significant ( $X^2=43.44$ ;  $p<0.05$ ). ).

**Table 11: The Relationship Between Application of Lean Management to Clinical Fields and Prevention of Medical Errors**

**H9: There is a significant relationship between applying lean management to clinical areas and preventing medical errors.**



		your lean management to clinical areas implementation	medical errors prevention
your lean management to clinical areas implementation	Pearson Correlation	1	0,308 <sup>**</sup>
	Sig. (2-tailed)		0.007
	n	75	75
medical errors prevention	Pearson Correlation	0,308 <sup>**</sup>	1
	Sig.(2-tailed)	0.007	
	n	75	75

When Table 11 was examined, it was concluded that there was a significant and positive relationship between the application of lean management in clinical areas and the prevention of medical errors ( $p < 0.05$ ;  $r = 0.308$ ). In this case, H9 was accepted.

**Table 12: The relationship between lean management practices and cost reduction**

**H10: There is a significant relationship between lean management practices and cost reduction.**

		medical errors prevention	health care costs decrease
medical errors prevention	Pearson Correlation	1	0,786 <sup>**</sup>
	Sig. (2-tailed)		0.000
	n	75	75
health care costs decrease	Pearson Correlation	0,786 <sup>**</sup>	1
	Sig.(2-tailed)	0.000	
	n	75	75

When Table 12 is examined, it is concluded that there is a significant and positive relationship between the prevention of medical errors in lean management and the reduction of health care costs ( $p < 0.05$ ;  $r = 0.786$ ). In this case, H10 is accepted.

**Table 13: The relationship between lean management practices and patient satisfaction**

**H11: There is a significant relationship between lean management practices and patient satisfaction.**

		medical errors prevention	Patient satisfaction
medical errors prevention	Pearson Correlation	1	0,921 <sup>**</sup>
	Sig. (2-tailed)		0.000
	n	75	75
Patient satisfaction	Pearson Correlation	0,921 <sup>**</sup>	1
	Sig.(2-tailed)	0.000	
	n	75	75

When Table 13 is examined, it is concluded that there is a significant and positive relationship between the prevention of medical errors in lean management and increased patient satisfaction ( $p < 0.05$ ;  $r = 0.921$ ). In this case, H11 is accepted.

**Table 14: The relationship between lean management practices and employee satisfaction**

**H12: There is a significant relationship between lean management practices and employee satisfaction.**

		Lean management cultural exchange requires	Worker satisfaction
Lean management cultural exchange requires	Pearson Correlation	1	0,420 <sup>**</sup>
	Sig. (2-tailed)		0.000
	n	75	75
Worker satisfaction	Pearson Correlation	0,420 <sup>**</sup>	1
	Sig.(2-tailed)	0.000	
	n	75	75

When Table 14 is examined, it is concluded that a significant and positive relationship between lean management requires cultural change and increased employee satisfaction ( $p < 0.05$ ;  $r = 0.420$ ). In this case, H12 was accepted.

**Table 15: The relationship between managers' having received adequate training about the lean hospital and their attitudes towards lean practices**

**H13:** There is a significant relationship between the managers' having received sufficient training about the lean hospital and their attitudes towards lean practices.

		Lean hospital related adequately trained be	Lean management is in line with my management philosophy
Lean hospital related adequately trained be	Pearson Correlation	1	0,698 <sup>**</sup>
	Sig. (2-tailed)		0.000
	n	75	75
Lean management is in line with my personal management philosophy	Pearson Correlation	0,698 <sup>**</sup>	1
	Sig.(2-tailed)	0.000	
	n	75	75

When Table 15 is examined, it has been concluded that a significant and positive relationship between having received adequate training on lean hospital and lean management is in line with my personal management philosophy ( $p < 0.05$ ;  $r = 0.698$ ). In this case, H13 was accepted.

**Table 16: The relationship between managers' willingness to implement lean management practices and their attitudes towards lean practices**

**H14:** There is a significant relationship between managers' willingness to implement lean management practices and their attitudes towards lean practices.

		Lean management their applications wanting to do	Lean management practices should be incorporated into daily activities
Lean management their applications wanting to do	Pearson Correlation	1	0,686 <sup>**</sup>
	Sig. (2-tailed)		0.000
	n	75	75
Lean management practices should be incorporated into daily activities	Pearson Correlation	0,686 <sup>**</sup>	1
	Sig.(2-tailed)	0.000	
	n	75	75

When Table 16 is examined, it is concluded that there is a significant and positive relationship between wanting to implement lean management practices and lean management practices that should be included in daily activities ( $p < 0.05$ ;  $r = 0.686$ ). In this case, H14 was accepted.

## CHAPTER V

### Discussion

In this section, the findings are discussed within the studies' framework. The aim is to reveal the relationship between lean management practices and their potential benefits to hospital businesses and determine the knowledge and attitudes of managers working in a lean hospital and who have received training in lean hospital management. The findings and hypotheses of this study were discussed, respectively. Whether the hypotheses were accepted or not was determined according to the hypothesis test results. The relationship between lean management practices and their potential benefits to hospital enterprises was examined with the following hypotheses, respectively, according to the managers who are still working in the lean hospital and have received training on lean hospital management.

**H9:** There is a significant relationship between applying lean management to clinical areas and preventing medical errors. The hypothesis was accepted. In parallel with the H9 hypothesis, Toussaint's (2019) study found that heart attack death rates were reduced from 22% to 2% in two years, thanks to lean applications in the McLeod Health Cardio care system Florence, South Carolina. From these findings that support the hypothesis, we see that the lean approach is critical in human life in preventing errors, which is one of the eight wastes in hospitals. Supporting the hypothesis, Andreamatteo et al. (2015) concluded in their research that the interest in the lean approach to increase clinical effectiveness has increased. The most significant potential benefit of lean management to hospital businesses in the prevention of medical errors. It is possible to prevent health-threatening problems quickly, without sacrificing quality, and at low cost, with lean management. Resolving health problems in hospitals avoiding medical errors affects public health and individual health. Globally, lean management makes a significant contribution to the development of health.

