ORIGINAL ARTICLE

The decision-making matrix of propensity to outsourcing hospital services in Bandar Abbas, Iran

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Abstract

Objective: To determine the level of managers' propensity for outsourcing the services in hospitals using decision-making matrix.

Methods: The applied, cross-sectional study was conducted at three hospitals affiliated to Bandar Abbas University of Medical Sciences, Iran, in 2013, and comprised managers and employees of four service units: radiology, laboratory, nursing, and nutrition services. Data was collected using two questionnaires and face-to-face interviews. Data was analysed using SPSS 16 and by using decision-making matrix.

Results: Of the 122 subjects in the study, 12(9.8%) were managers and 110(90.2%) were other employees. The highest and lowest propensities for outsourcing were related to nutrition (66.6%) and nursing services one (8.33%). The decision-making matrix showed low outsourcing of the nursing, radiology, and laboratory services based on the services' features. However, there were difference between the results obtained from laboratory service decision-making matrix and the propensity for laboratory service outsourcing.

Conclusion: The difference between the results obtained from the matrix and managers' viewpoint can be due to the lack of managers' sufficient attention to the features of hospital services when making decisions on outsourcing them.

Keywords: Outsourcing, Service features, Propensity for outsourcing services. (JPMA 65: 1288; 2015)

Introduction

The competitive economy of healthcare and the complexity and necessity of providing high-quality services have required healthcare organisations to use new managerial and organisational tools and approaches, with organisational restructuring and outsourcing being among the most effective ones which can be considered an improvement strategy.[1] This implies that others' knowledge, experience, and available equipment can be used and organisation should pay only for current expenditure.[2]

Outsourcing as a legal and managerial tool can decrease costs, increase productivity and quality of services, improve performance and increase accountability through motivating the buyer and provider.[3-5]

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Though outsourcing of non-clinical services has been highly successful, outsourcing the clinical services has been accompanied by some risks. A US study revealed a two-fold growth in outsourcing of nursing services from 1994 to 1995.[6] However, the results of the studies performed in other countries showed lack of propensity for outsourcing clinical services. For instance, a study in Australia found that, except for radiology and pharmacy services, none of the clinical services had been outsourced to the private sector and the hospital administrators believed that outsourcing these services not only did not have any financial savings, but would also create risks for patient care.[7] Moreover, a study in Taiwan showed that only less than 3% of nutrition, pharmacy, and nursing services had been outsourced to the private sector.[8] In Iran, the trend of outsourcing has been accelerated, with a study reporting that, on average, nearly 86.29% of the hospital nutrition services were outsourced from 2004 to 2006.[9] Moreover, Iran University of Medical Sciences has also implemented structural reforms and has started to outsource the services, installations, nursing, cooking, food distribution, and transportation units to non-public corporations since 2000.[10] Some studies in the south of Iran indicated that radiology had high propensity to outsourcing.[11,12]

According to the findings of some studies, the main problem of senior managers in organisations is determining the services which should be outsourced.[13] However, it should be noted that outsourcing is a complicated process and cannot be a solution for all problems of the health system. Besides, not all services can be outsourced.[14]

The experience of outsourcing in Iran has shown that despite its positive results and achievements, it has unfortunately caused some problems at the corporation level and also at the country macro level in some cases. In many cases, outsourcing has been done through trial and error and without taking a scientific approach and performing a systematic analysis. Yet, adopting a scientific approach and methodology can resolve many of these problems.

The conceptual model of service features is one of the appropriate methods which can be used for decisions about outsourcing services.[15]

Therefore, the present study was planned to determine potential of hospital services outsourcing by using the decision-making matrix and compare that with the level of administrators' propensity for outsourcing.

Subjects and Methods

The applied, cross-sectional study was conducted in 2013 at three hospitals affiliated with Bandar Abbas University of Medical Sciences, Iran. Employees working in four service units — radiology, laboratory, nursing, and nutrition services — and the hospitals' managers, including the administrators, financial managers, contract managers, and the heads of each studied service who had an important role in the decisions about the outsourcing of the hospital services, were involved in the study.

