



## The effects of the health reform plan on the performance indicators of hospitals affiliated with Qazvin University of Medical Sciences, Iran, 2014

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### Original Article

#### Abstract

**BACKGROUND:** One of the significant goals of healthcare delivery organizations is to promote people's health and provide high quality care. In this regard, health reform plan was designed in Iran. Therefore, the present study aimed to evaluate the performance of teaching hospitals after running of health system reform plan in Iran.

**METHODS:** This retrospective-descriptive study was carried out in 4 hospitals (Avicenna, Velayat, Rajaei, and Qhods) affiliated with Qazvin University of Medical Sciences, Qazvin, Iran, in 2014. Data collection tool was the checklist of standard indicators of Iranian Ministry of Health, because the checklist is standard to measure hospitals' performance. In this study, 19 indicators (performance indicators, personnel indicators, and financial indicators) were investigated. To fill out the indicators checklist, the statistics unit of Ministry of Health was used according to the reports of two consecutive years of 2013 and 2014. The collected data were analyzed using Excel software.

**RESULTS:** In general, out of the 7 performance indicators that were investigated in the hospitals, increase was observed in four, and decrease was seen in three items. Out of the six personnel indicators, all of the hospitals experienced a rise; and out of the six financial indicators, four items increased and two decreased.

**CONCLUSION:** The results of this study indicated that after one year of implementing health reform plan, the mentioned health care system experienced a remarkable progress in the hospitals. Providing the necessary infrastructures can help better conduction of the plan and promotion of the mentioned indicators by removing or decreasing the effect of some barriers.

**KEYWORDS:** Healthcare Systems, Outcomes Assessment, Indicators, Hospitals

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#### Introduction

Despite rapid advances in sciences and technology in the world, one of the significant goals of healthcare delivery organizations is to promote people's health and provide high-

quality care,<sup>1</sup> because low quality of health care services leads to an increase in costs, a decrease in profitability, and a drop in satisfaction and loyalty of patients.<sup>2</sup> The first and the most important factor in improving health care quality is to investigate and measure the quality of the delivered services, an index of which is examining the rate of

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efficiency and effectiveness.<sup>3,4</sup> As main organizations that provide healthcare services, hospitals play a significant role in promoting the level of the society's health and require special attention as the most important components of healthcare system. According to the study carried out by the World Bank, in developing countries, between 50% and 80% of health resources are allocated to hospitals.<sup>5</sup> Hospital management mainly attempts to enhance effectiveness and efficiency and reduce medical expenses.<sup>6</sup> However, poor management of hospital and failure to utilize the resources correctly lead to waste of resources such as money, human resources, buildings, and equipment. Such a waste means that creating a certain level of product or output is possible with a lower amount of resources. By preventing or reducing this waste, available resources can be utilized to deliver more services, develop access, and improve the quality of hospital services.<sup>7</sup> Nowadays, health systems are faced with numerous complex challenges including reform processes, change in people's health needs, increase in public expectations, lack of sufficient resources, an increase in healthcare expenses, necessity of paying attention to new financing resources, and necessity of utilizing more efficient available resources.<sup>8</sup> These challenges are continually changing under the effect of economic, social, political, and environmental circumstances. On the other hand, diseases and health threatening factors are constantly changing, particularly in the present era, they are experiencing very rapid changes. Response to such changes is the most important reason why the health system should be changed and promoted.<sup>9-11</sup> Over the recent years, there has been a remarkable development in reforms of health system. At all levels of economic development, most countries have sought better methods to organize and finance healthcare services with the purpose of justice development, public

coverage, efficiency, and effectiveness.<sup>8</sup> In Iran, Ministry of Health and Medical Education started running HSR plan in April 2014 as the main stewardship of the country's health with regard to the overall duties, missions, and upstream documents, particularly the Iran's 20-year vision plan, legal provisions related to health in the Fifth Development Plan, and the 11<sup>th</sup> government's programs of HSR. It has followed three approaches of financial support of people, creation of fair access to health services, and improving the quality of health services on 7 main axes. Its main responsibility is to reduce the peoples' share of out of pocket (OOP) up to 10%.<sup>12</sup> After that the HSR plan was implemented and a significant decrease occurred in health care costs, the national hospitals experienced an unprecedented increase in patients' referral to hospitals, and bed occupancy rate (BOR) rose.<sup>13</sup> This trend may bring about changes in performance of hospitals and quality of services delivered to patients covered by this plan. Due to the importance of this issue, evaluating the performance of health system can provide the decision makers with timely information related to the performance of health system. Such information leads to the managers and policymakers' awareness and provides circumstances in which progress toward national goals can be monitored and relevant policies can be evaluated. Timely monitoring and evaluation of reforms can provide evidence for redirection of the implementation of reforms.<sup>14</sup>

The purpose of this study was to evaluate the performance of teaching hospitals after implementation of the HSR plan.

