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COMPARISON OF PERFORMANCE OF HOSPITALS IN MAZANDARAN PROVINCE WITH THE APPROACH OF THE PABON LASSO MODEL AND BASED ON THE TYPE OF OWNERSHIP

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ABSTRACT

Background: Each organization needs an assessment of the system in order to be aware of the desirability and quality of its activities, especially in complex and dynamic environments such as the hospital, which is the largest and costly unit of the health system. The purpose of this study was to compare the performance of hospitals in Mazandaran province with the approach of the Pabon Lasso model based on the type of ownership. Methods: This was a descriptive-analytic study that was performed on all hospitals in Mazandaran province in a cross-sectional and retrospective study. The data were collected from the statistics unit of the hospitals. The Pabon Lasso graphic diagram was used to compare the performance. Results: The results showed that in the year 2013 (before the implementation of the health system reform), of the total 23 public hospitals, 7 hospitals (30.43%) were in the zone 3 and 7 hospitals (30.43%) in the zone 1. In the year 2015 (after the implementation of the health system reform), 6 hospitals (26.08%) were in the zone 3 and 5 hospitals (21.73%) in the zone 1.Conclusion: After the implementation of the Health System Reform Plan, changes were made to the situation of the hospitals. In general, one-third of public hospitals had desirable performance and efficiency. Therefore, managers and planners need to adopt strategies to improve the efficiency of other hospitals and appropriate distribution of resources.

Keywords: *Hospital, Performance Assessment, Pabon Lasso Model.*

INTRODUCTION

The Tremendous changes in management knowledge have made the existence of an effective evaluation system inevitable. Each organization needs an evaluation system to understand the desirability and quality of its activities, especially in complex dynamic environments (Iran. Ministry of Health and Medical Education, 2005). Hospitals, like any other organization, need monitoring and evaluation (Mohammadi et al., 2014). Today Hospitals are the main providers of health services and as the largest and most costly operating unit of the health system, have a special importance in healthcare economics (Rezapour and Asefzade, 2005). Various models and methods can be used to evaluate hospital performance. One of the ways in which today's application of resource efficiency is to be considered is the use of hospital performance indicators (Kavosi, Goodarzi and Almasiankia, 2013). Efficiency can be defined as the maximum use of resources available to produce the largest product, so that a product or service is produced at minimum cost. Various indicators can be used to evaluate the efficiency or inefficiency of the hospital (Hanson et al., 2002). The most important and effective

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indicators of hospital performance are: bed turnover rate, bed occupancy rate and average length of stay in the hospital (Asefzade, 2011). One of the most suitable methods for comparing the performance of hospitals based on the three performance indicators mentioned is the use of the Pabon Lasso Graphic Model, a universal application model, first introduced by Pabon Lasso in 1986 to determine the relative efficiency of hospitals (Pabon Lasso, 1986). The Pabon Lasso gragh has widespread use in comparing the performance of hospitals, according to the position of each center, we can measure the improvement or failure to improve the performance, and based on the results, we can use strategies to strengthen the strengths and reduce the impact of weaknesses (Nekoei Moghadam et al., 2012). Various plans for the development of the health system and the provision of various facilities with government costs have long been available to citizens, and in many countries in the world, similar plans and projects are being implemented. For example, in the United States, since 2010, the first comprehensive health system reform package has been adopted in an affordable health care law and began its enforcement operations (McDonoughJR, 2014). In the latest reform program of the hospital system in Iran, the health promotion plan for the health sector aimed at protecting citizens against health costs by focusing vulnerable populations through the organization of hospital services and reducing patient contributions in hospitals affiliated with the Ministry of Health, Medical education has been implemented since 2014 (National Institute of Health Research, 2014). The effectiveness of health promotion plan on the efficiency and effectiveness of hospitals is one of the basic priorities. Several studies at inside and abroad have been conducted to analyze the efficiency of hospitals using the Pabon Lasso model (Bahadori et al., 2011; Goshtasebi et al., 2009; Imamgholi et al., 2014; Ajlouni, 2013; Nonvignon et al., 2012; Asbu et al., 2012; Somanathan et al., 2000). Considering the large share of health care resources in hospitals, the evaluation of hospital performance is important in terms of resource efficiency and ownership (public, social security and private). Therefore, the present study aimed at comparing the performance of selected hospitals in Mazandaran province with the approach of the Pabon Lasso model and based on the type of ownership, examined three groups of public, private and social security hospitals, and examined the impact of health system reform on the performance of public hospitals.