Based on the findings of the pilot study, considering α=0.05, $\boldsymbol{x}$ = 36, s=8.3, and d=0.02, and using the mean estimation formula, a sample of four managers was selected for each of the studied service. Therefore, due to selection of four services in each of the three hospitals, 48 questionnaires were distributed based on the census method and each manager responded to four questionnaires, each of which was related to a studied service. Also, a sample of 110 employees was selected from the four studied services using stratified sampling proportional to size. In this way, 60, 20, 20, and 10 employees were selected from each service area. Moreover, an interview was conducted with the university contract manager in order to collect data regarding competitive status.

The decision-making matrix model consists of 10 independent variables as the service features, including intangibility, inseparability, heterogeneity, demand uncertainty, technological uncertainty, complexity, competitive status, the number of alternative suppliers, contact with the final client, and importance or sensitivity of the service, as well as one dependent variable; i.e., propensity for outsourcing the services.[15]

The required data was collected using two specifically designed questionnaires and an interview. The first questionnaire was used to determine the features of hospital services according to the conceptual model of service features and literature review, while the second one was used to measure the level of the studied hospital managers and administrators' propensity for outsourcing the services. The validity of these questionnaires was confirmed by getting experts' opinions. Besides, the reliability of the two questionnaires was confirmed through Cronbach's alpha coefficients of 0.85 and 0.78. The questionnaires were distributed among the participants and were gathered after a week. For interview, we matched the time and questions with the participants.

The study was approved by the institutional ethics committee and informed consent was obtained from the participants.

The collected data was analysed using SPSS 16 and the features of the four hospital services were identified through descriptive statistics. The level of managers' propensity for outsourcing these services was determined using the decision-making matrix and considered the following assumptions:

The more intangible, inseparable, heterogeneous, demand uncertain, complex, and important or sensitive the services were, the fewer the hospital managers and administrators' propensities for outsourcing these services were; the more technological uncertainty, competitive status, and number of alternative suppliers the services had, the higher the hospital managers and administrators' propensities for outsourcing were; the more contact with the final client the services had, the fewer the hospital managers and administrators' propensities for outsourcing these services were; the zero-one rule was applied for drawing matrix to determine the features of the studied services. For instance, a service could be tangible or intangible; the rows and columns of the matrix represented the minimum and maximum amounts of service features, respectively. Besides, the matrix cells were the resultant of the two features associated with outsourcing. If two service features were aligned with outsourcing of a

service, the propensity for outsourcing that service would increase. However, if two service features were in the opposite direction from outsourcing a service, the propensity for outsourcing that service would decrease. Also, if a feature was aligned with outsourcing and the other one was in the opposite direction from outsourcing a service, they would neutralise the effect of each other; and, finally, if the number of squares shaded dark grey on top of the main diameter was greater than those shaded light grey below the main diameter, the propensity for outsourcing the studied service would be high, and vice versa.