## Materials and Methods

This study was a descriptive study with a retrospective approach. The statistical population included 4 hospitals (Avicenna, Velayat, Rajaei, and Qhods) covered by HSR plan and affiliated with Qazvin University of

Medical Sciences, Qazvin, Iran. The issues that were investigated in this study were the indices of efficiency and effectiveness of hospitals before and after implementation of HSR plan over two consecutive years of 2013 and 2014. The changes in the index, based on time interrupted series in the two years were considered. The data collection instrument was the checklist of standard indicators affirmed by the Ministry of Health in order to evaluate the efficiency of hospitals. In this study, 19 indicators including 3 total performance indicators [BOR, average length of stay (ALS), patient admission (per 1000 people), total bed count day, bed turnover interval, the proportion of inpatient bed count to bed constructed, and the inpatients to outpatient ratio], personnel indicators [health staff to inpatient bed count ratio, health staff to bed constructed ratio, nonclinical personnel (administrative, financial, and service personnel) to inpatient bed count ratio, nonclinical personnel (administrative, financial, and service personnel) to bed constructed ratio, the proportion of the total personnel to available standards, the proportion of health staff to all the personnel], and financial indicators (specific revenue to the total cost ratio, the proportion of manpower cost to the total cost of hospital, the proportion of the repairs and maintenance cost to the total cost of hospital, the proportion of the commodity cost to the total cost of hospital, the proportion of the personnel's welfare costs to the total cost of hospital, and the per capita

personnel welfare cost). In order to complete the checklists, the indicators were retrieved from the statistics unit of Ministry of Health according to the reports of previous years. Afterwards, the collected data were analyzed through Microsoft Excel software (version 2010, Microsoft Corporation; WA, USA).

## Results

In the present study, 4 hospitals of Qazvin were examined before and after the implementation of development plan. The obtained results were examined in three groups of performance indicators, personnel indicators, and financial indicators. The results of examining the performance indicators showed that after implementation of HSR plan, the hospitals experienced an increase in all indicators except for the bed turnover interval (Table 1).

Examining the personnel indicators showed an increase after the implementation of the HSR plan (Table 2).

The results of examining the financial indicators showed that the indicators of the proportion of specific income to the whole expenses of hospital, the proportion of the cost of repairs and maintenance to the whole expenses of hospital, and the proportion of the cost of consumer goods to the whole expenses of hospital increased, and indicators of the proportion of payments to the personnel to the whole expenses of hospital, the proportion of the personnel's welfare costs to the whole expenses of hospital and personnel, and per capita personnel welfare costs decreased (Table 3).

**Table 1. The performance indicators in the studied hospitals before and after the health system reform (HSR) plan implementation**

Index	Bed occupancy rate (%)		Average length of stay (day)		Patient admission (per 1000 people)		Total bed count day		Bed turnover interval		Proportion of inpatient bed count to bed constructed		Inpatients to outpatient ratio	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	after
Avicenna	72.56	78.70	4.17	4.37	25.91	22.47	67158	62517.00	0.9680	0.598	0.756	0.704	4.94	6.30
Velayat	65.62	74.56	4.14	4.02	18.38	22.12	51051	58968.00	0.7320	0.377	0.865	1.000	3.41	2.89
Rajaei	66.08	71.41	3.43	3.15	18.09	17.60	39858	38220.00	0.5600	0.445	0.741	0.710	1.62	1.73
Qhods	71.49	81.03	3.63	3.92	15.75	14.48	35217	37674.00	0.5060	0.385	0.664	0.711	1.56	1.77
Mean	68.94	76.42	3.83	3.86	15.63	19.17	48321	49344.75	0.6915	0.450	0.760	0.780	2.88	3.17

**Table 2. Personnel indicators in the studied hospitals before and after health system reform (HSR) plan implementation**

Index	Health staff to inpatient bed count ratio		Health staff to bed constructed ratio		Nonclinical personnel to inpatient bed count ratio		Nonclinical personnel to bed constructed ratio		Proportion of the total personnel to available standards		Proportion of health staff to all the personnel	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Avicenna	1.65	1.99	1.24	1.40	0.94	1.06	0.71	0.75	0.78	0.87	0.63	0.65
Velayat	1.56	1.66	1.35	1.66	1.12	1.02	0.97	1.02	0.81	0.81	0.58	0.61
Rajaei	2.12	2.36	1.57	1.68	1.32	1.46	0.98	1.04	1.04	1.14	0.61	0.62
Qhods	1.83	1.84	1.11	1.31	1.03	1.02	0.68	0.73	0.84	0.78	0.65	0.67
Mean	1.79	1.96	1.32	1.51	1.12	1.14	0.68	0.89	0.87	0.90	0.62	0.64

### Discussion

The major mission of the health system is to promote the level of health, deliver high quality services, enhance the efficiency and effectiveness of health services, establish justice, provide sustainable finance, improve management, and be accessible and responsive to people's and society's needs.<sup>15</sup> In many countries, HSR has been carried out with numerous purposes including enhancing the quality, public insurance coverage, and decreasing medical expenses.<sup>16</sup> In Iran, HSR plan was also placed on the agenda of the policy-making council in order to improve and promote the performance of the health system.<sup>9</sup>

The results of this study showed that after implementation of HSR plan an increase in all indicators occurred except for the bed turnover interval. In the study carried out in Tehran's

hospitals, Iran, Sajadi and Zaboli concluded that implementation of the health reform plan enhanced the hospital performance indicators including BOR, patient admission, and the bed turnover, which is in agreement with the results of the present study in terms of the indicators of an increase in BOR, and increase in patient admission, while in contrast with it in terms of bed turnover.<sup>17</sup> The reason for a decrease in bed turnover in this study can be attributed to the increase in the ALS in hospital. In the study of Dadgar et al., an increasing trend in the number of inpatients after the implementation of HSR plan was reported, which is in line with the results of this study.<sup>18</sup> A remarkable part of increase in inpatients after the implementation of health reform plan in hospitals can be attributed to the patients' induced fake demand.