**H10:** There is a significant relationship between lean hospital practices and cost reduction. The hypothesis was accepted. In the literature (Parkes, 2015; Warner et al., 2013; Lee et al., 2019; Solak, 2015; Çakıroğlu, 2018; Yalçın et al., 2018;

Aydın, 2015; Nihal et al., 2015; Kwiatkowski et al. , 2016; Asnan, 2015). Studies are consistent with the results of the hypothesis. From these results, we understand that lean management effectively reduces costs. Reducing costs significantly avoids waste. It contributes to the increase of efficiency in hospitals. Lowering costs with lean applications is a significant result.

**H11:** There is a significant relationship between lean management practices and patient satisfaction. The hypothesis was accepted. There are studies supporting the assumption that lean practices increase patient satisfaction (Warner et al., 2013; Çakıroğlu, 2018; Escobar et al., 2015; Rauch et al., 2016; Çaklı, 2021). Their studies show similarities. The lean approach in hospitals determines the value from the patient's perspective. Patient satisfaction is a parameter that determines the quality of health services. Similar studies strengthen the H11 hypothesis. This result shows that lean management achieves an important goal by increasing patient satisfaction.

**H12:** There is a significant relationship between lean management practices and employee satisfaction. The hypothesis was accepted. Lean management practices have contributed significantly to developing employees' skills, increasing motivation, and strengthening their commitment to work (Derin, 2008). Lean practices are the methods that improve the performance of the employees and alleviate the workload (Yılmaz, 2017). These studies in the literature show parallelism with the H12 hypothesis. The increase in employee satisfaction in lean management effectively improves the quality of the health service provided.

As the satisfaction of the employees' increases, the quality of the work done will increase, and there will be positive developments in the treatment, patient care, and diagnosis processes related to human life. Increasing employee satisfaction also plays an essential role in successfully implementing lean management in hospitals.

The H9, H10, H11, H12 hypotheses of the research, as a result, showed "significant and positive relationships between lean management practices and their potential benefits to hospital businesses" according to the opinions of the managers who are still working in the lean hospital and who have received training on lean hospital management.



**H13:** There is a significant relationship between the managers' having received adequate training about the lean hospital and their attitudes towards lean practices. The hypothesis was accepted. It is necessary to provide continuous training to employees related to lean management (Taşdemir et al., 2021). It is essential to provide in-service training before and after starting lean practices in hospitals (Bulut, 2017). Lean practices in Sinop Atatürk State Hospital were expressed by Özşahin (2017) as follows: “Sinop Public Hospitals Association “Lean Hospital Project” was prepared. Sinop Atatürk State Hospital was provided with the training. We see that the literature supports the H13 hypothesis. The primary reason for the successful implementation of lean management in hospitals is that managers adopt lean management philosophy. To become conscious of lean management philosophy, hospital managers and all hospital staff should receive training on lean management by lean hospital management specialists.

**H14:** There is a significant relationship between managers' willingness to implement lean management practices and their attitudes towards lean practices. The hypothesis was accepted. For lean management to provide potential benefits to hospitals, managers must adopt the lean philosophy (Thomas et al., 2021).

Lean transformation in hospitals requires a willingness to lean management (Ilkım & Derin, 2016; Asnan et al., 2015). by Drotz and Poksinska (2014); Spagnol et al. (2013) emphasized that one of the obstacles to implementing lean management is the lack of support from the manager. Çetin (2014) states that the lean management approach can be used in every part of the service sector with managers' willingness.

In their study, Gemmel et al. (2018) stated that managers' desire for the lean approach should be continuous. In the research conducted by Kadarova and Demecko (2016), it was determined that the managers' appetite for lean thinking should be constant. Studies in the literature show parallelism with the H14 hypothesis.

The attitude of the managers is essential for the implementation of lean management in hospitals. Managers play a crucial role in developing the lean

approach, in the successful implementation of lean in the hospital, in creating policies that will prevent obstacles in the face of obstacles that occur in the hospital practices of lean management.

The H13 H14 hypotheses of the research showed "significant and positive relationships between lean management practices and the attitudes of managers" according to the opinions of the managers who are still working in the lean hospital and who have received training on lean hospital management.

- In the successful implementation of the lean approach in hospitals
- In determining the obstacles in front of lean management and creating policies accordingly
- In the development of lean applications
- Adoption of lean management by managers
- In the dissemination of lean management practices in hospitals
- Examining the potential benefits of lean practices to hospital businesses
- In determining the managers' attitudes, it is essential to investigate the knowledge and attitudes of the managers who are still working in the lean hospital and have received training on the lean hospital.

With hospitals in the provinces of Bursa (1. Private Medicabil Hospital/Bursa. 2.İnegöl State Hospital), Bartın (3. Bartın State Hospital), Konya (4. Konya Numune Hospital), Sinop (5. Sinop Atatürk State Hospital) which are attempting to implement lean hospital applications. The research is limited to 75 senior managers participating in the study who are currently operating in lean hospitals, attempting lean hospital practices, and have received training in lean hospital management. According to the research findings, there is no difference in the views of lean hospital managers about lean management according to their essential characteristics.