METHODS

This research is a descriptive and analytical study that was done in a cross-sectional and retrospective manner using data from years 2013 and 2015 (2014 was not considered due to the implementation of the Health system reform). The study population consisted of all hospitals in Mazandaran province in three groups: public, private and social security. In order to increase the accuracy of the research, the status of the performance of three types of hospitals was not sampled and the entire population was surveyed.

In order to collect the data, a license was first obtained from the research deputy of Mazandaran University of Medical Sciences. The required data were collected from the medical statistics department of the hospitals based on the approved form of the Ministry of Health and Medical Education, including the number of discharged persons, the number of deaths, the bed occupancy day and inpatient bed count day. In this study, the percentage of bed occupancy was calculated as a proportion of the bed occupancy day by inpatient bed count day in a given period, multiplied by 100. The bed turnover rate was calculated from the ratio

of the number of discharged to the average of inpatient bed count day in a given period. and the average length of stay of the patient from the sum of bed occupancy day to the number of discharged in the same period. The data was analyzed using Excel statistical software and Pabon Lasso graph.

Performance evaluation in this model is based on a graph diagram which is divided into four zone by two crossover lines, which are derived from the average of bed occupancy rate and bed turnover rate. The axis of length (x), the average percentage of bed occupancy, and the latitude axis (y), indicate the bed turnover rate. Any hospital in one of these zones can have specific characteristics that, given these characteristics, can provide practical analysis of that hospital, which provides a reasonable basis for decision makers in authorizes hospital management (Asefzade, 2011).

FINDINGS

The functional information of the three hospital groups is presented in Table 1. 23 public hospitals, 5 private hospitals and 5 social security hospitals were reviewed in 2013 and 2015. In order to investigate the effect of the health system reform on the performance of public hospitals, the performance of public hospitals, private and social security hospitals was studied separately in separate charts.

Table 1: Performance Indicators of Hospitals in Mazandaran Province in 2013 and 2015

Number	Hospital	Type of hospital	Before implementation of health system reform (2013)			After implementation of health system reform(2015)		
			Bed occupation rate (%)	Bed turnover rate (time)	Average length of stay (day)	Bed occupation rate (%)	Bed turnover rate (time)	Average length of stay (day)
1	Imam Ali Hospital, Amol	Public	84.70	96.30	3.20	89.60	94.20	3.40
2	Imam Reza Hospital, Amol		79.84	74.29	3.39	84.78	88.00	3.50
3	17 Shahrivar Hospital, Amol		70.31	80.67	2.77	77.55	98.00	2.92
4	Hazrat zeinab Hospital,Babolsar		34.40	62.40	2.00	35.30	64.70	1.90
5	Imam Khomeini Hospital, Behshahr		81.65	90.16	2.34	85.60	96.00	3.34
6	Shohada Hospital, Behshahr		103.00	118.00	2.90	89.20	112.00	2.80
7	Shahid Rajaee Hospital, Tonekabon		70.81	96.33	1.89	91.72	108.00	2.67
8	Haj Azizi Hospital, jouybar		68.00	87.00	2.30	75.00	86.00	2.60
9	Ayatollah Taleghani Hospital, Chalous		58.07	114.38	1.39	60.96	168.00	1.46
10	Ghaem Hospital, Krlardasht		29.70	60.90	1.80	53.70	105.00	1.80
11	Imam Sajjad Hospital,		58.31	78.66	1.82	73.19	88.00	3.10

