Evaluating Performance of Chest Diseases Departments Using Hospital Efficiency Indicators in Turkey

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

Article Information

Original Research Article

ABSTRACT

This study aims to investigate the performance of chest diseases departments using hospital performance indicators as specified in Pabon Lasso Modal (PLM). It is also intended to draw attention of hospital management on hospital performance issues to achieve a better level of functioning. This is a descriptive cross-sectional study analyzing chest diseases departments of state university and private university hospitals in Turkey. Convenient sampling method was chosen based on data availability of the hospitals and limitations of the PLM. Three major cities in Turkey (Ankara, Izmir and Istanbul) were chosen based on population and obtainable data for the sampling purposes. A total of 10 hospitals were selected, 5 of which were state university hospitals and the remaining 5 private university hospitals. The results indicated that all chest diseases departments of private university hospitals were in a higher zone from the public university hospitals according to the PLM.

Keywords: Pabon lasso modal; hospital; performance; turkey; chest disease department.

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1. INTRODUCTION

The healthcare industry, especially hospitals is an important part of the service sector. Because hospitals play a crucial role in diagnosis of illness, they have a direct effect on human life and well-being [1]. They are also the most costly component of health systems. Turkish Department of Social Security stated that almost 5.6 percent of total Gross Domestic Product (GDP) in Turkey is spend on healthcare [2]. Different resources show around 6.2 percent of total GDP in recent years [3]. These numbers show 600 USD annual healthcare spending for per person in Turkey.

Liberal policies and actions trying to bring discipline in healthcare spending make hospital services more competitive in Turkey. Hospitals need to monitor and evaluate their services and profits. At each level of the hospital system, the utilization of the hospital capacity and the mix of patients and offered services should be appropriate in order to provide quality services to all the patients at minimum cost. Quality service and minimum cost require health management knowledge, with a special focus on information use for performance improvement. In particular, data on outpatient visits, in-hospital admissions and duration of hospital stay, as well as service costs and staff productivity, are routinely collected by the hospital information system and may be used to assess the performance in service delivery. While service utilization measures can disguise important dimensions of efficiency, they can also reveal whether the necessary inputs are reaching the intended target groups and offer useful insights into the demand for services [4]. It is clear that performance evaluation is an effective method used by hospital management for evaluating and monitoring activities in the hospital. Pabon Lasso Modal (PLM) has been proved to be one of the most useful tools for comparing the performance of different hospitals or different divisions within the same hospital [5,6]. PLM was developed by Pabon Lasso in 1986 [7]. This modal is used for interpreting and comparing hospital efficiency utilizing three hospital indicators: Bed occupancy rate (BOR), bed turnover rate (BTR) and average length of stay (ALOS). PLM's graph is divided into four zones by two perpendicular lines; one is drawn from average BOR point on (X) axis and the other from average BTR on (Y) axis. Regarding the quantity of these three indicators, each hospital assigns itself special features by being positioned in one of the four zones of the chart.

Given a mathematical correlation among these three indicators, a line which starts from zero and passes through each point in the graph shows ALOS. ALOS increases from left to right and top to bottom consistently [7]. Either standard (least acceptable) value of the indicators in a given region/country or the average of all hospitals' related index can be visualized as a basis for graphsubdivisions (Fig. 1).
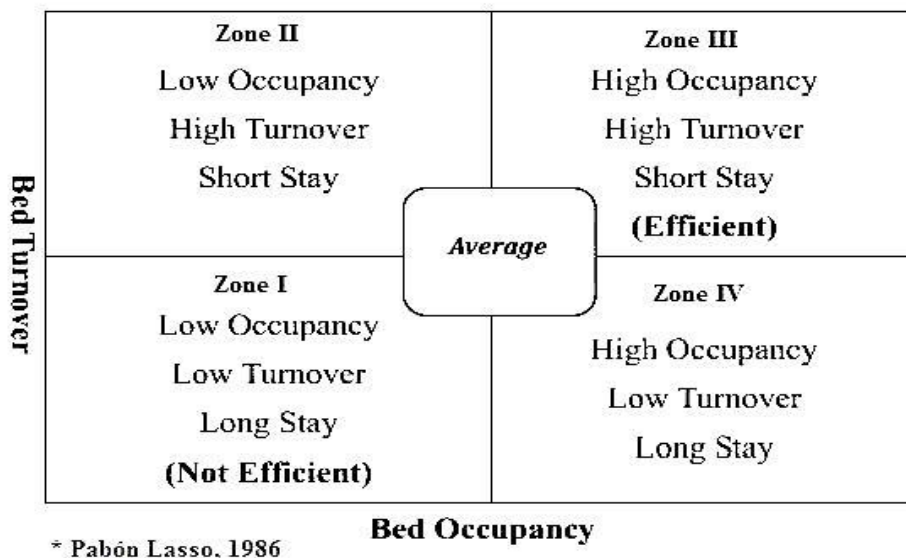