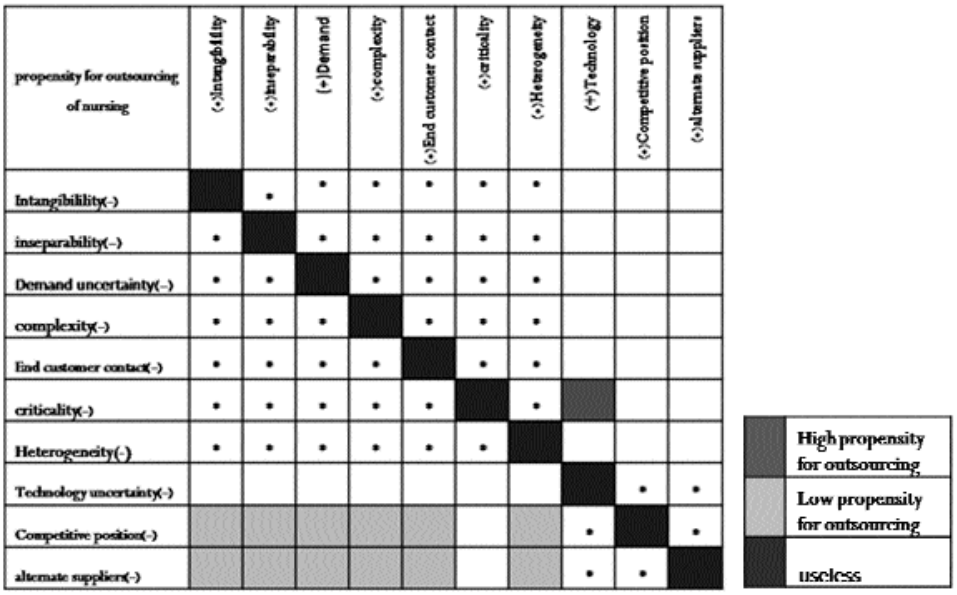

Figure-1: Decision matrix for outsourcing the nursing service.

Results

Of the 122 subjects in the study, 12(9.8%) were managers and 110(90.2%) were other employees. Among the four studied services, nutrition service was outsourced at all the three hospitals. However, other services — nursing, radiology, and laboratory services — were not outsourced in any of the hospitals. Also, the results of managers' survey demonstrated that the level of hospital managers' propensity for outsourcing nursing, radiology, laboratory, and nutrition services were one (8.33%), 3 (24.93%), 7 (58.3%), and 8(66.6%), respectively (Table-1).

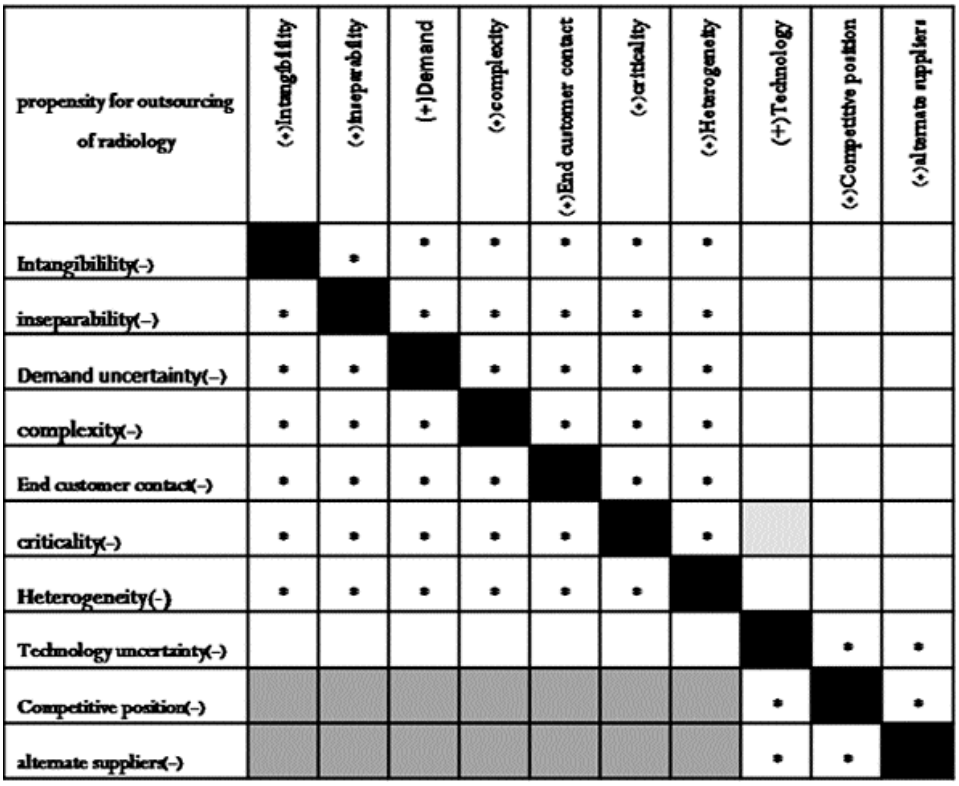

Figure-2: Decision matrix for outsourcing the radiology service.

