

Analysis of the current costing process based on activity-based costing in Lamerd Valiyeasr Hospital

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Abstract

Introduction: Activity-based costing system is one of the new systems of costing price of products and services for providing the required information for managers. It helps the users with correct and appropriate deciesions. The present study aims at determining the costing price of the services based on activity costing method in Lamerd Valiyeasr Hospital.

Methods: The present study is a cross-sectional and practical study. In this study, 9 activity centers were evaluated based on activity-based costing in Lamerd Valiyeasr Hospital in 2013. Data collecting instruments were check list of the direct and indirect costs of the related activity centers. In this study the costs were evaluated by direct allotment method.

Results: The results indicate that the costing price in these 9 activity centers is more than the tariff rate enacted in 2011-2012 with a significant difference.

Conclusion: The present study showed that there is a significant difference between the real price of the studied activities and the enacted traiffs. The costing price of the services can be reduced by improving functions, specially, by revising human resource management actions and also by standardizing the services utilization to reduce the utilizing costs.

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Introduction:

Regarding the significance of the authentic information avilability in managers' decision-making and the development of advanced technologies in different aspects with an increase in complexity and diversity of the activities, understanding these changes and evaluating their effects on the organizational costs are of high

significance. The significance is doubled for the service providers as to the fact that there are more diversity and changes in these units comparing to the production activities. Obviously, understanding these activities and evaluating their effects on the costing price of the services required designing an appropriate and effective costing system which can recognize the diversity and the complexity of the activities and also take into account their effects on

costing of giving services. Hospitals and other health care centers are increasingly encountered with a challenging and competitive environment. Much focus on the quality of taking care of sick people, the high cost of providing services and the severe competition are among the factors which force these organizations to revise their service provider units (1). There has been no practical action or even theoretical studies related to identifying the costs and calculating the costing price of the services provided by the service related activities in hospitals and considering the significance of financial information and the costing price in the managers' decision makings from different aspects, it is necessary to study and present applied and practical methods in this area. In this vein, increasing the authenticity, accuracy, and relevancy of costing information for making the right managerial and costing decisions is one of the main challenges in hospitals (2).

In hospitals, on the contrary to other economical sectors such as industry traditional systems are not effective and calculating the costing. As it is the purpose of each costing management system to provide the precise and useful information for organization so that they can present their materials and services with high quality in a competitive environment (3) Thus, it is necessarily required to study and investigate the various systems in this area and to apply the new systems of costing common worldwide and it should be considered in a special way. Costing can be defined as the cost of evaluating the final price of the product (4) during the past decades, there has been a great progress in costing methods including the most recent activity-based costing (5,6) "activity-based costing" system or to use a more commonly used term "ABC" system, is a method for measuring the costing, activity functions, and costing destinations. The costs are divided into the costs of the activities in levels of unit, category (group), product, and the cost in the level of the institution (7). Applying appropriate methods, this system take into account the effects of activity changes, complexity, variety and the special properties of each activity in calculating its costing price. In fact, this method is designed based on the hypothesis that the activities and the resources and as a result the costs are devoted to it and so are the products and the

services (8). In another term, the basic assumption of activity-based costing is that the activities are spent on making products, the resources are spent on activities and the costs are spent on sources (9).

As so, this method has correlated the costs to the activities based on the degree of applying the sources and then devoted them to the costing destinations based on the degree of the activities applied (6). In this way, the activity-based costing focus is on providing accurate information about the costs of the products (9). The structure of activity-based costing is formed by two steps: the first steps includes evaluating the resources which are not directly included in the costing category of the product and are related to the supporting activities. In the second step, the cost of each activity is devoted to a product comparing to a selected criterion based on the content of that activity (5).

Evaluation of function (10). Directing decisions (11) assisting to making right budget) a distinguishing feature of this system is its ability to precisely determine the costs and to present non-financial information to improve function and increase the efficiency of activities and to the last possible extent, it quantitatively computethese effects in calculating the costing price of the services and the products using appropriate methods. Considering the point that the main elements and sources used in service giver units are the human activities, applying this system is really useful because of its abilities and utilities.