	Ramsar							
12	Imam Khomeini Hospital, Sari		80.17	84.16	2.90	91.22	88.00	3.67
13	Bu-Ali Sina Hospital, Sari		66.41	69.76	2.78	72.75	82.00	3.72
14	Fatemeh Zahra Hospital, Sari		84.70	67.30	4.50	76.90	65.70	4.20
15	Zare Hospital, Sari		68.90	15.40	16.10	75.50	18.50	14.90
16	Shohada Hospital, Zirab		75.00	79.60	3.20	79.10	78.30	3.70
17	Imam Khomeini Hospital, Fereydunkenar		46.29	57.66	2.57	58.56	60.00	3.28
18	Razi Hospital, Ghaemshahr		81.16	66.35	4.21	86.07	70.00	4.40
19	Samen Alaemah Hospital, Galugah		31.46	62.42	1.85	41.07	62.00	2.17
20	Shohada Hospital, Mahmudabad		39.85	67.67	1.94	60.59	100.00	2.16
21	Imam Hossein Hospital, Neka		108.26	151.16	2.60	120.34	194.00	2.38
22	Imam Khomeini Hospital, Noor		61.17	87.07	2.45	68.00	98.00	2.75
23	Shahid Beheshti Hospital, Nowshahr		59.50	100.22	1.16	65.41	110.00	2.37
Average			67.02	81.21	3.13	74.43	92.80	3.40
1	Amirmazandarani Hospital, Sari	Private	63.40	160.00	1.30	71.90	169.00	1.50
2	Dr Omidi Hospital, Behshahr		22.10	48.20	1.50	20.10	51.20	1.30
3	Shafa Hospital, Sari		72.80	163.00	1.40	61.00	179.00	1.40
4	Mehr Hospital, Behshahr		83.00	114.00	1.90	96.30	129.00	2.70
5	Nimeshaban Hospital, Sari		48.70	161.00	0.90	86.00	153.00	0.80
Average			58.00	129.24	1.40	67.06	136.24	1.54
1	Bu-Ali Hospital, Neka	Social Security	68.60	88.50	2.60	76.70	104.00	2.60
2	Hekmat Hospital, Sari		69.02	84.50	2.40	69.70	95.00	2.60
3	Razi Hospital, Chalous		66.80	110.00	2.10	54.50	96.30	2.00
4	Shafa Hospital, Babolsar		50.40	81.20	2.00	57.50	83.60	2.50
5	Valiasr Hospital, Ghaemshahr		80.20	65.00	4.10	78.60	70.90	4.00
Average			67.00	85.84	2.64	67.40	89.96	2.74

In the years 2013 and 2015, the highest percentage of bed occupancy was taken by the public hospital (Imam Hossein Hospital) and the lowest percentage of bed occupancy was taken by the private hospital (Dr. Omidi Hospital). The highest rate of bed turnover in the year 2013 was private hospital (Shafa Hospital) and in 2015, the public hospital (Imam Hossein Hospital). The lowest rate of bed turnover in 2013 and 2015 years was public hospital (zare hospital). The highest average length of stay in the years 2013 and 2015 was public hospital (zare hospital) and the lowest was private hospital (nimeshaban Hospital).

According to Pabon Lasso's chart, the results showed that in 2013, 7 public hospitals (30.43%) in the first zone, 3 hospitals (13.04%) in the second zone, 7 hospitals (30.43%) in the third zone and 6 hospitals (26.08%) were in the fourth zone (Figure 1). In 2015, there were 5 hospitals (21.73%) in the first zone, 5 hospitals (21.73%) in the second zone, 6 hospitals (26.08%) in the third and 7 hospitals (30.43%) in the fourth zone (Figure 2).