Fig. 1. Pabon lasso diagram*

The first zone presents non efficient hospitals with lower BTR and lower BOR. The second zone is characterized by lower BOR and higher BTR than the average. Maternity and gynecology hospitals and short-term inpatient centers usually rest in this zone. They have several unused and extra beds. Most of these beds might be used for patients with no need for hospitalization or for their possible examination. Hospitals in the third zone are both of high occupancy and turnover; pointing that these hospitals are efficient in resource utilization. In fact, a high BTR and BOR indicate that hospitals have reached an appropriate level of efficiency, with relatively few vacant beds at any time. Ultimately, a lower turnover and a higher occupancy than average rate are featured in zone four. The hospitals in this zone are expected to have long-term inpatients along with less utilization from their resources as well as high costs. More chronic diseases with unnecessary long-term hospitalizations and inefficient service delivery may cause this situation. Psychiatric hospitals and nursing homes are normally put in this area. The centre area indicates where average hospitals are located. This classification could assist to understand the hospital resource utilization and could help recognize facilities that are not used optimally. It is also important to remember that because such outliers as single-specialty hospitals such as psychiatric or gynecologic with overly long and short ALOS and BOR might distort and skew the divisions [7].

Three data elements; length of stays, number of beds and number of discharges were taken into consideration for the study purposes. Formulas have been used for BOR, BTR and ALOS presented in Fig. 2.

This study aims to investigate the performance of chest diseases departments using hospital performance indicators as specified in PLM. It's also intended to draw hospital management's attention on hospital performance issues to achieve a better level of functioning.

2. MATERIALS AND METHODS

This is a descriptive cross-sectional study analyzing chest diseases departments of state university and private university hospitals in Turkey. Descriptive studies examine differences in occasions related to dependent variables. These studies are useful to identify patterns or trends in research area [8].

$$BOR = \frac{\text{Total length of stay in days per year}}{\text{Average number of beds per year} \times 365}$$

$$BTR = \frac{\text{Annual number of discharges per year}}{\text{Average number of beds per year}}$$

$$ALOS = \frac{\text{Total length of stay in days per year}}{\text{Number of discharges per year}}$$

Fig. 2. Formulas

Convenient sampling method was chosen based on data availability of the hospitals and limitations of the PLM. Three major cities in Turkey were chosen based on population and obtainable data for the sampling purposes. Maternity hospitals, army hospitals, tuberculosis (TB) specified hospitals and no bed service hospitals were excluded from the hospital list in these cities. Two state university hospitals (H1 and H2) and two private university hospitals (H3 and H4) from Ankara (capital) city; one state university hospital (H5), two private university hospitals (H6 and H7) from Istanbul city and two state university hospitals (H8 and H9) and one private university hospital (H10) from Izmir city which have solid and accessible data of chest diseases services were selected (Table 1).

Table 1 presents total length of stay in chest diseases departments in days per year (stay), average number of beds (beds) and number of discharges per year (discharges). The quality of the data presented depends largely on the quality of the data reported by chest diseases departments in hospitals.

The single-specialty hospitals and some hospital departments which have a very long term stay or high bed occupancy rate are not included in the study. There are two major concerns that affect the sampling procedure. First, PLM is not a suitable tool to assess where the patients stay in the hospital for long period of time. Second, the departments of the hospitals should have similar bed service for the patients. To minimize the differences among departments, only chest disease departments which have a closest characteristic were included. Besides, there were some major differences in the number of beds, stay and discharges. These differences are taken into consideration and explained in accordance with their places on PLM.

3. RESULTS AND DISCUSSION

Chest diseases departments' of ten hospitals multiple indicators were convened using PLM for the study purposes. BOR, BTR and ALOS values were analyzed for the efficiency evaluation. Results have indicated that state university hospitals' chest diseases departments had the higher ALOS (Fig. 3) comparing to private university hospitals. Among these hospitals, Istanbul had the higher ALOS (H5:13,86). The second highest ALOS and the lowest ALOS score among cities was found in Izmir (H8:13,77 and H9:8,23). Chest diseases departments of Ankara placed between highest and lowest scores with a relatively close to ALOS values of both Istanbul and Izmir cities (H1:11,74 and H2:12,90). Consequently, all university hospitals lied in zone four in the PLM. These results showed that chest diseases departments of state university hospitals had high occupancy, low turnover rate and long stay duration. The hospitals in zone four are advised to put extra shifts towards outpatient services, hiring part time help to overcome shortages and improving management [9].

Results indicated that all chest diseases departments of private university hospitals were in zone three in PLM. Among these private university hospitals, Izmir had the lowest ALOS value (H10:2,80) while Ankara had the highest ALOS (H3:7,08). Private university hospitals in Istanbul lied between these scores (H6:3,50, H7:4,60). The second private university hospital from Ankara had a low ALOS value placing just above Izmir (H4:3,44). Zone three shows a good degree of efficiency and management. Hospitals located in this zone should follow up their strategy to ensure their services in optimal number of beds [9].

