



Evaluating Conditions of Outsourced Pharmacies in Teaching Hospitals of Alborz University of Medical Sciences: A Cross-Sectional Study

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ABSTRACT

Background: Outsourcing is the strategy of reducing expenses and improving organizational quality whose evaluation in healthcare organizations is of special importance. This study aims to investigate the status of outsourced pharmacies of Alborz University of Medical Sciences based on personnel perspectives and available documentation.

Methods: This was a descriptive analytical and cross-sectional study conducted in outsourced pharmacies of 10 teaching hospitals of Alborz University of Medical Sciences. Expenses, revenues and working time were derived from the hospitals' information centers and the documents. 128 relevant officials were selected by census to investigate the views of managers and authorities of clinical wards on outsourcing. Authors analyzed data using descriptive statistics, t-test and chi-square test through SPSS₂₂ software. All cost was converted to US dollar by using the average exchange rate in 2019 (1USD=110.000IR).

Results: The average satisfaction of managers and staff with outsourcing pharmacies were 4.20 (82 %) and 4.45 (80 %) out of 5. The highest level belonged to medicine expiration date with the average of 4.64, and the lowest score was related to medicinal status at the time of delivery with the average of 4. Consumption expenses for a bed in outsourced pharmacies regarding all the hospitals were 123 \$, and the profitability of the pharmacy for one bed was 134 \$ (5.540.900 Rials).

Conclusion: Based on the results, the following components had a relatively proper quality and an acceptable quality in all the respects of the staff's view regarding the conditions in the pharmacies. They can be inferred as the most salient characteristics of the present study in investigating the quality of outsourcing the pharmacies of the teaching hospitals in Alborz medical sciences. The important components include: The time spent by executive managers of the pharmacy's affairs, decrease of the manager's workload, improvement of management, increase in management's satisfaction in the organization and etc.

Key words: Hospital, Outsourcing, Effectiveness, Pharmacy, Reducing expense

Citation

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Introduction

Today healthcare systems face numerous and complicated challenges. They include: Reform processes, people's changing health needs, increasing public expectations, paucity of sufficient resources, the necessity of attention to new financial resources, and the exigency of using the existing resources more efficiently (1). In response to the challenges of improving services using government budgets, signing contracts with non-government institutions such as private organizations, universities, doctors, and non-profitable companies would be a good alternative (2). Outsourcing is one of the contemporary strategies of entering organizations into competition in public services and their concentration on technical and specific functions which becomes viable through delegating certain services to the service providers outside the organization (3-7). In other words, outsourcing means delegation of the risk and responsibility of carrying a task or service to another unit or institution outside the organization (8).

The conditions of healthcare system need drastic changes in organization, structure, finance, and management software through the help of which optimal changes can be provided in the health market. This is in order to achieve pre-set goals regarding people's criteria and indices of justice. Outsourcing is considered one of the suggested strategies for increasing practicality and quality in healthcare systems (9). Recent studies have shown that outsourcing in healthcare organizations can affect availability, justice, quality and functionality of health services, promote the goals of public health, and provide a suitable setting for cooperation of private and public sectors (8-10).

Arisi-nwugballa's study showed that outsourced support services have a potential impact on the quality of healthcare provided (11). Tan et al. (12) stated that outsourcing of health services influences basic medical supplies, laboratory equipment and vehicles, infrastructures and accessibility to essential drugs. The experience of outsourcing pharmacies and medical documents in Iran also demonstrates a reduction in expenses,

improvement in services, and an increase in the staff and clients' satisfaction (13, 14)

Outsourcing, despite its advantages, had disadvantages as well. They include: Reduction of supervision and control on the outsourced task; reduction of quality, responsibility, necessary information about the outsourced service, intra-organizational capacity, and independence of organization (15, 16). Unexpected expenses, the hardships of reverting to the pre-outsourcing status, injury to the reputation of the organization through malfunction of private service provider, dependence on the private service provider's company, and reduction of security in the organization are some of the negative implications of this phenomenon which will emerge as a result of mismanagement (15-17).

The study of Duffield et al. (18) in Australia concluded that outsourcing of certain tasks such as nursing and supervisory posts has resulted in the depletion of patients' security and has not yielded good results (19). Similarly, a study in Iran showed that outsourcing policy due to the lack of proper outsourcing model and weakness of government management did not achieve the goals such as minimizing the structure of the health system and improving efficiency.