**Table 3. Financial indicators in the studied hospitals before and after health system reform (HSR) plan implementation**

Index	Specific revenue to the total cost ratio		Proportion of manpower cost to the total cost of hospital		Proportion of the repairs and maintenance cost to the total cost of hospital		Proportion of the commodity cost to the total cost of hospital		Proportion of the personnel's welfare costs to the total cost of hospital		Per capita personnel welfare cost (USD)	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Avicenna	69.0	72	33.00	31	1.00	2.00	25	27.0	8	7	1227	1326
Velayat	55.0	59	34.00	27	1.00	0.24	24	42.0	17	6	2141	1051
Rajaei	60.0	37	43.00	36	1.00	1.00	25	28.0	8	7	1085	1184
Qhods	42.0	66	35.00	42	0.33	0.45	6	9.0	7	8	1108	1052
Mean	56.5	58	36.25	34	0.83	0.92	20	26.5	10	7	1390	1153

In a study carried out in Massachusetts, United States, in order to investigate the effect of healthcare reforms on hospitals and preventive care, it was indicated that reforms were accompanied with a decrease in the ALS, the number of referred inpatients from the emergency ward, and avoidable admissions, which is not in agreement with this study.<sup>19</sup>

In this study, personnel indicators increased compared to previous years after the implementation of HSR plan, which was because of employing clinical and non-clinical work force during implementation of the plan; this work force entered the health system in order to deliver services.

While examining the financial indicators, an increase was observed in the indicators of the proportion of specific revenue to the total cost ratio, the proportion of the repairs and maintenance cost to the total cost of hospital, and proportion of the commodity cost to the total cost of hospital, and a decrease was observed in indicators of the proportion of the commodity cost to the total cost of hospital and the proportion of the personnel's welfare costs to the total cost of hospital. Sajadi and Zaboli reported an increase in hospital revenues after the implementation of reform plan, which is in line with the present study.<sup>17</sup> Moreover, in the study carried out in Taiwan, Shoujun reported similar results.<sup>20</sup> This increase in revenue can be caused by patients' referral from private hospitals to teaching hospitals and a rise in admission rate of teaching hospitals. In the study carried out by Yang et al. in China and the study conducted by Dunn and Shapiro in Turkey, it was concluded that implementation of reform plan resulted in an increase in personnel's costs, particularly the doctors, which is not in agreement with the results of the present study.<sup>21,22</sup>

The results of this study indicated that implementation of health reform plan in healthcare sector had a positive effect on the performance of the studied hospitals. In a

study that was carried out in China's hospitals over 2005-2011 in order to evaluate the performance of the hospitals after the implementation of reform plan, the results indicated that HSR had a positive effect on the hospitals' performance, and decreased economic burden on the patients, which is in line with the results of the present study.<sup>23</sup> The results of the study carried out by Anderson and Wakerman in Australian hospitals showed that reform had a positive effect on some areas of the hospitals' performance, which is in agreement with the results of the present study.<sup>24</sup> In addition, Dadgar et al. in their study concluded that implementation of the HSR plan had a remarkable effect on the increase in hospital's performance indicators.<sup>18</sup> Among the limitations of the present study one can refer to this point that since health reform plan has been recently implemented in Iran, no similar studies were found, and in most studies, satisfaction of the personnel and patients or an increase in the number of natural childbirth was measured while the hospitals' performance was not focused on.

**Limitations and suggestions:** This study's limitation was short time after the implementation of health reform plan. However, more studies need to be conducted to verify that results in longer interval. Reform plan has reached a sufficient stability and adequacy to be used in short time in each development plan. In the same way, future studies could focus only on changes in the quantity of services based on the study of improving service quality, and patient and staff satisfaction before and after the plan. Moreover, with approximately one year of implementation of the health reform plan and fundamental changes, repetition of similar schemes could also show the effectiveness of the plan more realistically.

## Conclusion

The results of this study indicated that one year



after the implementation of HSR plan, in all the selected indicators (as a result of implementation of the new reform plan), it was observed that the plan had remarkable progress and a positive effect on the studied hospitals' performance. However, the effects observed should be judged cautiously, considering the possible negative consequences such as induced demand and hospital workload increase in the long run. Providing the required infrastructures through removing or reducing some administrative barriers helps better implementation of the plan, promotes the mentioned indicators, increases the quality of the delivered services, enhances the personnel's and the patients' satisfaction, and finally improves the hospitals' performance.

### Conflict of Interests

Authors have no conflict of interests.

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