Table 1. Hospitals

| Hospital	Stay	Beds	Discharges
H1 State University Hospital	9956	31	848
H2 State University Hospital	27786	100	2154
H3 Private University Hospital	1792	6	253
H4 Private University Hospital	1421	5	413
H5 State University Hospital	8721	36	629
H6 Private University Hospital	5800	18	1656
H7 Private University Hospital	1958	10	426
H8 State University Hospital	15448	44	1122
H9 State University Hospital	17109	97	2080
H10 Private University Hospital	977	8	349
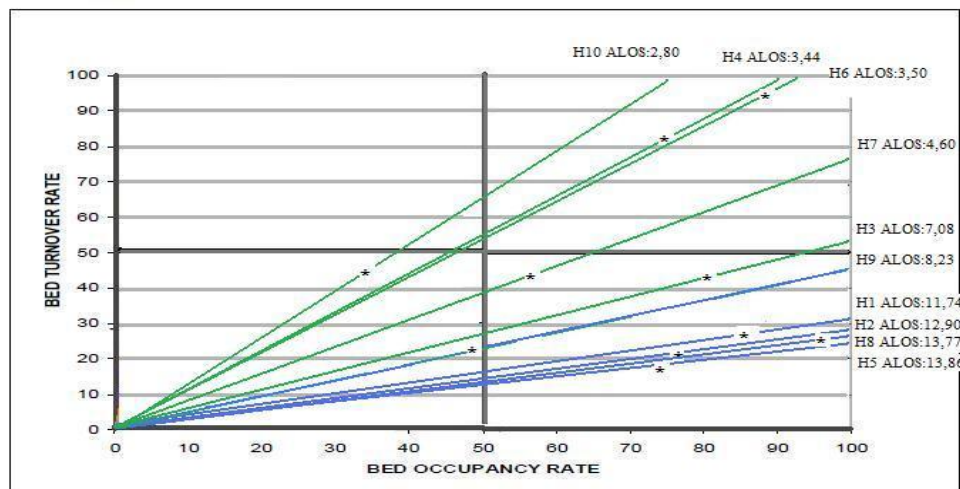
Fig. 3. Chest diseases departments' distribution on PLM

Research suggested that there is a correlation between number of beds and bed turnover. When number of beds increased, bed turnover rates get longer as well [10-12]. Current study also indicated that high bed capacity hospitals have high ALOS, low BTR and high BOR (H1, H2, H5, H8 and H9). All of the state hospitals' chest diseases departments were placed in zone four at PLM graph. Management of hospitals with high bed capacity should re-evaluate their practices to improve their effectiveness. It is stated that short bed occupation in hospitals will diminish the costs of health expenses and it must be a priority [13,14].

There have been differences also detected among state university hospitals and private university hospitals in terms of BOR, BTR and ALOS. Researcher suggests that the involvement level of a health expense affects the BOR, BTR and ALOS [15,16]. Findings of current study also suggested that chest diseases departments of private university sector were placed in zone three while state university hospitals were placed in zone four in PLM. It can be suggested that customers' involvement in the expenses also affects their BOR, BTR and ALOS. Raising involvement level in expenses decreases the Figs. of BOR, BTR and ALOS.

4. CONCLUSION AND RECOMMENDATION

This study presents that chest disease departments of state hospitals of Ankara were in the same zone (zone four) in PLM. Their low bed turnover rate, long length of stay and high bed occupancy rate seems responsible for this result. However, chest disease departments of private university hospitals in Ankara were found in the most effective zone (zone three) in PLM. Consequently, state university hospitals of Ankara should take necessary precautions to diminish bed turnover rates and length of stay. State and private university hospitals of Istanbul also show the same patterns in PLM as in Ankara. While state hospitals were found in zone four, private hospitals were in zone three. It can be easily assumed that state hospitals of Istanbul should reduce the bed turnover rates and length of stay as well.

Two of the hospitals' chest disease departments of Izmir (H9 and H10) were found in zone I in PLM. This position indicates a very poor efficiency. This zone signifies low bed occupancy, low bed turnover rate and long length of stay. It has been suggested that these hospitals need to increase demand towards their chest department services.

This study showed that chest disease departments of state hospitals were in zone four in PLM. They also had high ALOS values. When we look at chest disease departments of private hospitals, they were mainly found in zone three indicating a better management. Efficiency measurement using PLM discussed here is really only a partial measure of overall performance. Monitoring performance of hospitals constitutes a primary responsibility for healthcare sector management to increase their efficiency. Despite the limitations of the hospital information system, data available from routine sources are useful for performance monitoring and for identifying challenging areas in hospitals. Commitment of management staff and experienced technical staff would increase the effectiveness of given health services. In addition, we need to bear in mind the basics of what we mean by efficiency, but of course, we do not own the term and many other professions such as management scientists publish useful work in this area. However, not only must we decide how we measure economic efficiency and productivity, but why and how important it is relative to other societal objectives in terms of the delivery of health care [17].

COMPETING INTERESTS

Author has declared that no competing interests exist.

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