One of the outsourced parts in a hospital is the pharmacy (20). The pharmacies of medical centers have always been challenging sections in hospitals regarding the potential for high income and the importance of medicinal and consumable equipment provision. The challenge also includes their ability to make false medicinal needs and illicit businesses. The economic effect of expenses, income, and the quality of the provision of patients' medical needs are of utmost importance from the hospitals' managers' point of view (20). Thus, outsourcing the pharmacy is a suitable strategic measure to achieve pre-set goals, namely increasing the quality, satisfaction, and the revenue of the pharmacy; and decreasing expenses (13, 21).

In fact, investigating outsourcing in Iran indicates that despite positive achievements, some problems have troubled hospitals and the hospital



management system in the country. This mars the accomplishment of privatization goals through outsourcing. Regarding the fact that the strategy of outsourcing has been a common practice in the healthcare section of Iran, researchers have not carried out an accurate evaluation of the realization of the goals of this strategy has not been yet. Regarding the role and importance of the pharmacy in a hospital, this paper seeks to evaluate the outsourced pharmacies of Alborz teaching hospitals.

Materials and Methods

This descriptive analytical and cross-sectional study was done in 2020. The research community included outsourced pharmacies of 10 teaching hospitals affiliated with the University of Medical Sciences in Alborz city in Iran. The hospitals were divided into three groups of small (up to 70 beds-2 hospital-), medium (71 to 150 beds-5 hospitals-), and large (more than 150 beds-4 hospitals-). To investigate the hospitals' clinical managers and staff's view on outsourcing, researchers needed their participation in the study. From each hospital, the following participants entered the study: the Chief Executive Officer (CEO) of the hospital, the matron, treatment deputy, the secretary of medicinal and treatment committee, charge nurses, and the bosses of clinical wards. Due to the low number of participants, authors did not conduct sampling, and all of them, who were totally 128, participated in the study.

Data were gathered in two stages. The first stage was collecting data from the documentation available. The data related to the amount of time for providing medicine by the pharmacy, the time of using medicine on the part of the ward, and the time of medicine delivery were specified by means of Health Information System (HIS). By calculating the total amount of time in two equal periods, researchers obtained the average time. In order to specify the needed time for providing the pharmacy's medicine from medicine-distributing companies, researchers asked the technician and manager of the pharmacy questions which were answered orally. This was regarding a lack of

documentation. Data related to Human Resources (HR), revenue and monthly expenses of the pharmacy were also taken from the information system of the pharmacy.

In order to evaluate the clinical officials' point of view, researchers used a questionnaire in two steps. This questionnaire included 18 questions in the domains of medicinal variety, the number of received (filled) prescriptions, the quality of medicinal items, coordination with wards, delivery of required items, the quality of medicine/equipment, the staff's conduct, on time briefing, and providing scarce drugs. Scoring ranged from very good to very weak according to the Likert Scale. In the second step, to evaluate the stance of the hospitals' managers on outsourcing pharmacies, a questionnaire ranging from completely agree to completely disagree was utilized. Questions for management interviews included issues such as the time spent by the pharmacy manager, the amount of managers' workload, the improvement and improvement of managerial performance, satisfaction of managers, and the willingness of the CEO to engage with the private sector.

Both of these questionnaires were used in a similar study(13). In this study, the validity and reliability of the questionnaire has been examined and they were used here with a few alterations. Evaluation of the validity of the questionnaires was done using Cronbach's Alpha, and the coefficient of 0.86. This confirmed the validity of the instrument. Data were analyzed using descriptive statistics, t-test, and chi-square tests through SPSS22 software. This study was confirmed by Ethics Committee of Shahid Beheshti University of Medical Sciences.

Results

According to the findings of the research, the average income of the pharmacy per bed was 134 \$, its minimum amount was 47 \$ and the maximum income was 344 \$ (Table 1). The average monthly expenses of the pharmacy were 1256 \$ per bed. 582 \$ of it belonged to the personnel's expenses (31.70 %) (Table 2). By

subtracting expenses from the revenue, the monthly profit of the outsourced pharmacies was 10 \$ per bed. The result of this test showed that the bigger the hospital is, the smaller the average consumption expenses of the pharmacy per bed becomes.

According to the findings of Table 3, the average time for providing the clinical wards' needed medicine according to the hospital information system was 15.50 hours. Its minimum was 11 hours and 15 minutes. Generally, a significant correlation between the time for providing the needed medicine and the size of the hospital sits do not exist. Moreover, the average time for providing the needed medicine from medicinal companies was 2 days, the minimum of which was 1 day and the maximum was 3 days. There was a significant correlation between the time for providing the needed medicine by medicinal companies and the size of the hospital

(P-value < 0.05). This time was more for small hospitals.

More often, the managers' points of view about the status of the outsourced pharmacies were positive. The broadest agreement was about the reduction of the time spent by the manager in the pharmacy's affairs with an average of 4.90, and the narrowest was about the level of satisfaction with the status of the outsourced pharmacies with an average of 3.40 (Table 4).