Methods:

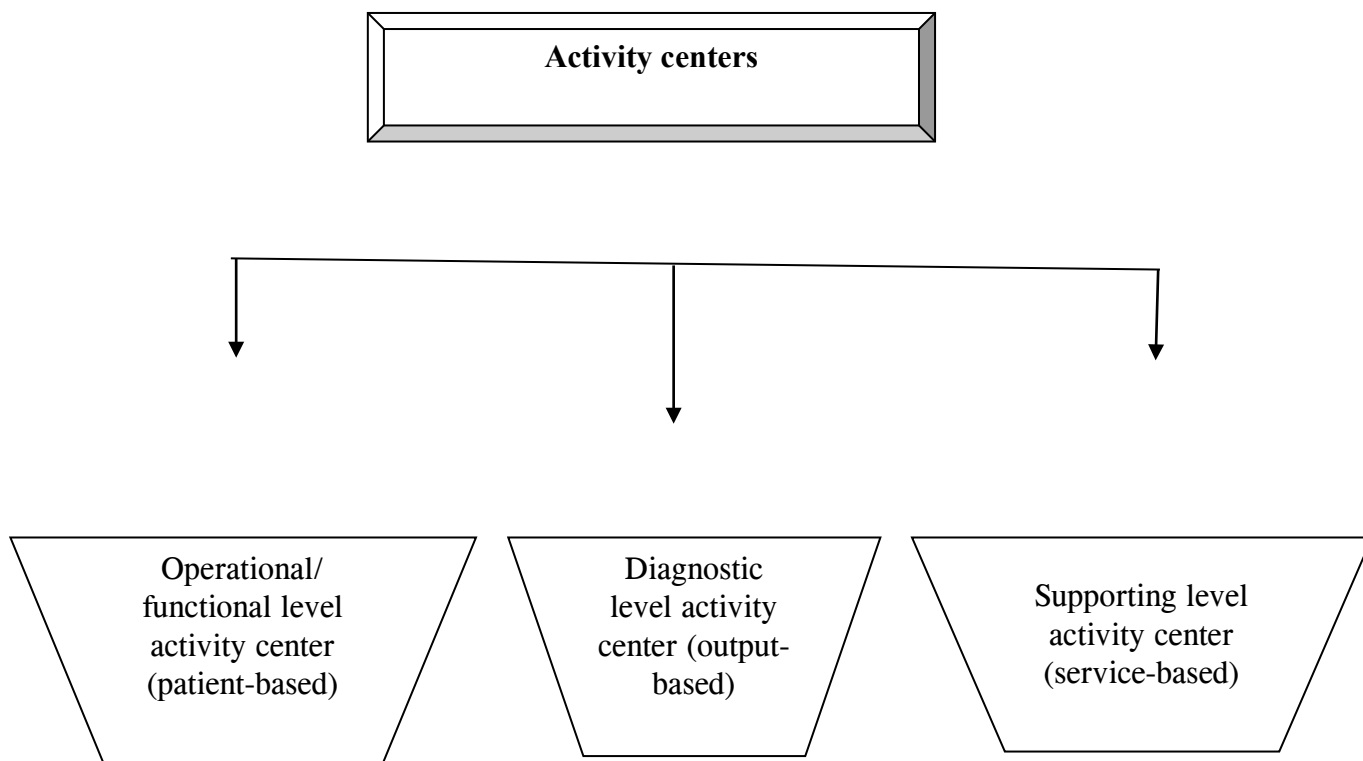
The present study is a cross-sectional and practical one in which the costing price of the activity center is calculated using the activity-based costing (ABC) method in Lamerd Valiyeasr Hospital. The data for this study is gathered through 15 cost-related forms and also through the study of the related documents and proofs and also through interview and observation. In general, the method of this study can be defined in a format of six steps:

The steps performed to calculate the costing price in the studying area are:

The first step is segregating and determining the activity centers including:

1. Functional activity centers

- 2. Recognizing activity centers
- 3. Supporting and official activity centers



Official sections and services	Diagnostic sections	Operational sections
-management -official services and personnel - accounting -supplies - information and admissions -strile - nutrition and kitchen -hospital pharmacy -medical equipments -installation and technical services - general services and cleaning -telecommunications - transportation -tailoring - kitchen - security guard -computer -nursery room	-endoscopy - radiology - sonography - mammography laboratory -haematology -parasitology - urology -echocardiography -sport test -injections	-emergency -intern emergencies -surgical emergency -heart surgery - urology surgery - surgery2 - surgery3 - surgery 4 - inward/interior units - inward unit1 -inward unit2 -intensive care units -inward ICU Surgical intensive care Coronary care unit -recovery units

The second step: costing in the activity centers

The next step in designing the recommended system is identifying the manner of the costs in each activity center which can be divided into two categories of direct and indirect costs. The costs are divided based on the purpose of the cost.

1. Personnel costs: includes all costs paid to personnel by the hospital
2. Consumed material costs: includes direct and indirect costs

The third step: evaluates the costing functions in service-giver and official activity centers, accounting unit activity center, income and salary accounting, calculating the salaries and the advantages of the hospital personnel including overtime work, new design, calculating taxes and other paid premium which are related to the hospital personnel in one way or the other.

2- The activity center of the warehouses

Applying ABC system of the warehouses is based on the works which are being done.

3- The supplies unit activity center

The supplies unit is divided into miscellaneous activity centers based on the services it gives to different units of the hospital.

4- Computer activity center

The information about the number of the available computers in different activity centers of the hospital has been identified and determined.

5- Official and Personnel activity center

Cost allotment in this unit is on the basis of "the number of working people (formal personnel and trainee)" in each unit.

6- Transportation activity center

According to the results of the analysis of the activity in this activity center, all the services in this center are devoted to the management activity center and the activity center of the operating units.

7- The activity center of medical proof unit and reception of bedridden patients

The unit of the medical proofs acts in forming dossier and keeping the bedridden patient and the outpatients' resumes. The activities of this unit start since the time the patient is accepted by forming a dossier for him/her and goes on till the patient is discharged. The costs are identified according to the information from this activity center during this period.

8- Hospital pharmacy activity center

Hospital pharmacy prepares the drug manuscripts and also a combination of all drugs required by different units of the hospital. Costs are allotted to this unit on the basis of "the number of the prepared medical items" for the units of the hospital.

9- Laundry activity center

This unit washes and prepares the clothes and the sheets and all other textiles needed in hospital units. It mainly gives services to the operational units. After gathering the costs related to this activity center and determining the cost allotted to it, according to output (the washed clothes (kilo)), the cost price will be calculated based on the outputs.

10- The security guard activity center

This unit, like all other supporting units, acts in giving services to all other units of hospital. To have more real allotments in this activity center, the number of the units and the percent of the services which use the security guard activity center were determined, so that on the basis of these allotments the costs of this activity center will be devoted to other sections.

To allot the costs of this activity center, a part of the collected costs in this center is devoted on the basis of "the watching hours" in each unit, and another part which is related to the whole hospital is devoted on the basis of "the physical infrastructure area" in each unit. Thus, some activity centers of the hospital, receive both the direct costs of the security guard unit and a part of the whole hospital security guard cost.

11- Management activity center: the most logical basis for cost allotment to this activity center is "the number of working people".

12- Nursing office activity center: the most logical basis for cost allotment to this activity center is "the number of working people from nursing office in other activity centers".

13- Telecommunication activity center: the most logical basis for cost allotment to this activity center is "the number of working people in other activity centers".

14- Hospital general service activity center: the whole costs of this activity center is allotted to other activity centers after collecting and on the basis of "the square infrastructure area".