When the literature is examined, some studies are similar to the study's findings: In the survey conducted by Kaltenbrunner et al. (2019), it was observed that there was no difference in the perceptions of lean management according to the

descriptive characteristics of healthcare professionals. In the study conducted by Yetgin and Sur (2017), it was observed that there was no difference in lean management perceptions according to health promotion features ( $p>0.05$ ). Detected. It has been observed that there is no difference in the views of hospital managers about lean management according to their descriptive characteristics. The fact that the opinions on lean management do not change according to the introductory features strengthens the adoption of the lean philosophy.

The managers' response who participated in the survey to the idea that "There is a great need to use consultants from outside the hospital to help implement the lean approach in hospitals" was 17.3% strongly disagree 26.7% disagree. In total, 44% disagreed response was given. In the study of Gao and Grud (2019), which does not coincide with the views of the managers in this direction, it has been determined that hospitals in China tend to use lean consultants from outside the hospital, who can recommend more acceptance as well as promoting their lean services.

In the study conducted by Isfahani et al. (2019), it was stated that it is necessary to use lean consultants from outside the institution to increase their knowledge about the features and dimensions of lean management and reduce the resistance of the personnel. Between lean management practices and cost reduction; between lean management practices and patient satisfaction; between lean management practices and employee satisfaction; between the managers' having received adequate training on lean hospital and their attitudes towards lean practices; A significant relationship was found between the managers' willingness to implement lean management practices and their attitudes towards lean practices.

The most important of the potential benefits of lean management to hospital businesses in the prevention of medical errors. It is possible to prevent health-threatening problems most only, quickly, without sacrificing quality, and at low cost, with lean management. Resolving health problems in hospitals avoiding medical errors affects public health and individual health. Globally, lean management makes a significant contribution to the development of health.

## CHAPTER VI

### Conclusion and Recommendations

In this section, the results reached in line with the aims and sub-objectives of the research, and the suggestions developed based on these results are given.

**Table 17: Results of Testing the Hypotheses of the Study**

hypotheses	Results
<b>H1 hypothesis</b>	<b>Rejection</b>
<b>H2 hypothesis</b>	<b>Rejection</b>
<b>H3 hypothesis</b>	<b>Acceptance</b>
<b>H4 hypothesis</b>	<b>Rejection</b>
<b>H5 hypothesis</b>	<b>Rejection</b>
<b>H6 hypothesis</b>	<b>Rejection</b>
<b>H7 hypothesis</b>	<b>Rejection</b>
<b>H8 hypothesis</b>	<b>Acceptance</b>
<b>H9 hypothesis</b>	<b>Acceptance</b>
<b>H10 hypothesis</b>	<b>Acceptance</b>
<b>H11 hypothesis</b>	<b>Acceptance</b>
<b>H12 hypothesis</b>	<b>Acceptance</b>
<b>H13 hypothesis</b>	<b>Acceptance</b>
<b>H14 hypothesis</b>	<b>Acceptance</b>

This study examined the attitudes of the managers who are still working in the lean hospital and who have received training on lean hospital management and the potential benefits of lean management practices to hospital enterprises. The response of the managers who participated in the survey to the idea that "Lean practices operating in my hospital will lead to an increase in the quality of the service provided in the long run" was 32.5% agree, 56.7% agree. A total of 89.2% agreed it was given.

Studies in parallel with the views of managers in this direction are as follows in the literature: The acceleration of the lean management philosophy contributes significantly to the improvements in the long processes of the business (Özkan et al., 2015; Mazzocato et al., 2010; Urban, 2015).

In the long run, lean practices reduce costs and risks, increasing growth and strengthening hospitals (Bulut, 2017). In Chiu's (2016) study, it was emphasized that lean practices would improve service quality. The managers who participated in the survey that lean management requires cultural change were 26.7% agree and 73.3% agree. In total, the answer was 100% agree. (2019) emphasized that there should be a cultural change to implement lean management. In the research conducted by Teich and Faddoul (2013), it was stated that cultural change is effective in implementing lean. In the study conducted by Durur (2018), it has been determined that a cultural change is necessary for the lean management approach to be fully established, and a minimum of five years is needed to complete a cultural change.

In the study conducted by Ilkim and Derin (2016), it was determined that lean practices require an understanding and cultural change. The managers' response who participated in the survey to the idea that "There is a great need to use consultants from outside the hospital to help implement the lean approach in hospitals" was 17.3% strongly disagree, 26.7% disagree. In total, 44% disagreed response was given.

In the study of Gao and Grud (2019), which does not coincide with the views of the managers in this direction, it has been determined that hospitals in China tend to use lean consultants from outside the hospital, who can recommend more acceptance as well as promoting their lean services. Isfahani et al. (2019) stated in their research that it is necessary to use lean consultants from outside the organization to increase their knowledge about the features and dimensions of lean management and reduce the personnel's resistance.

The managers who participated in the survey to the idea that "Lean management should be included in daily management activities" was 27.7% agree

and 72.3% agree. In total, a response of 100% agree was given. In the studies of Burgess and Radnor (2011) parallel to the managers' opinions in this direction, it was determined that lean practices are a part of daily working life. The response of the managers who participated in the survey to the idea that "Lean management practices, which are widely used in the manufacturing industry, will be transferred to the clinical areas of the hospital and will work" was 41.3% agree, 58.7% agree. In total, 100% agree was given. In the study of Özkan et al. (2015), which coincides with the administrators' opinions in this direction, it was emphasized that lean applications could be made in clinical processes. The response of the managers who participated in the survey to the idea that "Lean management practices, which are widely used in the manufacturing industry, will be transferred and operated in the non-clinical areas of the hospital" was 29.3% agree and 36.0% agree.