Table 5 shows the clinical officials' viewpoints on the status of the outsourced pharmacies. The lowest mark belongs to item 1 (on-time medicine delivery) with the average of 4, and the highest mark belongs to item 12 (the expiration date of the medicine delivered to wards) with the average of 4.64. All in all, the given mark by the clinical officials' viewpoint to the status of the outsourced pharmacies was 4.45 out of 5.

Table 1. The status of outsourced pharmacies

Hospital group	Hospital's name	Average income per bed	Revenue			
			Average	Standard deviation	Minimum	Maximum
Small	Hospital1	344 \$	221 \$	88 \$	135 \$	344 \$
	Hospital2	190 \$				
	Hospital3	217 \$				
	Hospital4	135 \$				
Medium	Hospital5	95 \$	89 \$	24 \$	63 \$	111 \$
	Hospital6	111 \$				
	Hospital7	63 \$				
	Hospital8	67 \$				
Large	Hospital9	47 \$	61 \$	12 \$	47 \$	68 \$
	Hospital10	68 \$				

**Table 2.** The status of personnel and consumption expenses of the outsourced pharmacies

Hospital group	Hospital name	Average consumption expenses per bed	Average consumption expenses	Average personnel expenses per bed	Average personnel expenses	Total expenses	Average of Total Expenses	Percentage of personnel expenses out of total expenses	Average percentage of personnel expenses
Small	Hospital 1	290 \$		76 \$		367 \$		30.83	
	Hospital2	242 \$		43 \$		284 \$			
			210 \$	39 \$	48 \$	229 \$	258 \$	15.00	18.82
	Hospital3	190 \$		34 \$		152 \$		17.24	
	Hospital4	118 \$						22.22	
Medium	Hospital5	66 \$		19 \$		85 \$		22.22	
	Hospital6	100 \$		22 \$		122 \$		18.18	
	Hospital7	74 \$	80 \$	14 \$	18 \$		98 \$		18.82
								16.07	
Large						88 \$			
	Hospital8	64 \$		186\$		250 \$		47.74	
						175 \$		73.57	
				129 \$					
Total	Hospital9	46 \$	58 \$		129 \$		170 \$		56.85
				19 \$		84 \$		22.50	
Total	Hospital10	65 \$							
		1256 \$		582 \$		1838 \$		30.67	



Table 3. Medicinal provision time for both the pharmacy and ward

Hospital group	Hospital's name	Ward's medicinal provision by the pharmacy		Medicine provision by medicinal companies	
		Average		Average	
Small	Hospital1	24.00 hours	10.75	2 days	2.25
	Hospital2	24.00 hours		3 days	
	Hospital3	3.00 hours		1 day	
	Hospital4	24.00 hours		3 days	
Medium	Hospital5	24.00 hours	24.00	2 days	2.33
	Hospital6	24.00 hours		2 days	
	Hospital7	24.00 hours		3 days	
	Hospital8	24.00 hours		1 days	
Large	Hospital9	8.00 hours	13.33	2 days	9.00
	Hospital10	8.00 hours		1 days	
In all the hospitals		15.50 hours	2		

Table 4. The viewpoints of the CEOs of hospitals about the status of the outsourced pharmacies

Items	Range of responses					Average
	Completely agree	Agree	Moderate	Disagree	Completely disagree	
Reduction of the time spent by the manager on the affairs of outsourced pharmacies	5 (50 %)	5 (50 %)	0	0	0	4.90
The reduction of responsibilities of the manager in the affairs of outsourced pharmacies	0	9 (90 %)	1 (10 %)	0	0	3.90
Improvement in the performance of management in the affairs of outsourced pharmacies	0	5 (50 %)	5 (50 %)	0	0	3.50
Increase in the manager's level of satisfaction regarding the status of the outsourced pharmacies	4 (40 %)	5 (50 %)	5 (50 %)	0	0	3.40
Increase in the manager's tendency to cooperate with the private sector regarding the status of the outsourced pharmacies	5 (50 %)	4 (40 %)	1 (10 %)	0	0	4.40

Table 5. The clinical officials' viewpoints on the status of the outsourced pharmacies

