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Research Article

Effect of the Health Promotion Plan on the Performance of Hospitals: Evidences from East of Iran

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Abstract

Background: Hospitals are considered as the most central and resource-consuming units in the healthcare system. They use from 50 to 80% of public expenditures. As hospitals become more efficient, the better the allocated resources in health sector will be used.

Objectives: The aim of this study was to assess hospitals' efficiency in South Khorasan using the Pabon Lasso model.

Methods: In this quasi-experimental and time-series study, we investigated the efficacy of South Khorasan hospitals during 2010 - 2018 (before and after the implementation of the health reform plan). All public hospitals in South Khorasan province were enrolled. Data including bed occupancy rate (BER), bed turnover (BT), and patient length of stay (LOS) were collected from hospitals in summer 2018 and analyzed using SPSS, version 21.

Results: The means of the Pabon Lasso performance indicators for eight years were 74.4% for bed occupancy rate, 89.9 times for bed turnover, and 3.01 days for the length of stay. The coefficient of occupancy index after the implementation of the health reform plan was 5.7% higher than before, the bed turnover index increased 4.1 times, and the average length of stay increased by 0.08 day. On average, 35% of the hospitals were located in region 1, while 38% in region 2, 21% in Region 3, and 6% in Region 4 in the Pabon Lasso Diagram.

Conclusions: Only 21% of the hospitals were in the region 3 of the Pabon Lasso Diagram, which is the desirable region for the efficiency of hospitals. This situation is not desirable and acceptable for hospitals. To increase productivity, interventions are required, and health planners and authorities need to apply economic tools for the improvement of this situation.

Keywords: Pabon Lasso; Performance; Hospital

1. Background

According to the World Health Organization (WHO), hospitals in developing countries account for about half of the national health expenditure. Hospitals are accountable for 50 to 80% of the current health expenditure (1-3). On the one hand, these organizations are the largest and most cost-effective units of health systems, and they use most of the financial and human resources (4).On the other, these institutions with huge resources need a careful performance measurement. The performance of hospitals can be assessed from a variety of perspectives, such as quality, performance, efficiency, and access (5). One of the models used today to observe the principle of productivity in the optimal use of resources is performance evaluation by the use of hospital performance indicators (6).

In summary, efficiency means action toward maximum usage of resources so that incomes and profits can be generated for the corporate, and in this case, hospital.Appropriate indices or indicators could be used as benchmarks to assess the efficiency level of hospitals (7). The foremost indicators of performance assessment for a hospital are: (1) bed occupancy rate, (2) bed turnover rate, and (3) average hospital stay (8, 9). The criterion which is defined by MOHME for the above-mentioned indicators are classified as desirable, moderate, and undesirable (10).

One of the applicable methods to assess the performance of the three indicators mentioned above is using the Pabon Lasso model. Introduced firstly by Pabon Lasso in 1986, this model has been used to assess the efficiency of hospitals (11). The Pabon Lasso model's benefits include introducing the most functioning units, identifying the areas needing improvement, and applying useful strategies to improve centers in terms of efficiency (12). In the Pabon Lasso model, hospitals are divided into four areas. Former studies carried out in the country using the Pabon Lasso model have mostly used one-year data.

2. Objectives

This study was conducted with the aim of evaluating the efficiency of South Khorasan hospitals in the period of eight years from 2010 to 2018.

3. Methods

This was a time-series study with a quasi-experimental design conducted retrospectively in 2018. A census sampling approach was recruited, and all the hospitals in South Khorasan Province were assessed (14 hospitals). The data pertained to an eight-year time frame (from 2010 to 2018), which is before and after the implementation of the health promotion plan in Iran.

As mentioned before, the performance of hospital units was assessed using the Pabon Lasso model. In this method, the horizontal axis of the chart illustrates the percentage of bed occupancy, the vertical axis the indicates bed turnover rate and the axis parallel with the two mentioned axes (vertical and horizontal) depicts duration of stay. In this regard, to estimate the efficiency, there is one point on the parallel axes, which is accompanied by a line drawn from the basis of the coordinates. Also, one point acquired from the two available indicators shows the average length of hospitalization. This obtained amount is rising uniformly from left to right and from up to down (13).

According to the Pabon Lasso model's manual, the status of the operating centers in each of the four regions and the interpretation of each region based on the indices discussed before are follows.

- Region 1 (southwestern side of the chart): Low bed occupancy rate/low bed turnover rate, shows to the units thatbed supply is more than the demand for health care interventions.