A total of 65.3% agree it was given. In the study conducted by Vashi et al. (2019), which aligns with the managers' opinions in this direction, it was determined that lean is also applied in non-clinical areas. The managers who participated in the survey to the idea that "lack of knowledge and motivation is an obstacle to the implementation of lean management" was 20.0% agree and 80.0% agree. In total, a response of 100% agree was given. Studies that coincide with managers' views in this direction are as follows in the literature: (Spagnol et al., 2013; Isfahani et al., 2019; Lodgaard et al., 2016; Lopez et al., 2015).

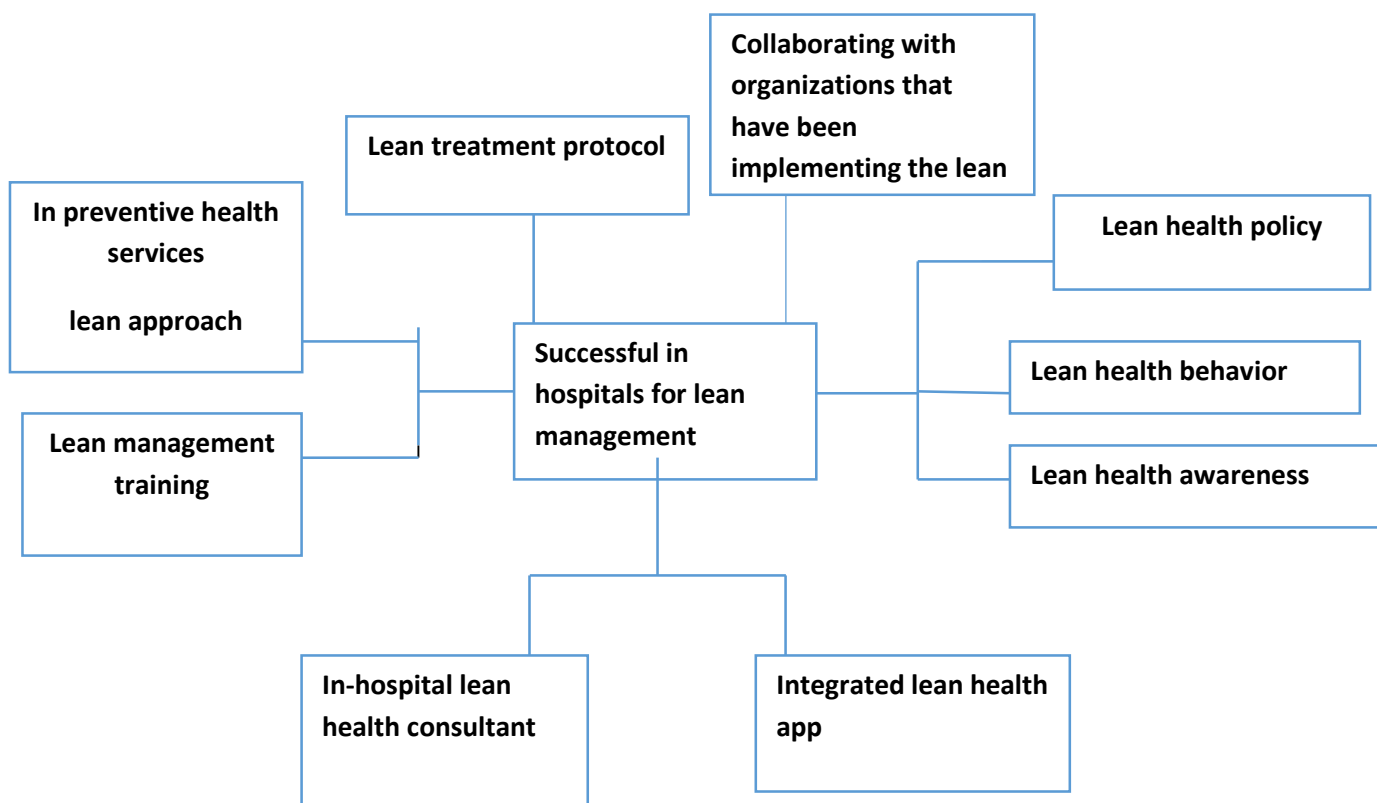
As a result, the findings obtained in the research show similar results in terms of the findings obtained in the studies related to lean hospital management in the literature. In this context, the potential benefits of lean management practices to hospital enterprises and the examination of the managers' attitudes who are still working in the lean hospital and who have received training in lean hospital management about lean management constitute up-to-date data—more straightforward management of hospitals, rapid prevention of waste in hospitals, developments in health. Hospitals need to implement lean management to follow up and be successful at low cost and contribute to healthy growth in the individual, society, and global sense.

**Recommendations**

What needs to be done to implement lean management in hospitals in Turkey successfully and to generate interest in managers

In Turkey, what needs to be done to successfully implement lean management in hospitals and generate interest in managers is presented in Figure 8, in line with the research findings. For this proposal to be implemented successfully, there are some things to be done at the level of the Ministry of Health and the group of hospitals. For lean awareness in health, institutions, academicians, private sector entrepreneurs, and professional organizations are required to reach the desired level.

**Figure 8: Lean management success criteria for hospitals**



**What to Do at the Level of the Ministry of Health:**

- Lean health policy
- Lean treatment protocol
- Lean approach in preventive health services
- In-hospital lean health consultant

Lean hospital management should be adopted primarily by the Ministry of Health, the highest-level direction. Continuity is essential in lean management. For this reason, lean hospital management should not be implemented in individual hospitals but should be realized with lean management that covers all hospitals established by the Ministry of Health. A lean health institute affiliated with the Ministry of Health should be established. Joint projects on lean hospitals should be developed with international lean health institutes. To prevent unnecessary treatments, examinations, and drug use in hospitals, treatment, and examination protocols should be established by the relevant experts by the Ministry of Health. Hospitals should be ensured to comply with these protocols. The burden of hospitals should be alleviated by preventing unnecessary applications to hospitals with lean approach practices in preventive health services. The Ministry of Health should train lean health consultants from within the hospital who know how to follow the hospital's process in the best way and how to manage the hospital.