Item		Average	Standard deviation	Maximum	Minimum
1	On-time medicine delivery	4.00	0.60	5	2
2	The variety of medicinal items	4.10	0.67	5	2
3	The multiplicity of prescriptions who answered	4.01	0.61	5	3
4	Access to urgent medicines	4.06	0.55	5	3
5	On-time delivery of medicinal equipment	4.13	0.53	5	3
6	The delivery of applied medicinal items	4.11	0.52	5	3
7	The quality of medicines	4.13	0.66	5	2
8	Accepting suggestions to improve function	4.25	0.63	5	3
9	The quality of the equipment in the pharmacy	4.03	0.66	5	2
10	The responsibility for problems	4.21	0.60	5	3
11	The conduct of personnel in the pharmacy	4.57	0.55	5	3
12	Not delivering expired medicine	4.64	0.47	5	4
13	Providing scarce and necessary drugs	4.18	0.44	5	3
14	On-time notification about the existing equipment	4.12	0.57	5	2
15	On-time notification about the existing medicine	4.13	0.58	5	2
16	The ability of the technician of the pharmacy	4.36	0.55	5	3
17	The pharmacy's cooperation with wards' officials	4.46	0.51	5	3
18	The general mindset of the hospital about the pharmacy	4.56	0.52	5	3



Discussion

Outsourcing, as an important management decision, had a significant impact on hospital operations and profitability. Results suggested that outsourcing reduced the time spent by the manager of pharmacy, the managerial load. It improved manager's performance and management satisfaction in the organization. Generally, outsourcing caused satisfaction of managers in the organization. The study conducted by Kavousi et al. (22) indicated that the managers of teaching hospitals of Shiraz also were inclined to outsource various sections of hospital. Hsiao et al. (23) in Taiwan stated that the inclination of managers to outsource para-clinical services is high, but it is low for that of clinical services. According to the findings of this study, CEOs believed that not only outsourcing clinical services does bring about financial management prudence, it might also affect the quality of offered services to patients. Another study showed that sensitivities about delegating such services as nursing and pharmacy are more than hospital (22).

Regarding the findings of present study, outsourcing of pharmacy brings about higher revenue and reduces the expenses of the hospital and the pharmacy. This confirms the findings of other studies. For example, the study conducted by Maschuris showed that outsourcing hospital services saves the cost of the hospital (24). In addition, Barati's study indicated that positive results had been achieved in terms of reducing the expenses and increasing the revenue. This is in line with the results of the present study (25). Other studies have also shown a significant correlation between human resource expenses, consumer goods and apparatus, current and general expenses of hospital wards before and after outsourcing, and rise in purchasing power as a result of saving money for the organization (14, 26). A review study by Kurdi et al. (26) pointed out that through outsourcing some sections such as installations, food catering, etc. to other organizations, you can reduce the management's workload and focus their attention on major responsibilities and activities, hence reducing expenses.

According to the findings of the research, the accreditation score of the outsourced pharmacies (at a 0-100 range) varied from 18 in Fatemeh Zahra hospital to 79 in Kamali hospital. In addition, 50 percent of the outsourced pharmacies achieved an accreditation score ranging from 35 to 45. No research had been done to evaluate the status of various outsourced sections in terms of meeting accreditation standards. In this respect, it would be impossible to compare the findings of the present study with others. Nevertheless, in the study done by Dargahi et al. (27) the status of accreditation score of the pharmacies of Tehran medical school has been evaluated. Among the 5 hospitals studied, only one pharmacy in all the hospitals had received a score below 50. In general, the pharmacies of the hospitals had achieved a score of 70 or above in the accreditation process.

The average time for providing the required medicine for clinical wards was 15.50 hours. The average time for providing the medicine needed by the pharmacy from medicine-distributing companies was 2 days. Special attention must be given to the great chunk of time allocated for providing medicine and the paucity of needed medicines. Providing them from companies requires (spending) a lot of time (28).

According to the clinical authorities' point of view, the status of the pharmacies after outsourcing has become better than before. In all the 18 items under study, at least 80 % (45.40 %) of the officials agreed to outsourcing. Tourani et al. (13) found that the staff of the pharmacy was more satisfied compared to before the time of outsourcing. This is in line with this research's findings. According to the produced results and obtaining all the staff's view, the most unsuitable status belonged to the on-time delivery of medicine with an average of 4, and the expiry date of medicines got the highest percentage with the average of 4.64 based on the staff's view. The study done by Tourani et al. (13), highly correlates with the present study in terms of their methodologies. Some components about the status of the pharmacy of Firoozgar hospital have been

assessed both before and after outsourcing. The following components had a significant correlation with each other and had a more improved status after outsourcing: on-time delivery of equipment, the delivery of all the required items, the quality of the medicines and equipment, efforts to improve services, acceptance of proposals to improve performance, the ability to analyze the problems, the staff's conduct, the status of the expiry date of medicines, and the provision of scarce medicines.