15- The activity center of the technical and installation services

The costs are allotted to this activity center based on different factors including “the physical infrastructure area” related to the activity center, “the number of working people” in each activity center “ the amount of used water or other installations” and etc. Where the main activities of this activity center are related to operating and keeping the installation system, repairing and rebuilding services of the different units of the hospital, thus, using the “physical infrastructure area” basis related to each unit can be indicative of the functions and the activities of this center to a great extent and cause the cost to be logically allotted to this activity center.

16- Oxygen provision activity center

Costing of this activity center in hospitals equipped with central oxygen system which provides oxygen for all the operative and diagnostic units is different from those providing their needed oxygen from the supplies unit and oxygen cylinders. That is because in hospitals equipped with central oxygen system, the main cost of this activity center is related to the depreciation of machineries and equipments and only a low percent of its costs are considered the flow costs. But, in hospitals which provides their needed oxygen from the supplies unit, its main costs are those of current costs and the changing costs are related to buying oxygen capsule. According to the investigations done in this area, and the experts' viewpoints, since oxygen cylinders are part of the unit chattels and they are distributed based on each of operative units, thus, using the basis of “number of oxygen cylinders” in each unit can be indicative of the function of this basis and the amount it is used.

The fourth steps: cost allotments

Cost allotment methods are:

1-4 Direct allotment method

In this method, the costs of all the activity centers are allotted merely to these centers based on the amount of services given to the operating activity centers, no cost is devoted to other activity centers (supporting and staff) even if they are using the services of this activity center.

2-4 One- directional allotment method

In this method, the costs of the supporting units are devoted to both operating activity centers and other parts of the supporting units. However, the cost devotion is one- directional.

3-4 Two- directional allotment method

Although comparing to one-directional allotment method this is a more real method, considering the fact that in cost devotion a static manner is the criterion, so, it does not determine the costs allotted to each activity center completely.

4-4 Synchronic equation use method

The interaction between the activity centers is considered to devote the costs in this method and applying the devotion basis, the costs which are developed between the service receiving center, devoted to each activity center and calculated, are a combination of direct costs from the same activity center and the other costs devoted to it. To do so, for all activity centers a cost allotment matrix is considered and the costs of each activity center is shown in the matrix according to the allotment basis, then using the converse operation matrix the devoted costs to each activity center are calculated.

The fifth step: Standard costing and how to calculate the costing price in diagnostic activity centers

To attain the costing price information in systems which have no availability of such information, two methods can be used:

1. Using the costing price information in other similar system
2. Performing standardization operation and calculating the costing price in the intended system

The sixth step: The costing information of diagnostic activity centers (output-based)

1. Radiology activity center

Different diagnostic activities are performed in the unit of radiology such as radiography, sonography and

The seven step: costing information in operating unit (patient-based)

The activity of the operative units in hospital is related to the direct presentation of sanitary and remedial services. Regarding costing, these units are considered as the final focus of the costs. And

all the activities performed in the units of supporting and diagnostic, finally, lead to the functions performed in these units. The output of the operating units is actually "beds a day" during the interded period of the study. After costing, cost allotments and determining the costs of each activity center, on the basis of "beds a day" in operating units, these costs are divided by the beds a day and by taking the average of the costing price for each day of "beds a day" is obtained for each activity center.

Results:

Considering the nature of the activity-based costing system (ABC), it can be used for all service-provider units (production and industrial) worldwide. But it should be noticed that according to the criteria for using this method of costing, the system must be performed after investigating the possibility of applying this activity-based costing system.

Since the costing price data obtained from both ABC and traditional method are related to the same data, and our two populations are not separated, thus, a paired T-Test or non-parametrical method were used for paired data.

To do this, first we test the assumption of the data normality by Kolmogorov- Smirnov (k-s) test, so we have.