**Hospital-Level Actions**

- Lean health behavior
- Integrated lean health application
- Lean management training
- Collaborating with institutions implementing the lean approach for a long time.

Physicians, nurses, other health workers, and all hospital employees, especially the top and middle-level managers of the hospital management, should receive training on lean hospital management. Lean management training should be



obtained from lean consultants and requires continuity. Everyone should be encouraged to attend the training.

Education is the most important factor in the adoption of lean management. A "lean health institute," the hospital unit that will carry out studies in coordination with the lean health institute affiliated with the Ministry of Health, should be established in hospitals. It should be managed by lean consultants who are constantly in hospitals. Lean practices in hospitals should be carried out with a holistic approach in clinical and non-clinical units. Lean implementation in a single unit improves performance in that unit. The holistic application of the lean approach in the hospital positively reflects the hospital's performance.

While determining the rules and procedures in hospitals, it is of great importance to reflect the perspective of the service recipients. Necessary training should be given to patients to gain lean health behavior. Hospitals have to benefit the individual, society, and universal health. As the lean health behavior of the patients increases, the community will be conscious. This will make outstanding contributions to hospitals in preventing waste. For hospitals to be successful in lean practices, they must cooperate with other institutions and organizations that are not health institutions that have adopted the lean management philosophy for a long time.

### **Lean Health Awareness**

- Things to Do at Academic Level
- What Private Sector Entrepreneurs Need to Do
- What Professional Organizations Should Do

### **Things to Do at Academic Level**

Lean management should have a place in academia. Academic studies have the most critical effect on raising awareness about lean management. Departments related to lean management should be opened at the university, and courses should be given. Scientific projects related to lean management should be produced. Universities should collaborate and share academically lean hospitals. These activities will strengthen the adoption of lean management.

### **What Private Sector Entrepreneurs Need to Do:**

Private sector entrepreneurs will contribute to the successful implementation of lean management in hospitals, adopting and disseminating lean management,

sharing the benefits that hospitals derive from lean practices, developing projects related to lean hospital management, and engaging in pioneering entrepreneurial activities.

#### **What Professional Organizations Should Do:**

- Lean health managers association should be established.
- It should work in coordination with other associations and carry out activities.
- Health management and education association, nursing association, health, and insurance managers association, and health academicians' association can increase awareness in lean hospital management by making organizations related to lean hospital practices, organizing congresses and seminars, and engaging in academic activities.

As lean management is adopted, lean practices increase, successful lean hospital results are shared, and hospital managers' positive attitudes about lean hospital management are expressed. Awareness about lean hospital management will be created and will gradually increase. Hospitals must adopt the principles, techniques, philosophy, and vision of lean management to implement lean management in hospitals effectively.

#### **Suggestions for Future Research**

For future research, conducting research in the hospital applying the lean management approach in Japan, where lean thinking first emerged, the effect of lean management practices on the prevention of hospital falls, the impact of lean management approach on lean practices in the hospital with the application of lean management approach in primary health care services, job rotation, employee problem solving. It is recommended to contribute to the literature by researching the ability of the organization, how the reduction of the hierarchical structure will affect lean management, investigating whether Lean consultants from outside the institution will have an effect on employee motivation, and revealing the relationship between crisis management and lean management.

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## **EKLER**

### **Anket Formu**

Bu anket formu Yalın Yönetim Uygulamalarının Hastane İşletmelerine Potansiyel Yararları ve Türkiye’de Sağlık Yöneticilerince Bilinirliği konulu doktora tez çalışması için kullanılacaktır. Ankete verilecek cevaplar bütünüyle gizli tutulacak olup, elde edilen veriler akademik çalışma dışında kullanılmayacaktır. Zaman ayırdığınız için teşekkür ederim.

**Seval YETGİN**

K.K.T.C.

Yakın Doğu Üniversitesi

Sosyal Bilimler Enstitüsü

İşletme Yönetimi Anabilim Dalı

Doktora Öğrencisi

## BİRİNCİ BÖLÜM

140

Aşağıdaki ifadeler yalın yönetim uygulamalarına yönelik algı ve tutumlarla ilgilidir. Lütfen her ifadeyi dikkatle okuyunuz ve görüşünüzü en iyi temsil eden sayıyı üzerine (X) işareti koyarak işaretleyiniz.

		Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
1	Hastanemde işleyen yalın uygulamalar uzun vadede sunulan hizmetin kalitesinde bir artışa yol açacaktır	1	2	3	4	5
2	Yalın yönetim süreci gelecek 10 yılda sağlık bakım endüstrisinde gelişmeye devam edecektir.	1	2	3	4	5
3	Hastanelerde yalın yaklaşımın uygulanmasına yardım etmek için hastane dışından danışmanlar kullanmaya çok ihtiyaç vardır	1	2	3	4	5
4	Hastanemde yalın yönetimin uygulanmasında bir lider rolü üstlenmek için yalın yönetim kavramları ve yöntemleriyle ilgili yeterli eğitim aldım	1	2	3	4	5
5	Yalın yönetim süreci ile ilişkili yönetim felsefeleri, kişisel yönetim felsefelerimle aynı doğrultudadır.	1	2	3	4	5
6	Üretim endüstrisinde yaygın olarak kullanılan yalın yönetim uygulamaları, hastanenin klinik olmayan alanlarına aktarılacak ve işleyecektir.	1	2	3	4	5
7	Üretim endüstrisinde yaygın olarak kullanılan yalın yönetim uygulamaları, hastanenin klinik alanlarına aktarılacak ve işleyecektir.	1	2	3	4	5
8	Yönetimin bir üyesi olarak, yalın yönetim sürecini çalıştırmak için gereken zaman ve enerjiyi sunmaya istekliyim.	1	2	3	4	5
9	Yalın yönetim Sağlık Bakanlığı'na bağlı hastanelerin sundukları hizmet düzeyini yükseltmelerine yardım edecek bir yönetim aracıdır.	1	2	3	4	5
10	Yalın yönetim, sağlık bakım endüstrisinde gelecek 5 yılda popülaritesi ve kullanımını azalacak geçici bir hevestir.	1	2	3	4	5
11	Yönetici olarak, hastanemde yalın yönetim uygulamasına katılmak isterim.	1	2	3	4	5
12	Yalın yönetim, günlük yönetim faaliyetlerinin içine katılmalıdır.	1	2	3	4	5
13	Yalın yönetim hastanelerin kalite problemlerine bir hızlı çözümdür.	1	2	3	4	5
14	Hastanemdeki yönetim, bir ekip olarak birlikte iyi çalışır.	1	2	3	4	5
15	Yalın yönetim, kurum liderlerinin yalın yaklaşıma bağlılığını sürekli olarak göstermesini gerektiren bir süreçtir.	1	2	3	4	5

		Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
16	Hastanemde yalın yönetim uygulanmasında bir lider rolü almak isterim	1	2	3	4	5
17	Yalın yönetimin uygulanması kültürel değişimi gerektirir	1	2	3	4	5
18	Yalın yönetim uygulamaları toplam sağlık bakım maliyetlerini düşürecektir.	1	2	3	4	5
19	Yalın yönetim uygulamaları tıbbi hataları önemli ölçüde önleyecektir	1	2	3	4	5
20	Yalın yönetimi uygulamaları hasta memnuniyetini artıracaktır.	1	2	3	4	5
21	Yalın yönetim uygulamaları çalışan memnuniyetini artıracaktır.	1	2	3	4	5
22	Yöneticinin desteğinin eksikliği yalın yönetimin uygulanmasında engeldir.	1	2	3	4	5
23	Değişim direnci yalın yönetimin uygulanmasında engeldir.	1	2	3	4	5
24	Bilgi ve motivasyon eksikliği yalın yönetimin uygulanmasında engeldir.	1	2	3	4	5

## İKİNCİ BÖLÜM

### Görev Unvanınız

- |   |   |
|---|---|
| <input type="checkbox"/> Hastane Yöneticisi                       | <input type="checkbox"/> Başhekim                       |
| <input type="checkbox"/> Başhekim Yardımcısı                      | <input type="checkbox"/> İdari ve Mali Hizmetler Müdürü |
| <input type="checkbox"/> İdari ve Mali Hizmetler Müdür Yardımcısı | <input type="checkbox"/> Sağlık Bakım Hizmetleri Müdürü |
| <input type="checkbox"/> Sağlık Bakım Hizmetleri Müdür Yardımcısı | <input type="checkbox"/> Kalite Direktörü               |

### Öğrenim Durumunuz

- |                                  |  |
|----------------------------------|--|
| <input type="checkbox"/> Lisans  | <input type="checkbox"/> Yüksek Lisans |
| <input type="checkbox"/> Doktora | <input type="checkbox"/> Diğer:.....   |

Yaş: .....

### Cinsiyet:

- |                                |                                |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> Kadın | <input type="checkbox"/> Erkek |
|--------------------------------|--------------------------------|

Lütfen hastanenizin fiili yatak sayısını işaretleyiniz.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> 50 ve altı | <input type="checkbox"/> 51-100       |
| <input type="checkbox"/> 101-200    | <input type="checkbox"/> 201-300      |
| <input type="checkbox"/> 301-400    | <input type="checkbox"/> 401-500      |
| <input type="checkbox"/> 501-600    | <input type="checkbox"/> 601 ve üzeri |

Hastanenizin türü nedir?

Devlet Hastanesi

Özel hastane

Eğitim ve Araştırma Hastanesi

## İzin ve Onay Yazıları



T.C.  
BARTIN VALİLİĞİ  
İl Sağlık Müdürlüğü



Sayı : 78239813-044  
Konu : Yalın Yönetim Uygulamalarının  
Hastane İşlerine Potansiyel Yararları  
ve Sağlık Yöneticilerince Bilinirliği

Sayın Seval YETKİN  
(Yenişehir Mah.Çiğdem Sok.No:5/1 Merkez/KARABÜK)

12.11.2018 tarih ve 66604974-000-6449 sayılı dilekçenize istinaden; "Yalın Yönetim Uygulamalarının Hastane İşlerine Potansiyel Yararları ve Sağlık Yöneticilerince Bilinirliği" konulu çalışmamızı Bartın Devlet Hastanesinde yapmanız Müdürlüğümüzce uygun görülmüş olup;

Bölgelerinizi arz ederim.

e-İmzalıdır.  
Dr.Dursun KOC  
İl Sağlık Müdürü

Ek: YAZI ÖRNEĞİ

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Bilgi İçin:Emel NİSTİN  
Ünvan:TIHHE SEKRETER

Telefon No:0378) 228 36 55-56-57

Elektronik ortamda onay için adresimiz: <http://bny.gov.tr> adresinden al179aac-0304-4304-6202-09480147454 kodu ile erişebilirsiniz.  
Bu belge 5070 sayılı elektronik imza kanunu gereğince elektronik imza ile imzalanmıştır.