The medicine-related item

The quality of the distributed medicines in pharmacies got the average of 4.13 out of 5 based on the staff's view. It is lower than the average of the studied items. As indicated in Tourani's study, the quality of medicines after outsourcing the pharmacy showed a better result than before (13).

The function-related items

Regarding the staff's view, all the items of the on-time delivery of medicine, the number of the answered prescriptions, access to urgent medicinal items, the delivery of the required medicinal items, responding to problems, the status of providing scarce and urgently needed medicines, on-time notification about the stock medicine, and the ability of the technician of the pharmacy received worse scores than the other studied items. On the other hand, the items on the staff's conduct, the expiry date of the delivered medicinal items to wards, the cooperation of the manager of the pharmacy with the managers of wards, the overall view existing in the hospital about the pharmacy concerning procedural indices had a higher average in comparison with other studied items.

The improvement of the procedures related to these items must be considered. The on-time delivery of medicine in hospitals got the lowest mark (with the average of 4) among all the items according to the staff's viewpoint. The study conducted by Tourani et al. (13) indicated that the on-time delivery of medicine did not have a significant correlation before and after outsourcing. However, it has not been mentioned that the delivery of medicine compared with the past has

become better or worse. In this study, the on-time delivery of medicine has got the lowest mark based on the staff's view. However, for a comprehensive analogy and judgment, authors need temporal indices. What can be understood from the on-time delivery of medicine is that this index is given great importance by patients too. The study done by Kaboutari is indicative of the importance of the on-time delivery of medicine from the patients' point of view (29).

The number of made up prescriptions in the study done by Tourani et al. (13) was higher after outsourcing. This large number also prevents of the unnecessary waste of time (29).

The equipment-related items

Findings of the present study and the evaluation of the staff's view, the status of on-time notification about the stock equipment, the quality of the stock equipment in the pharmacy, and the on-time delivery of medicinal equipment all got a lower score among all the items. Comparing the findings of the present study with that of Tourani et al. (13) in this area shows that the two items of the quality of equipment and the on-time delivery of medicinal equipment before and after outsourcing had had a significant difference and has improved after resourcing. Only the status of notification about the stock equipment has not shown a significant difference. In this study, all the three equipment-related items have received a lower average than all the items. The improvement of the equipment-related procedures in the studied pharmacies seems to be necessary in this area.

The strengths of this research was investigating the functional indices of pharmacies, evaluation of the staff's viewpoints on various items of the function of the pharmacy, and the evaluation of the hospital managers' stances as key individuals who have the highest authority on outsourcing and. They devote the greatest part of their working time to different sections. Studying these three factors (the point of view of managers, employees, and documentation) simultaneously causes access to an all-inclusive view viable. The data related to time



for providing medicine from pharmaceutical companies can be regarded as a limitation in the present study. Other limitations included face to face gathering of data from the technicians of pharmacies because they were not documented. Moreover, the data related to financial statistics, namely the revenue and the expenses, might be reported more or less than what was already there. As a result of the workload of the staff and personnel of the wards and the pharmacy, there was little cooperation, and this was why the authors had to repeatedly go to the hospitals.

Conclusion

Based on the results, the following components had a relatively proper quality and an acceptable quality in all the respects of the staff's view regarding the conditions in the pharmacies. They can be inferred as the most salient characteristics of the present study in investigating the quality of outsourcing the pharmacies of the teaching hospitals in Alburz medical school. The components include: The time spent by executive managers of the pharmacy's affairs, decrease of the manager's workload, improvement of management, increase in management's satisfaction in the organization, decrease in the time of medicine provision, the amount of time for providing required medicine in a minute, revenue generation by pharmacies, accreditation score acquired from the ministry of health, consumer expenses of the pharmacy and procedural indices of the outsourced pharmacies such as the expiry date and quality of medicines. To inspire the process of outsourcing, key decision-makings (such as the management of the hospital, the management of the pharmacy, and considering the staff's views) evaluation of the quality of outsourcing in the pharmacy are needed. The roles, rules and regulations must be clear, properly defined, and accessible. In addition, in the process of outsourcing, various aspects such as different outsourcing activities, selecting activities for outsourcing, the advantages and disadvantages of outsourcing, the management of relations and solving problems in outsourcing, legal

considerations for outsourcing, necessary factors for success in outsourcing, and the life circle of outsourcing must be considered to maximize the achievement of the pre-set goals.

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Conflict of interests

The authors declared no conflict of interests.

Authors' contributions

Marzban S and Rajaei R designed research; .Rajaei R and Zarei E conducted research; Marzban S analyzed data; and Rajaei R wrote the paper. Rajaei R had primary responsibility for final content. All authors read and approved the final manuscript.

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