Original Research

Comparative Study of The Minimum Cost of The Diagnostic-Therapeutic Path Way with The Approved Tariff, To Determine the Efficiency of The Plastic Surgery Process of Bu Ali Hospital, Islamic Azad University of Medical Sciences of Tehran

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[DOR: 20.1001.1.23222913.2021.10.2.3.9]

Abstract

Background and Objectives: Rapid growth of technology and globalization of trade has increased competition between manufacturing companies in capturing global and domestic markets, and in this area, successful companies can adapt their rapid growth to the changes created and always satisfy customers' rights to high quality and price by producing and offering products and services to sustain their life. Achieving this goal is not possible except under the right recognition of activities and costs and controlling them.

Methods: The present study is an applied and retrospective descriptive-comparative study that compares the minimum cost of the diagnostic-therapeutic pathways with the approved tariff to determine the efficiency of the plastic surgery process in Bu Ali Hospital, Islamic Azad University of medical sciences, Tehran in 2018. The required data on the costs of plastic surgery were collected through the Hospital Information System and the required information on tariffs was collected from the annual circulars of the Supreme Insurance Council of the Ministry of Health and the tariff received from patients to calculate the cost of surgery.

Results: According to the results, the average cost of a bed day service unit in the surgical department of Bu Ali Hospital in Tehran has estimated at 9378626.39 Rials and the tariff received from patients is 11350961.39 Rials.

Conclusion: The comparison between the diagnostic-therapeutic pathway in the plastic surgery group of Bu Ali Hospital in Tehran, suggests that the hospital gained profitable in the plastic surgery group and services continue to be the same.

Keywords: Minimum DTP cost, Approved tariff, efficiencies of process, Plastic surgery, Hospital

Submitted: 25 April 2021, Revised: 23 May 2021, Accepted: 29 June 2021

Introduction:

After the formation of new systems of human societies, especially after the industrial revolution and an increase in urbanization population in today's form, the cost of the health and treatment of society has accounted for a large amount of funds of countries. The figures vary depending on the type of society (developed or developing) (1). A large part of these costs belongs to treatment and services that are often provided in hospital centers. Hospitals are one of the most important elements of the health care system and accounted for about half of health care costs (2). Since these centers have a special technical, human and managerial complexity, their proper and effective management is one of the main concerns of the health sector of countries (3). The first task of each hospital as a vital part in the health system is to provide service for people of society (3). The sharp increase in health costs has led most countries and the relevant organizations to think of these services from financial and economic aspects. Also, unnecessary increase in costs in the health sector have restricted development of other goals that can have a positive and significant effect on health services and health process (4).

Financial issues of hospitals, including supplying resources and distribution of costs, are one of the important issues and it can be stated that any activity that takes place in hospitals depends on the financial issues. In addition, any change in it can have a direct impact on other components and functions of health care services in the hospital, ranging from the level and frequency of services to its quality and effectiveness and efficiency (5). Therefore, funding, appropriate distribution, proper control of costs ensure doing any activity and providing health services. For this reason, it is essential to identify costs, calculate and control it properly and scientifically (6). Hospitals have recently tried to identify, intervene, and control health care costs, some of which have been followed by national programs (7). The application of incorrect costing systems leads to large errors in predicting and estimating the cost of products. This is especially evident in hospitals with high indirect costs and large variety of products or services. The use of incorrect costing systems in them distorts the total cost of products and thus incorrect information (8). In recent years, studies have been conducted on financial debates and costs of hospitals to identify, compare and distribute hospital costs (3 and 9). Some studies have examined the global calculation (tariff of a service, such as surgery, anesthesia, etc.), the cost of surgical procedures compared to its non-global calculation and showed a significant difference between the global cost of surgical procedures with their real cost (3). Also, some studies have had an analytical look at this issue. For example, research in France has evaluated and priced medical care and medical measures regarding plastic head and neck surgeries. They reported that outpatient head and neck plastic surgery may be available for most patients without the need for care and cost, but more studies are still needed. Inspector General of France Social Affairs announced that outpatient surgery is becoming a standard criterion with the aim of observing the requirements for more care with no cost (10). By reviewing different library studies, experiences, research and different articles and observing the problems of costing system based on fixed tariff, it is concluded that to determine the total cost of the high-quality and desirable health care services of plastic surgery in hospitals, a proper and accurate costing model is essential to meet the different needs of these health centers. Assignment of some units providing services to the private sector, lack of appropriate criteria for determining the cost of health care, inability of the accounting system in providing the information required by managers, and failure of costing policies and lack of significant increase in clients referring to restoration and plastic surgeries in Abu Ali Hospital after more than five years old (238 cases over 5 years) motivated us to conduct this study. Hence, the present study was conducted to compare the minimum cost of diagnostic-therapeutic route with tariffs approved to detect the efficiency of the plastic surgical procedures in Bu-Ali Hospital affiliated to Islamic Azad University of Tehran.