The results of identifying the features of the 4 service units showed that the nurses considered their services as more intangible, inseparable, heterogeneous, and demand uncertain compared to other employees. Also, they, more than other employees, believed that their services had more contact with the final clients at the time of service delivery. Furthermore, the laboratory employees, more than other employees, believed that their services had complexity and technological uncertainty. Besides, the radiology employees, more than

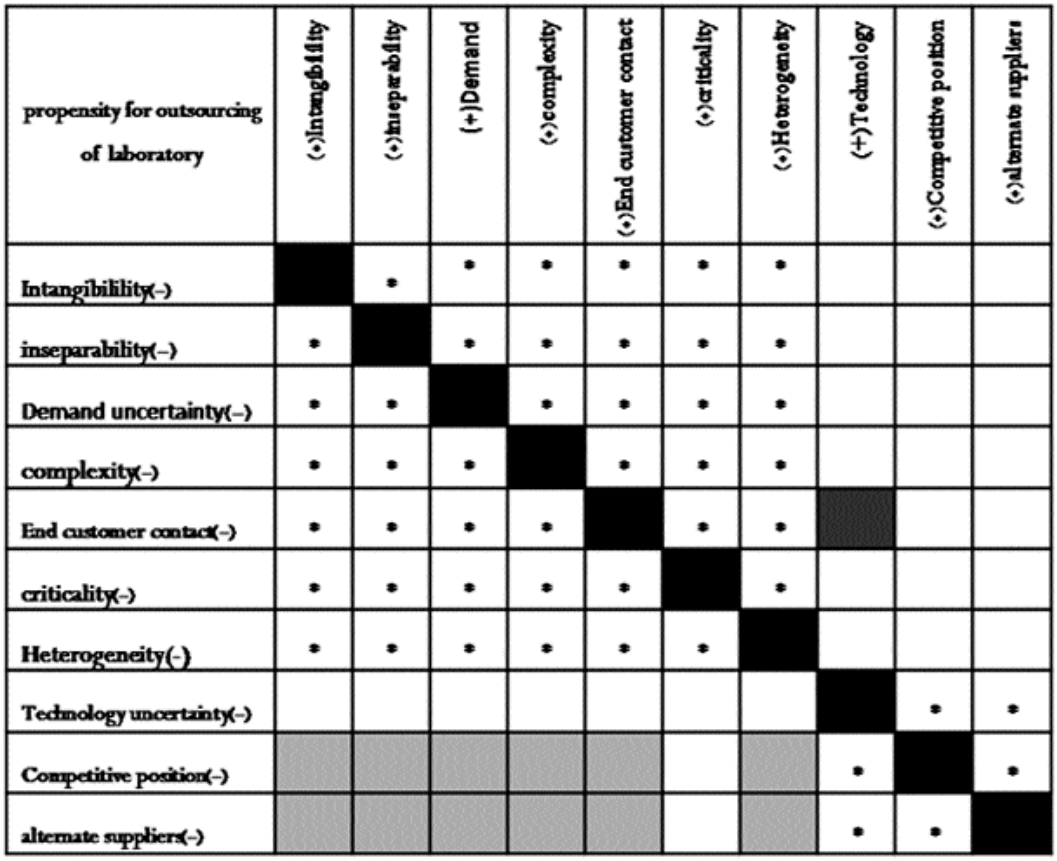

Figure-3: Decision matrix for outsourcing the laboratory service.

other employees, considered their services as important and sensitive. Finally, the nutrition employees, more than others, believed that their services had the largest number of alternative suppliers (Table-2).

The results of the interview with the contract manager about the competitive position of the studied services indicated that competition over prices for outsourcing the nursing, radiology, and laboratory services was low in the bidding sessions. However, nutrition service had a good competitive status.