T.C.  
SİNOP VALİLİĞİ  
İl Sağlık Müdürlüğü



Sayı : 20785280-605.99  
Konu : Araştırma İzni(Seval YETGİN)

MÜDÜRLÜK MAKAMINA

K.K.T.C Yakın Doğu Üniversitesi Doktora Öğrencisi Seval YETGİN'in "Yalın Yönetim Uygulamalarının Hastane İşletmelerine Potansiyel Yararları ve Türkiye'de Sağlık Yöneticilerince Bilinirliği" konulu araştırma çalışmasını başvuru formunda belirtilen şartlarda Sinop Atatürk Devlet Hastanesinde yapması ve söz konusu araştırma sona erdiğinde sonuç raporunun bir kopyasının tarafınıza sunulması uygun görülmüştür.

Takdirlerinize arz ederim,

e-İmzalıdır,  
Uzm.Dr.Mehmet USTA  
Sağlık Hizmetleri Başkanı

O L U R  
.../.../2019  
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İzmitten elektronik olarak varılan belge için adresimizden 06006725-0750-4553-6360-8636411094E kodu ile erişebilirsiniz,  
Bu belge 5070 sayılı Elektronik İmza Kanunu gereğince elektronik imza ile onaylanmıştır.

Sayı: 9154

13.12.2018

**YAKIN DOĞU ÜNİVERSİTESİ**  
 Sosyal Bilimler Enstitüsü

Enstitünüz İşletme Doktora programı öğrenciniz 20164076 numaralı Seval YETGİN' in "Yalın Yönetim Uygulamalarının Hastane İşletmelerine Potansiyel Yararları ve Türkiye'de Sağlık Yöneticilerince Bilinirliği" başlıklı çalışma başvurusu Özel Medicabil Hastanesi Kalite Kurulu alt komisyonunda değerlendirilmiş olup, Özel Medicabil Hastanesi' nde çalışma anketini bizzat kendisi tarafından uygulanmasının uygun görülmesi üzerine 10 Aralık 2018 tarihinde Özel Medicabil Hastanesi' nin yöneticilerine çalışma anketini uygulamıştır.

Çalışmanın tamamladıktan sonra bir nüshasını hastane arşivine eklenmesi için Özel Medicabil Hastanesi' ne teslim edilmesi rica olunur.

*Prof. Dr. Ayran YILMAZLAR*  
 Medicabil Yalın Sağlık Enstitüsü  
 Koordinatörü



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Sayın Seval YETGİN,

Merhaba Seval Hanım, çalışmamda kullandığım anket formuna ve ölçeği "Yalın Yönetim Uygulamalarının Hastane İşletmelerine Potansiyel Yararları ve Türkiye'de Sağlık Yöneticilerince Bilinirliği" başlıklı doktora tezinizde kullanabilirsiniz. Tez çalışmalarınızda başarılar dilerim.

26.09.2018

Yecim AKAR





T.C.  
BURSA VALİLİĞİ  
İl Sağlık Müdürlüğü



Sayı : 00429979-044  
Konu : Seval YETGİN'in Arayışına İzin  
İlk.

### MÜDÜRLÜK MAKAMINA

Yakın Doğu Üniversitesi Sosyal Bilimler Enstitüsünde 24.10.2018 tarih ve E.18.04 sayılı yazısında, İşletme Doktora Programı öğrencisi Seval YETGİN'in, "Yalın Yönetim Uygulamalarının Hastane İşlemlerine Pratiksel Yararları ve Türkiye'de Sağlık Yöneticilerinin Bilinirliği" konulu araştırma çalışmasını Müdürlüğünüzde bağlı İlgili Devlet Hastanesinde araştırma sorularına uygulamak istediği Bakanlığımıza Uygun görüldüğü olup, Makamınıza de istyap görüldüğü takdirde olurlarınıza arz ederim.

e-imzalıdır.  
Dr. Ebru ATICI  
Personel ve Destek Hizmetleri  
Başkanı

**O L U R**  
.../11/2018  
e-imzalıdır.  
Dr. Özgür AKAN  
İl Sağlık Müdürü

Dokuz Eylül İlçe Sağlık Hizmetleri Müdürlüğü, BURSA  
T.C. Sağlık Bakanlığı

Adres: Bursa İlçe Sağlık Hizmetleri Müdürlüğü, Bursa, Türkiye

Yazın Gönderildiği Tarih: 2018/11/14  
Yazın Gönderildiği Saat: 14:30

İlçe Sağlık Hizmetleri Müdürlüğü

Yazın Gönderildiği Tarih: 2018/11/14

Yazın Gönderildiği Saat: 14:30



T.C.  
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İl Sağlık Müdürlüğü

KONYA İL SAĞLIK MÜDÜRLÜĞÜ - KONYA SAĞLIK  
İZLEME, DEĞERLENDİRME VE DENETİM BİRİMİ  
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KONYA-TR

Sayı : 94723667-806.01.03  
Konu : Bilimsel Araştırma Kabulü

Sayın Seval YETKİNLİ

İlgi : 09/11/18 tarihli dilekçeniz.

Sağlık Müdürlüğüne bağlı sağlık tesislerinde yapılması planlanan bilimsel araştırma, tez, anket, vb. başvurularını incelemek, görüş bildirmek ve değerlendirmek üzere kurulan komisyon tarafından ilgili başvuru değerlendirilmiştir.