As determined in the below table, (p) is 96% for traditional method and 99% for ABCmethod, thus a paired T-Test is used. According to the calculations, t is equal to 102/788- percent for

activity-based costing system regarding the point that the probability (error) value (p-value) is less than 5 percent and equal to 0.01.

Table 1. One-Sample Kolmogorov-Smimov Test

		Sonati	ABC
N		9	9
Nomal Parameters (a,b)	Mean	18567-1578	20334.9167
	Std. Daviation	663.11792	651.41682
Most Extreme Differences	Absolute	-165	.141
	Positive	-112	.087
	Negative	-165	-141
Kolmogorov-Smimov Z		-496	.424
Asymp.Sig. (2-tailed)		.966	.994

a test distribution is normal.
b calculated from data.

Thus, regarding the tables obtained by statistical tests, it was determined that there is a significant difference between the costing price information from the activity-based costing system and the traditional system commonly used in hospital. It can be concluded that applying the activity-based costing system is possible in Lamerd Valiyeasr Hospital, as well using ABC method, the hospital can have a more acute costing price comparing to the traditional methods.

The costs of each activity center = the costs related to each activity center (direct and indirect) + the percent of the costs from other activity centers belonged to this center.

Table 2. Prime Samples Test

		Paired Differences			95%Confodance Interval of the Difference		t	df	Sig.(2.tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Sonati.	0	51.59453	17.19818	0	0	-102	8	.000
	AB	1767.7589			1807.4180	1728.0998			

Conclusion:

According to the present study which was about applying the activity-based costing for calculating the costing price in Lamerd Valiyeasr Hospital, the

results suggest that the costing price tariff by applying ABC method is considerably different from those by traditional methods. Furthermore, the large amount of the indirect expenses in hospital indicates that the sources are not used correctly.

References:

1. Aird B. Activity-based cost management in health care-another fad?. *Int J Health Care Qual Assur.* 1996;9:16-19.
2. Babed M, Balachandran. Cost driver optimization in activity Bbased costing, the accounting review. 1993;563-575.
3. Baxendal A, Gupta M. Aligning TOC with ABC to enhance profitability. *Management Accounting.* 1998;39-44.
4. Bennet P. ABM and the procurement cost model. *Management Accounting.* 1996:28-32.
5. Bromwich M. Management accounting: pathway to progress. *Management Counting.* 1994:39-44.
6. Braush M, Taylor T. The cost of capacity. *Anagment Accounting.* 1997:44-45.
7. Brinker BJ. Guide to management. New York: John Wiley and Sons Press; 2000.
8. Capettini R, Chow Wch, McNamee AH. One the need and opportunities for improving costing and cost management in healt care organizations. *Managerial Finance.* 1998;24:46-59.
9. Cooper R. The rise of activity based costing part. *Four Journal of Cost Management.* 1989;20-26.
10. Cooper R, Kaplan RS. ABS measuring the cost of source usage. *Accounting Horizons.* 1992:2-13.
11. Cooper R, Kaplan RS. The design of cost management system. *Printice-Hall Press;* 1998.
12. Cooper R, Kaplan RS. Measure costs right: make the right decission. *Hardvard Business Review.* 1998:96-103.
13. Cooper R, Kaplan RS. Profit priorities from ABS. *Hardvard Business Review.* 1997:1-33.
14. Gunasekaran A. A framework for the dessign and audit of an activity based costing system. *Managerial Auditing Journal.* 1999;14:118-126.
15. Chen Zh, Wang L. A generic activity-dictionary based method for product costing in mass customization. *Journal of Manufacturing Technology Management.* 2007;18:678-700.
16. Imes J, Mitchell F, Yoshikawa T. Activity costing for engineers. New Jersey: John Wiley and Sons Press; 1994.
17. Tumey BBP. Activity based costing: the performance breakthrough. London: CLA Press; 1996.
18. Lere JC. Activity-based costing: a powerful tool for princing. *Journal of Business and Industrial Marketing.* 2000;15:23-33.