- Region 2 (northwest side of the chart): Low bed occupancy rate/high bed turnover rate illustrates unnecessary hospitalization and additional bed capacity in health centers (characteristics of centers and departments of obstetrics and gynecology).

- Region 3 (northeastern side of the chart): High bed occupancy rate/low bed turnover rate, which shows these centers benefit from a desirable performance, despite minimum usage of beds possible.

- Region 4 (south-east side of the chart): High bed occupancy rate/low bed turnover rate, which illustrates long-term hospitalization, low utilization of outpatient facilities, and high costs and expenditures (psychiatric and elderly units of hospitals).

The purpose of this study was to measure the efficiency of South Khorasan hospitals using the Pabon Lasso chart. SPSS version 21 was used to analyze the data and draw the Pabon Lasso chart.

4. Results

The statistical population consisted of 14 hospitals, of which eight were excluded from the study due to the lack of information. The data of the six hospitals studied are the performance indicators listed in Table 1, which include the average percentage of bed occupancy, average bed, and average hospital stay during eight years.

Table 1. Indicators of the Studied Hospitals

Indicators of Bed in the Six Hospitals Studied	Years								Average During8 Years			
	2011	2012	2013	2014	2015	2016	2017	2018	Total	Beforethe Promotion Plan	After the Promotion Plan	Change
Active bed	671	665	698	717	744	767	826	819	738	688	789	101
Patient admission	59244	60587	60275	61472	68518	72641	78072	70882	66461	60395	72528	12134
Occupied beds	178832	181438	176149	182336	206192	221015	240338	223482	201223	179689	222757	43068
Percentage of bed occupancy	73	74.8	69.1	69.7	75.9	78.9	79.9	74.8	74.5	71.6	77.3	5.7
Average hospital stay	3.1	3	2.9	2.9	2.9	3	3.1	3.2	3	2.96	3.05	0.08
Bed occupancy rate	88.3	91.1	86.4	85.7	92.1	94.7	94.5	86.5	89.9	87.9	92	4.1

The status of the hospitals surveyed from 2010 to 2018 indicates the presence of an average of 35% (17 hospitals per year) in region 1, 38% (18 hospitals per year) in region 2, 21% (10 hospitals per year) in region 3, and 6% (3 hospitals per year) in region 4 of the Pabon Lasso chart. Region 3 statistics have experienced a 25% improvement since the implementation of the Health Promotion Plan. These statistics are presented in Table 2 before and after the implementation of the eight-year development plan (Figure 1).

Table 2. Distribution of the Hospitals Studied in the Pabon Lasso Charta

Periods	Region 1	Region 2	Region 3	Region 4
Before implementing the healthcare promotion plan 2011 to 2014	11 (45.9)	9 (37.5)	2 (8.3)	2 (8.3)
after implementation of the healthcare promotion plan, 2015 to 2018	6 (25)	9 (37.6)	8 (33.3)	1 (4.1)
Total 2011 to 2018	17 (35.4)	18 (37.5)	10 (20.8)	3 (6.2)

[a] Values are indicated as No. (%) (hospital-year).