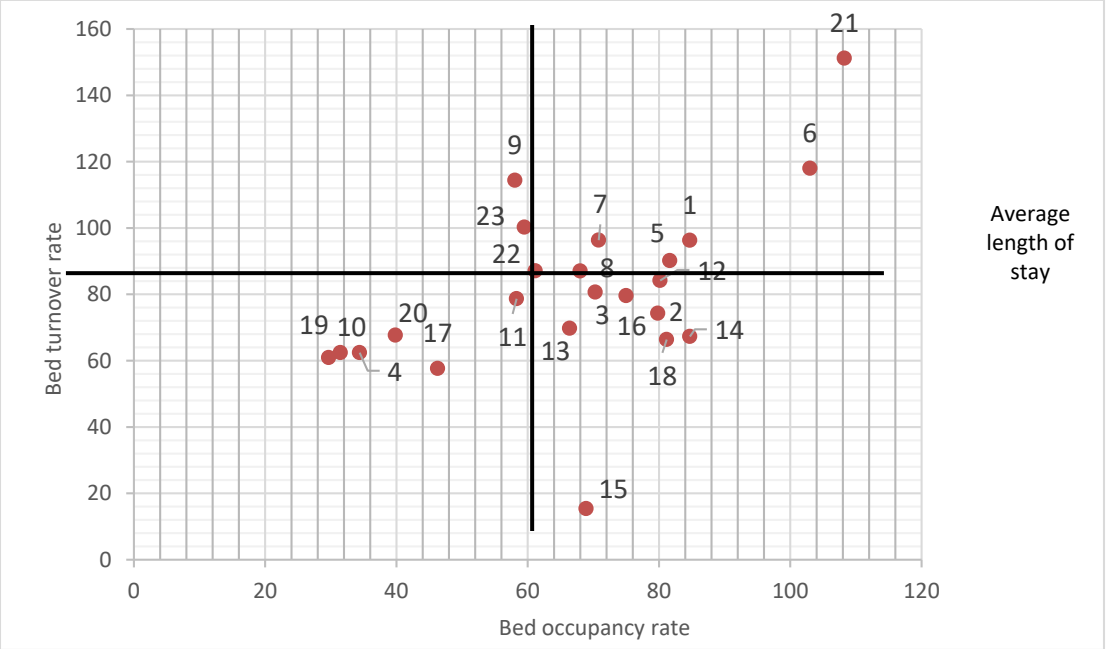

Figure 1: Position of public hospitals in Pabon Lasso graph in 2013

Figure 2: Position of public hospitals in Pabon Lasso graph in 2015

The status of private hospitals according to the Pabon Lasso charts in the year 2013 showed that 2 hospitals (40%) were in the first and 2 hospitals (40%) were in the third and one hospital (20%) were in the fourth zone (Figure 3). In 2015, there was one hospital (20%) in

the first, one hospital (20%) in the second, two hospitals (40%) were in the third and one hospital (20%) in the fourth zone (Figure 4).

Figure 3: Position of private hospitals in Pabon Lasso graph in 2013

Figure 4: Position of private hospitals in Pabon Lasso graph in 2015

Of the 5 social security hospitals in the year 2013, one hospital (20%) in the first zone, one hospital (20%) in the second zone, one hospital (20%) in the third and two hospitals (40%) were placed in the fourth zone (Figure 5). In 2015, there was one hospital (20%) in the first zone and one hospital (20%) in the second zone, two hospitals (40%) were in the third and one hospital (20%) in the fourth zone (Figure 6).

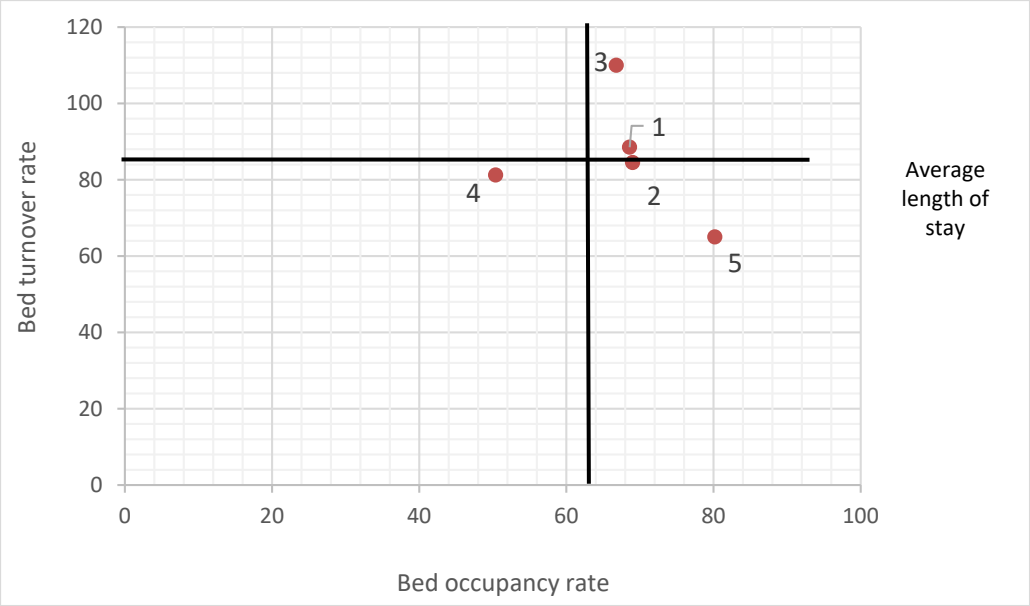

Figure 5: Position of social security hospitals in Pabon Lasso graph in 2013

Figure 6: Position of social security hospitals in Pabon Lasso graph in 2015

DISCUSSION AND CONCLUSION

The purpose of this study was to evaluate the performance of hospitals in Mazandaran province (public, private, and social security) using the Pabon Lasso model in 2013 and 2015 years, and to investigate the effect of the health system reform on the performance of public hospitals. By calculating performance indicators in the studied hospitals and locating them on the Pabon Lasso chart, the status of each hospital were identified.

