



**KERMAN UNIVERSITY
OF MEDICAL SCIENCES**

Faculty of Management and Medical Information

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Title

**Investigating the Process of Patient Flow and Identifying opportunities for its
improvement based on lean management using the six sigma approach in
Emergency Department of Shafa Teaching Hospital of
Kerman University of Medical Sciences**

By

Azam Parvaz

Supervisor

Dr. Mahmoud Nekoei-Moghadam

Advisors

1-Dr. Mohammadhossein Mehrolohasani | 2- Dr. Mohammadsaleh Kushki

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Abstract

Background: Today, lean management is emphasized to reduce useless and value-added actions in a process. Six Sigma, as one of the most important lean subsystems, is a way of thinking about how to evaluate processes more effectively, to achieve better results for patients and service providers by relying on a set of tools. The present study aims to examine the process of patient circulation and identifying opportunities for its improvement based on lean management using the six sigma approach in Emergency Department of Shafa Teaching Hospital of Kerman University of Medical Sciences.

Method: The present study is a sequential mixed method design, which was conducted in 2022. In this study, six sigma method with DMAIC approach in four steps and spaghetti chart was used for the application of lean management. The qualitative part of this study was related to field observations, focus group discussion meetings, interviews with personnel and employees involved in the process of the patient as well as the patients. The quantitative part included measuring the duration of each step of the treatment process and the distance traveled during the patient's stay until the assignment of the emergency patient and determining the sigma level of the process. The study population included all the patients of the Cardiovascular Emergency Department of Shafa Kerman Medical Teaching Hospital (in three separate work shifts) in the number of 180 people during the study period. The data collection tools in this study included researcher-made forms and Patient Satisfaction Survey. Word 2013 software was used to draw the process diagram and spaghetti chart, and Excel 2013 and Spss 23 software were used for data analysis.

Results: By examining the processes, the main problem that was identified as the cause of dissatisfaction in the emergency cardiology department was the prolongation of the admission period and the long stay of the patient in the department. Using the drawing of the patient's current process and the spaghetti chart, factors prolonging the admission were identified. If the solution of the presence of the admission force in the triage and admission of level 1 to 3 patients along with receiving payment through the card reader device is implemented, the distance and time spent in the admission will be reduced by 100%. By changing the use of the bank space to accept outpatients and discharge night shift patients, the distance traveled will decrease by 60% and the time spent by 52.6%. The route to the ATM is reduced by 77% and the time spent by 75%. Also, by changing the position of the wheelchair to transfer the patients, in addition to reducing the error in finding the location of the wheelchairs by accompanying the patient, the distance traveled is reduced by 84% and the time spent is reduced by 73.3%. Finally, this placement change will have a direct effect on reducing the time of transferring the patient to the ward. By providing a solution for allocating funds for replacing and purchasing advanced equipment, creating new locations and centralizing buildings in the future construction projects of the hospital, improving the methods and methods of monitoring the performance of doctors, the longevity of patients in The sector will decrease.

Conclusion: The use of lean thinking in the hospital by using the spaghetti chart method will improve the flow of patients' activities and, as a result, increase their satisfaction. Implementation of Spaghetti Chart will shorten the time of admission and shorten the time of transferring the patient to the ward. Also, the use of Lean Six Sigma in the hospital leads to the elimination of waste in the processes of providing services to patients and reducing the time of providing

services. As a result of the implementation of the solutions, the treatment process of the patients will be done with more speed and quality, the longevity of the patients in the department will decrease and the satisfaction of the patients will increase.

Keywords: Processing Improvement, Patient Flow, Lean Management, Six Sigma, Spaghetti Chart, Emergency department