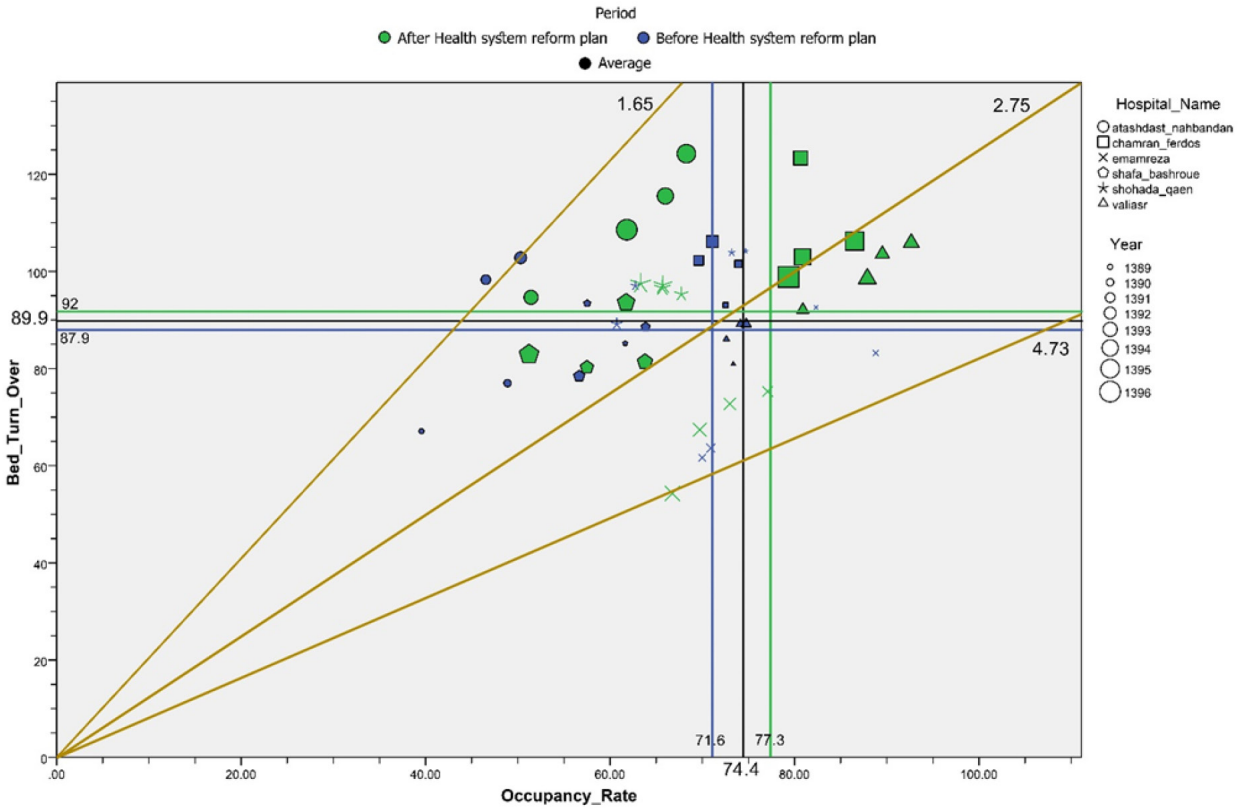

Figure 1. Pabon Lass diagram for hospitals in South Khorasan Province

Table 3. An Overview of the Status of the Studied Hospi tals from 2010 – 2018

Indicator/Year	Bed Occupancy (%)	The Percentage of Bed Occupancy is Favorable from the Perspective of the Ministry of Health	Average Bed Turnover (Rank/Year)	Average Optimal Bed Turnover from the Perspective of the Ministry of Health	Average Stay (Day)	Mean of Favorable Stay from the Perspective of the Ministry of Health
2011	73	Above 70%	88.3	More than 24 times	3.1	Less than 5/3 days
2012	74.8	Above 70%	91.1	More than 24 times	3	Less than 5/3 days
2013	69.1	Above 70%	86.4	More than 24 times	2.9	Less than 5/3 days
2014	69.7	Above 70%	85.7	More than 24 times	2.9	Less than 5/3 days
2015	75.9	Above 70%	92.1	More than 24 times	2.9	Less than 5/3 days

2016	78.9	Above 70%	94.7	More than 24 times	3	Less than 5/3 days
2017	79.7	Above 70%	94.5	More than 24 times	3.1	Less than 5/3 days
2018	74.8	Above 70%	86.5	More than 24 times	3.2	Less than 5/3 days
Average	74.5	Above 70%	89.9	More than 24 times	3	Less than 5/3 days

5. Discussion

The aim of this study was to evaluate the performance indicators of hospitals in South Khorasan Province before and after the implementation of the health promotion plan in Iran. Considering an average growth of 5.7% for bed occupancy, 4.1% for annual bed turnover, and 0.08 day for patient stay compared to before the health promotion plan, and a comparison of the overall average of these indicators with the standards of the Ministry of Health and Medical Education, the hospitals in South Khorasan Province are in good condition in terms of bed turnover and medium stay indices and have a moderate rate of bed occupancy. According to the results of the eight-year study, 35.4% of hospitals were in region 1, 37.5% in region 2, 20.8% in region 3, and 6.2% in region 4. The comparison of some national studies in Yasuj (14), Isfahan (15), Kerman and Shiraz (16), Kerman (17), Qazvin (18), West Azerbaijan (19), Ahwaz (11), Tehran (20), Lorestan (21), East Azerbaijan (22), Kermanshah (23), Shahre-Kurd (24), Kurdistan (13), Qom and Kashan (25), Ardebil (26) and Yazd (27) are shown in Table 4.