Based on the four zones in the diagram, if the first zone (low bed occupancy rate and bed turnover rate) is considered inappropriate in terms of efficiency and the third zone (high bed

occupancy rate and bed turnover rate), then the study results indicate In the year 2013 (before the implementation of health system reform), there were 7 public hospitals in the efficient zone (zone 3) and 7 public hospitals in the inefficient zone (zone 1), and in the year 2015 (after the implementation of Health System reform), 6 The hospital was located in the efficient zone (zone 3) and five hospitals in the inefficient zone (zone 1), indicating that the number of effective and ineffective hospitals has decreased and The number of hospitals in the second and fourth zone has increased. Being in these zones (2&4) represents relative performance and leads management to follow up on efficiency improvements. In general, one-third of public hospitals were in a favorable state of performance and efficiency. Private hospitals and social security hospitals had a better performance in the year 2015 than in 2013.

In the study of Bastani of the 14 hospitals of Shiraz University of Medical Sciences in the year 2013 (before the implementation of the health system reform), 28% were in the third zone (efficient zone) and 14% in the first zone (inefficient zone). In the year 2014 (after implementing the Health system reform), 21% were in the third zone and 21% in the first zone. In fact, the number of efficient and inefficient government hospitals fell after the implementation of the healthcare reform plan (Bastani et al., 2016). The results of this study are consistent with the present study. In the study of Nazari in the 1999 in Mazandaran and Semnan province hospitals, 36% of Mazandaran hospitals were placed in the first zone, 9% in the third zone and 55% in the fourth zone, and 100% of the Semnan hospitals were placed in the fourth zone (Nazari, 1999). In the study of Mehrolassani in Kerman hospitals, in 2008, social security hospitals and in 2009 and 2010 public hospitals were more favorable performance than the other two groups (Mehrolhasani et al., 2014). In a study in Tunisia of the 40 hospitals, nineteen hospitals were in the first zone, three hospitals in the second zone, eleven hospitals in the third zone and seven hospitals in the fourth zone (Younsi, 2014).

The hospitals located in the first zone have a low bed occupancy rate and low bed turnover rates; in fact, these hospitals have a limited use of their hospital capacity, in other words, the high supply of beds to low demand and low use of hospital service. These hospitals have poor performance and should improve their performance by paying attention to the quality of service delivery and cost reduction by identifying the factors of efficiency weaknesses followed by corrective actions and identifying the factors affecting the increase in bed occupancy rates and pay more attention to the quality of service provision and reduce costs. The second zone is more specific for hospitals with high bed turnover (including women's hospitals with a low hospitalization period) and low bed occupancy, indicating unnecessary beds and additional beds. Hospitals in this zone are best placed to take urgent and unnecessary measures in order to prevent hospital admissions. Hospitals in the third zone have high bed occupancy rates and high bed turnover rates, and are well-positioned to use existing resources. The appropriate strategy for hospitals located in the third zone should be to ensure continuity of service provision with minimum bed rates. In the fourth zone, hospitals with a high bed occupancy rate, but low bed turnover rate, representing the provision of services to patients with severe, chronic conditions, or those with a mean long unnecessary hospital stay, so hospitalization Long-term, low utilization of existing facilities and high cost of the characteristics of these hospitals, typically the centers of psychiatric medicine and nursing medicine are in this group. The main suggestion to improve the performance of these hospitals is to emphasize the provision of outpatient services and efforts to improve hospital management.

Paying attention to the trilogy indicators simultaneously in the Pabon Lasso chart can help identify the current status of hospitals in terms of efficiency and performance. The point to be considered is the separation of hospitals according to their characteristics. Variables such as specialty type, ownership, educational and non-educational status can affect the performance and efficiency of the hospital, and therefore, comparing and commenting on them should be done with caution and consideration of the above mentioned variables. In this study, the performance of the hospital is evaluated solely in terms of efficiency and using several key indicators, and the examination of other dimensions of productivity requires access to accurate information as well as appropriate methods for analysis.

It is suggested that the performance of hospitals be monitored on a regular basis according to different graphical diagrams, and the results of evaluations for planning and policy making and increasing the utilization of hospital resources and avoiding waste of resources are used and, finally, the reasons for the success or failure of the centers are determined by a periodic comparison of the hospital. Considering that in this study the performance of public hospitals has been studied one year before and one year after the implementation of the health system reform, it is recommended that the impact of the health system development plan on the performance of hospitals over a longer period of time be considered.

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