The results of the decision-making matrix for outsourcing the nursing, radiology, and laboratory services showed that, unlike the nutrition service matrix, the number of squares shaded light grey below the main diameter was greater than that of the squares shaded dark grey on top of the main diameter. Therefore, the propensity for outsourcing

Table-1: Propensity for outsourcing.

Propensity for outsourcing services services	Strongly agree Frequency (%)	Agree Frequency (%)	No comment Frequency (%)	Disagree Frequency (%)	Strongly disagree Frequency (%)	Total Frequency (%)	Percent of manager were agreed or strongly agreed or agreed with outsourcing
Nursing	1 (8.33)	0 (0.0)	3 (25.0)	5 (41.6)	3 (25.0)	12 (100)	8.33%
Radiology	1 (8.33)	2 (16.6)	3 (25.0)	4 (33.3)	2 (16.6)	12 (100)	24.93%
Laboratory	3 (25.0)	4 (33.3)	3 (25.0)	2 (16.6)	0 (0.0)	12 (100)	58.3%

Table-2: Employees' viewpoints.

Features Services	Intangibility	Inseparability	Heterogeneity	Demand uncertainty	Contact with the final client	Technological uncertainty	Complexity	Importance or Sensitivity	Number of alternative suppliers
Nursing	42(69.3%)	47(78.4%)	49(81.2%)	52(86.8%)	54(90.4%)	33(54.2%)	42(69.8%)	45(75.5%)	16(26.4%)
Radiology	10(52.6%)	14(68.5%)	11(55.0%)	14(70.0%)	15(73.7%)	12(60.0%)	10(50.1%)	16(80.0%)	6(30.0%)
Laboratory	11(56.0%)	15(75.5%)	12(60.0%)	14(69.4%)	9(45.4%)	13(65.2%)	15(76.5%)	12(57.9%)	7(35.9%)
Nutrition	1(9.8%)	3(30.4%)	5(51.0%)	6(58.6%)	2(21.3%)	3(32.0%)	2(22.6%)	1(10.6%)	8(82.3%)

propensity for outsourcing of nutrition	(•)Intangibility	(•)Inseparability	(+)Demand	(•)complexity	(•)End customer contact	(•)criticality	(•)Heterogeneity	(+)Technology	(•)Competitive position	(•)alternate suppliers
Intangibility(–)		•	•	•	•	•	•			
inseparability(–)	•		•	•	•	•	•			
Demand uncertainty(–)	•	•		•	•	•	•			
complexity(–)	•	•	•		•	•	•			
End customer contact(–)	•	•	•	•		•	•			
criticality(–)	•	•	•	•	•		•			
Heterogeneity(–)	•	•	•	•	•	•				
Technology uncertainty(–)									•	•
Competitive position(–)								•		•
alternate suppliers(–)								•	•	

Figure-4: Decision matrix for outsourcing the nutrition service.

these services was low (Figures-1-4).

Discussion

The study on hospital services was conducted for the first time in Iran. The results of the present study revealed the managers' high propensity for outsourcing the nutrition service which had been outsourced at all the studied hospitals. In fact, provision of such services does not require much expertise. Thus, many contractors are able to provide these services and this has increased the outsourcing of nutrition services. Similarly, the results of studies of Iran researchers group in 2003, conducted to investigate the overall conditions of outsourcing services in the universities of medical sciences, indicated the managers' high propensity to outsource support and logistic services because of their relative simplicity and the large number of contractors for providing these services.[1] A study in Texas found that the nutrition services had been outsourced to the private sector more than other services. Therefore, the results of these two studies are similar to those of the present study.[16]

Our results indicated high propensity of hospital managers to outsource the laboratory service, but the matrix indicated that the propensity of hospital managers for outsourcing laboratory service had to be low. This can be due to the lack of managers' sufficient attention to the features of hospital services when making decisions on outsourcing them. A study in the south of Iran confirmed this finding.[11] Laboratory outsourcing lead to increased productivity and income of the ward.[17]