Table 4. Comparison of the Findings of This Study with Other Studies Conducted in Irana

Area and Time of Studies	Number of Hospitals	Region 1	Region 2	Region 3	Region 4	Average flat indicators		
						Coefficient of Bed Occupancy	Bed Turnover	Average of Stay
Yasuj (2005)	6	50	0	34	16	62.78	76.73	2.99
Isfahan (2005 - 2006)	31	6	45	43	6	52	70	7
Kerman and Shiraz (2007)	8	0	25	50	25	65.4	60.2	5.5
Kerman (2008 - 2010)	23	26	28.5	32.5	13	60	70	2.4
Qazvin (2007 - 2009)	6	16.7	16.7	33.3	33.3	64.5	61.1	5.2
West Azerbaijan (2009)	22	26	4	39	31	63.5	85.44	2.84
Ahvaz (2009)	26	8	27	38	27	65.13	79.3	3.57
Tehran, Shahid Beheshti (2010)	23	17.3	43.7	17.3	21.7	74.5	56	4.9
Lorestan (2010)	14	28.5	21.5	35.7	14.3	53	95.5	3.2
East Azerbaijan (2010)	31	36	12.8	38.4	12.8	56.1	83.3	6.2
Kermanshah (2006)	6	16.6	33.4	16.6	33.4	64.4	81.8	3.7
Shahre-Kurd (2006)	8	_	_	_	_	60.7	_	2.4
Kurdistan (2007)	12	8	33	42	17	62.5	79.2	3.4
Qom and Kashan (2009 - 2011)	11	15.1	33.4	18.1	33.4	_	_	_
Ardebil (2012)	14	42.5	0	35.7	21.5	55.4	80.85	2.44
Yazd (2012)	20**	31.5	15.7	31.5	21.3	19.65	74	2.83%
East Azerbaijan - Tabriz (2009 - 2013)	21	25.2	23.5	26.1	25.2	67.6	99.85	72.3
South Khorasan (2010 - 2018) this study	8	35.4	37.5	20.8	6.2	74.5	89.9	3

[a] Values are indicated as percentage unless otherwise indicated.

An increase of 25% in hospitals in District 3 after the implementation of the Health Promotion Plan indicates the positive effects of this plan on the efficiency of the hospitals in South Khorasan. According to Hashemian et al. study, the number of hospitalized patients in District 3 in 2015 increased by 16.3% compared to the previous year (28).

According to Table 3, although the performance status in South Khorasan Province hospitals compared to other provinces such as Isfahan, Shiraz, and Kerman, is in an unfavorable situation, the bed indices of this province compared to the other regions were more optimal. One of the reasons for this difference is the fact that the number of beds in these hospitals were more than in hospitals in other provinces, because the horizontal axis of the Pabon Lasso chart above this area is higher than the rest of the country, and as a result, more hospitals were in regions 1 and 4.

Considering that all the studied are general hospitals, placement in any region other than region 3 is evaluated undesirables.According to the study, hospitals in region 1 should increase their bed turnover and occupancy rate, with measures such as preventing the expansion of the center, and if possible, transferring some of the existing beds to other treatment centers covered by the university (12). Hospitals in region 2 can take steps to increase the bed occupancy rate, reduce the number of beds, and lower the number of unnecessary hospitalizations (13). The status of the hospitals in region 3 was desirable and should be planned for the sustainability of the hospital status and the improvement of the hospital using fewer beds (13). An essential strategy to improve the performance of hospitals in region 4 is cost reduction and improvement of outpatient services (12, 17). Hospitals located in low-performing areas are mainly affected by the presence of excess beds or poor distribution of beds between the departments, poor quality of service provision, low payment capacity in low income groups, the absence of a covered area, the proximity of hospitals, and failure to comply with the requirements for service leveling by providers (23).

To increase the efficiency and quality of hospital services, we can identify the capabilities and facilities available in the health and medical networks, provide adequate funding and human resources, apply the principles of scientific management in health centers, review the rules and remove the possible obstacles by specialist managers, establish a system based on the performance evaluation of the organization, staff, and managers of health care networks, assess the satisfaction of healthcare providers with the provision of health services, reinforce the staff morale by holding necessary training courses, level out the delivery of services at different levels of the health care network system (23), increase bed capacity or build a hospital, increase home care, educate patients, and enhance prevention services.

5.1. Conclusion

The three indicators of efficiency were in a good status than the ministry's standards, and more growth in region 3 than in the other areas indicates improved performance after the implementation of the health promotion plan. However, these growth indicators can have implicit effects on the demand for health services and increase the number of health insurers.

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