İlgi sayılı yazınız ekinde yer alan müracaatınız incelenmiş ve Müdürlüğümüze uygun görülmüş olup, onay sureti ekte gönderilmiştir.  
Bilgilerinize rica ederim.

*e-İmzalıdır.*

Uz.Dr. Tarık ACAR  
İl Sağlık Müdürü a.  
Sağlık Hizmetleri, İlaç ve Tıbbi  
Cihaz Hizmetleri Başkanı

Adresi Yarışehir mah.  
Gittenbik sok.  
No: 5/1  
Karabük

Ek:  
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Telefon: 0 332 3511832 - 1199 Faks No: 03323517268

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Evrakın elektronik imzalı suretine <http://e-betge.saglik.gov.tr> adresinden 114cca5e-4892-4f12-8b3f-2b3bc8490d5a kodu ile erişebilirsiniz.

Bu belge 5070 sayılı elektronik imza kanuna göre güvenli elektronik imza ile imzalanmıştır.

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HEMŞİRE

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## **BIOGRAPHY**

**Adı Soyadı:** Seval YETGİN

### **İletişim Bilgileri**

**Adresi:** Yenimahalle Mah. Bağlar Cad. Coşkun Türk Ap. 21/3 Safranbolu

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### **Öğrenim Durumu**

**Ön lisans:** Ebelik Bölümü: İstanbul Üniversitesi Cerrahpaşa Sağlık Hizmetleri MYO  
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**Yüksek L.:** Sağlık Yönetimi – İstanbul Okan Üniversitesi Sağlık Bilimleri Enstitüsü  
2012-2014

**Doktora:** İşletme Yönetimi KKTC Yakın Doğu Üniversitesi Sosyal Bilimler  
Enstitüsü 2016-

### **Yüksek Lisans Tez Başlığı (özeti ekte) ve Tez Danışman(lar)ı :**

Karabük İlinde Gebelerde Sağlık Arama Davranışı İle İlgili Bir Araştırma

**Danışman:** Prof. Dr. Haydar SUR

### **Uluslararası hakemli dergilerde yayınlanan makaleler (SCI & SSCI & Arts and Humanities)**

Yetgin,S. And Sur, H.(2020).” Potantial benefits of lean management applications and awareness by health managers in Turkey.”Revista Argentina de Clinica Psicologica,2020,Vol.XXIX,N0:5,2030-2034 pp.(SSCI)-2020.

### **Uluslararası bilimsel toplantılarda sunulan ve bildiri kitabında basılan bildiriler**

1. Yetgin, Seval, and Haydar, Sur (2015) Karabük Search Behavior in Healthy Related Research in Pregnant. International Journal of Health Administration and Education Congress 28-29, March 2015 Istanbul, Turkey.

2.Yetgin Seval, Haydar Sur (2017) Sağlık Çalışanlarının Yalın Yönetim ile İlgili Algılarını Belirlemeye Yönelik Bir Araştırma. 1.Uluslararası Yalın Hastane Kongresi 23-25 Mart 2017, Bursa, Türkiye.

### **Projeler**

T.C. Karabük Valiliği, İl Sağlık Müdürlüğü tarafından yürütülen Bebek Dostu İl Projesi

### **İş Tecrübesi**

1997-1998 Özel Avrupa Hastanesi, Mecidiye köy, İstanbul

1999 -2007 Karabük Özel Vatan Hastanesi; Ebe, hemşire, doğumhane sorumlu hemşiresi.

2010-2011 Karabük Sağlık Meslek Lisesi, ücretli öğretmenlik; beslenme dersi ve uygulamalar.

### **Katıldığı Seminerler ve Eğitimler**

T.C. Sağlık Bakanlığı, Tedavi Hizmetleri Genel Müdürlüğü, Hemşirelik Yetkisiyle Çalışır Belgesi.

T.C. Karabük Valiliği, İl Sağlık Müdürlüğü tarafından yürütülen Bebek Dostu İl Projesinde Ödül.

Ebeler Derneği ve Karabük Üniversitesi tarafından Doğuma Hazırlık Kursu Eğitimi Eğiitimi Katılım Belgesi 14-17 Mayıs 2011 Karabük.

Medicabil Yalın Sağlık Enstitüsü tarafından Yalın Sağlık Eğitimi Katılım Belgesi 4-6 Ekim 2017 Bursa.

10.Ulusal Sağlık Kuruluşları Yönetimi Kongresi 24-27 Mayıs 2012 Mardin.

Dumlupınar Üniversitesi İktisadi ve İdari Bilimler Fakültesi, İşletme Bölümü Yönetim ve Organizasyon Anabilim Dalı 21.Ulusal Yönetim ve Organizasyon Kongresi 30-31 Mayıs 2013 Kütahya.

T.C.MEB Bilgisayar İşletmenliği.

International Journal of Health Administration and Education Congress 28-29 March 2015 Istanbul, Turkey.

Uluslararası Değişen Dünyada Değişen Doğumlar Sempozyumu 22 Mayıs 2015  
İstanbul, Türkiye

10.Sağlık ve Hastane İdaresi Kongresi 1-3 Aralık 2016 Ankara.

11. International Symposium on social sciences 5-7 May 2018 Antalya, Turkey.

12. 1.Uluslararası 11.Sağlık ve Hastane İdaresi Kongresi 13-15 Ekim 2017 Trabzon,  
Türkiye.

1.Uluslararası Yalın Hastane Kongresi 23-25 Mart 2017 Bursa, Türkiye.

2.Uluslararası Yalın Hastane Kongresi 29-31 Mart 2018 Bursa, Türkiye.

Sağlık Yönetimi Zirvesi 18 Aralık 2017 Ankara



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ÖĞRENCİ ÖDEVLERİ

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