The studied hospital managers did not have any propensity for outsourcing the nursing service and none of them had outsourced their nursing services. The results of earlier studies[7,8] also revealed the low propensity of hospital managers for outsourcing clinical services. Although the results of almost all studies on outsourcing the nursing services have shown a very low level of outsourcing of this service, but a study in the US indicated a two-fold growth in the outsourcing of the nursing service from 1994 to 1995, implying the American hospital managers' increased propensity for outsourcing this service.[6]

The results of the present study demonstrated that nursing, radiology, and laboratory services were highly intangible, which can be attributed to their nature. Patients receiving such services are not able to touch them and the services, as experiences, neither can be touched nor can be considered assets. Therefore, evaluation of these services will be difficult for recipients and there will be differences between their expectations and perceptions. However, nutrition service is tangible.

In addition, the study results showed that nursing, radiology, and laboratory services were inseparable. Therefore, it can be said that these services are highly associated with other hospital activities, and the activities required to perform any service are also highly related to each other. Conversely, the nutrition service had low inseparability.

The results of the current study indicated the heterogeneity of the four studied services. Because

various employees work in different shifts and different patients usually receive different services, service quality is different from one patient to another, which leads to heterogeneity of services.

Moreover, the results showed that these services were faced with demand uncertainty. Thus, it can be deduced that the demand for these services were not predictable at different times. This might result from the types of patients who refer to hospitals, because the number of individuals who will get sick in future cannot be predicted to specify the volume of the patients using these services.

According to the current study findings, the providers' contact with final clients or patients was high at the time of providing nursing and radiology services. Therefore, presence of the patients in the place where these services were provided was necessary. However, this was not the case about laboratory and nutrition services. In other words, presence of the patients is necessary only in a small part of the laboratory services process. Also, the patients are not required to attend the place where the nutrition service is provided.

The study results revealed many fluctuations in advancement of technologies and equipment used to provide nursing, laboratory, and radiology services. In fact, more advanced technologies continuously enter the market for delivering these services. However, the nature of nutrition service is such that the equipment used for its preparation and delivery does not have many changes and fluctuations.

Also, nursing, radiology, and laboratory services had great complexity, so that a large number of steps had to be taken to provide these services. On the contrary, the nutrition service did not have much complexity.[7,13]

Furthermore, nursing, radiology, and laboratory services were very important and sensitive so much so that lack of each production factor could interrupt the cycle of producing and providing services for patients. However, the importance and sensitivity of the nutrition service was not high.

Moreover, the results showed a small number of alternative suppliers and contractors to provide nursing, radiology, and laboratory services. This can be due to the specialised nature of these services.[6] Therefore, the number of contractors who can provide these services is not high. Conversely, the number of contractors who can provide nutrition service is high, because it is a general service whose provision does not require much expertise.

The results of some studies conducted on the status of service outsourcing in British health system showed that outsourcing was among the priorities of the health system as well as the goals and responsibilities of the government. Paying careful attention to the quality, being result-oriented, and improving patients' access to healthcare services are among the consequences of outsourcing. Moreover, outsourcing in private sector in the Indian health system resulted in improvement of efficiency, access to services, reception of high-quality services, and promotion of services quality.[18-20]

The employees' lack of cooperation in completing the questionnaires was a limitation of the study. Yet, they enhanced their cooperation after the researcher's follow-ups.

Conclusion

Nutrition services had the highest propensity to outsourcing. The difference between the results obtained from the matrix and the managers' viewpoint can be due to lack of sufficient attention on the part of managers to the features of hospital services when making decisions on outsourcing them. It is recommended that hospital services should be outsourced based on scientific principles and infrastructures of outsourcing be prepared in hospitals. Also, managers and policymakers should use other countries' experiences in outsourcing.

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Reference

1. Group of experts. Study methods of reduce support services. Policies of Medical Universities, 2003.
2. Moschuris SJ, Kondylis MN. Outsourcing in public hospitals: a Greek perspective. J Health Organ Manag. 2006; 20: 4-14
3. Perrot J. The role of contracting in improving health systems performance. Discussion paper No. 1; 2004. World Health Organization, Geneva. [Online] 2004 [Cited 2014 Jun 23]. Available from: URL: http://www.who.int/health_financing/documents/cov-dp_e_04_1-role_contracting/en/.
4. Loevinsohn B, Harding A. Buying results? Contracting for health service delivery in developing countries. Lancet 2005; 366: 676-81.
5. Akbulut Y, Terekli1 G, Yildirim T. Outsourcing in Turkish Hospitals: A Systematic Review. Ankara J Health Serv. 2012; 11: 25-33.
6. Vining A R, Globerman S. Contracting-out health care services: a conceptual framework. Health policy. 1999; 16: 77-96.
7. Young S. Outsourcing in the Australian health sector: the interplay of economics and politics. Int J Public Sect Manage 2005; 18: 25-36.
8. Hsiao CT1, Pai JY, Chiu H. "The study on the outsourcing of Taiwan's hospitals".BMC Health service Res. 2009; 13: 9: 78.
9. Tabibi, J, Kakhani, M J, Ehsani, E, Evaluation strategy to reduce

enterprise support services affiliated hospitals, Ministry of Health and Medical Education. Health Manag J. 2007; 10: 59-66.
10. Sharif Zare M, Measure the effectiveness of the privatization in Isfahan University of Medical Sciences. Journal of Homa-ye-Salamat. A journal on Policy, Quality and Management in Health System. 2007; 4: 15-20.
11. Kavousi Z, Setoudehzade F, Kharazmi E, Khabiri R,Ravangard R, Rahimi H. The level of propensity to outsource Study: Based on hospital services features by managers and staff perspective in hospitals of Shiraz University of Medical Science. Hosp J 2012; 11: 9-18.
12. Karimi S, Agharahimi Z, Yaghoubi M. Impacts of outsourcing in educational hospitals in Iran: a study on Isfahan University of Medical Sciences. J Educ Health Promotion. 2012; 1: 1-5.
13. James FK, Daniel TH, Mark AW, Michael TR. The influence of outsourcing on job satisfaction and turnover intentions of technical managers. Human Resource Planning. 2002; 25: 3.
14. Siddiqi S, Masud TI, Sabri B. Contracting but not without caution: experience with outsourcing of health services in countries of the Eastern Mediterranean Region. Bull World Health Organ. 2006; 84: 867-75.
15. Ahsrafzade F, Comprehensive model for outsourcing services [Online] 2004. [Cited 2014 May 17]. Available from URL: sar.behdasht.gov.ir/%5Cuploads%5C170_379_Tasadigari%20Paper.doc.
16. Kwon J1, Yoon BJ. Prevalence of outsourcing and perception of clinical nutrition managers on performance of health care. J Am Diet Assoc. 2003; 103: 1039-42.
17. Omrani M, Mostafavi H, Khazar S, Ghalami S, Farajzadeh F. Laboratories Performance after Outsourcing in the Hospitals of Shahid Beheshti University of Medical Sciences . mljgoums. 2013; 7: 42-48.
18. Nikolic IA, Maikisch H. Public-Private Partnerships and Collaboration in the Health Sector: An Overview with Case Studies from Recent European Experience. [Online] 2006 [Cited 2014 Jul 5]; Available from: URL: http://siteresources.worldbank.org/ INTECAREGTOPHEANUT/Resources/HNPDiscussionSeriesPPPPaper.pdf
19. Great Britain, National Audit Office. The Performance and Management of Hospital Pfi Contracts. London: The Stationery Office, 2010.
20. Golna C, Pashardes P, Allin S, Theodorou M, Merkur S, Mossialos E. HealthCare systems in transition: Cyprus. Copenhagen, WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies, 2004.