Theoretical foundations and research background

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Abbothabi et al. conducted a study in 2020 entitled "Comparison of global surgical tariff and real cost bill at Hazrat Rasool Akram Educational-Medical Center. According to the results of the mentioneds study, real cost bill of hospital costs is much higher than the global tariff (11). A study was conducted by Zarei et al. (2019) under the title of “Does the approaved tariff cover the real cost of global surgical procedures?" According to the results of the mentioned study, the real cost of global surgical procedures was $ 503, while the average tariff was $ 361, so the hospital has lost $ 142 for each surgery (12). A study was conducted by Kalhor et al. (2018) under the title of "Comparison of the Tariffs of the Ministry of Health and Radiology services using the activity-based costing method". The results of this study showed that each radiography from the skull, face and profile costs 6 .57 dollars and its tariff was $ 2.49, the cost of each cystogram is $ 15.8 and its tariff is $ 6.63, so this ward has been loss-making of the hospital (13). A study was conducted by Janati et al. (2017) under the title of "Analysis of eye surgery cost and its comparison with government tariffs". The results of this study showed that cost of each strabismus unit was $ 464, cost of each glaucoma unit was $ 505, and cost of each cataracts unit was $ 400, and the tariff of each strabismus unit was $ 229, the tariff of each glaucoma unit was $ 207 and cataracts, and tariff of each cataracts unit was $ 325, so the cost of the provided services was higher than the tariff (14).

According to the results of this study, the mean total cost of radiology services:

In Hospital A: 223324 Rials and in Hospital B: 194094 Rials. The mean cost of CT scan services 600522 Rials in Hospital A and 485230 Rials in the Hospital B.

The cost of radiology in Hospital A was 24232000000 Rials and income was 21817000000 Rials, and the cost of radiology in Hospital B was 10363000000 Rials and income was 10860000000 Rials. The cost of CT scan in Hospital A: 16551000000 Rials and income: 16020000000 Rials and the cost of CT scan in Hospital B: 1070.55000000 Rials and income: 13983000000 Rials. Thus, both radiology and CT scan wards in Hospital A were loss making and in Hospital B, they were profitable (15). A retrospective study conducted by Beyranvand et al (2015) under the title of "Calculating the total cost of Physiotherapy Department of Sina Educational Hospital of Tehran according to activity-based costing and their comparison with the tariff approved in 2013". According to the results of the mentioned study, the total cost of this unit in 2013 was 794286777 Rials and its income was 1076033097 Rials. Comparing the cost and income of this unit in 2013 indicates that physiotherapy unit had a profit of 281746 320 Rials, sot it has been profitable for the hospital (16). A study was conducted by Ghanbari et al. (2015) under the title of "Comparison of dialysis service costs with government tariff, using the activity-based costing model in Imam Sajjad Hospital in Shahriar". According to the results of this study, the cost of each service in this hospital was 1051674 Rials and dialysis tariff was 734000 Rials from April to July, 858200 Rials from August to January, and 897200 Rials in February and March, so this unit has been loss-making for hospital (17). A study was conducted by Chatr Rooz et al. (2015) under the title of "Comparison of global surgical procedures costs with approved tariffs in Hospitals of Tehran University of Medical Sciences”. According to the results of this study, the mean service cost for each bill was 6066769 Rials and cost predicted in global tariff was 4346663 Rials, so the hospital lost with a mean of 1725106 Rials per bill (18).

A study was conducted by Sarlak et al. (2015) "Verification of approved tariffs of medical services compared to total cost of these services in Qom University of Medical Sciences with an activity-based costing approach". According to the results of this study, total cost of one unit of service of cesarean section is 5359395 Rials in Izadi Hospital, 4974339 in Hazrat-e Zahra Hospital with of 4218300 Rials.

Total cost of one unit of service for normal delivery is 4539553 Rials in Izadi Hospital, 3592610 Rials in Hazrat-e Zahra and its tariff was 2613600 Rials. Total cost of one unit of service for painless delivery was 4462739 Rials in Izadi Hospital and 3862724 Rials in Hazrat-e Zahra Hospital and its tariff was 3096000 Rials.

Thus, one unit of all basic services, including cesarean section, normal delivery and painless

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delivery in Izadi center is more compared to Hazrat-e Zahra center and also the tariff approved by the Ministry of Health does not compensate the total cost of one unit of main services in two centers (19). A descriptive-analytic study conducted by Hosseini et al. (2015) under the title of "Comparison of the costs of hospitalized patients' medical records in the global system with a retrospective repayment system in Iran" on 1286 medical records of hospitalized patients in the Bastak Hospital of Hormozgan University of Medical Sciences in 2012. It revealed that 18% of the cases were global in the group of women and childbirth, 81% of cases were related to general surgical procedure group and 62% of cases were related to eye surgery group. In 21% of the cases, the cost of global surgery was profitable to the hospital, which 36 percent of the differences in costs were significant. They conclude that due to the reduction in the length of stay of patients in global surgery, reviewing the repayment system seems necessary and the implementation of the prospective repayment system is recommended for other diagnostics and surgical procedures (20).

A retrospective and descriptive-analytical study was conducted by Arab et al. (2018) 2008 under the title of comparing the costs of global surgeries with real costs in a cancer institute. They examined the state of calculation of costs of 464 global surgeries in the center institute in 2003 and 2004 compared with non-global calculation of these surgeries. Their results showed that the difference between the costs of global surgery paid by insured companies to hospitals with their real costs in 2004 was reduced compared to 2003. Also, there was a significant difference between the global costs of surgical procedures with their real cost in each of the years of 2003 and 2004, and real costs were much higher than global costs. Arab et al. concluded that the reason for reducing the difference between the cost of global surgeries paid by insured companies to hospitals and their real costs was due to an increase in the awareness of physicians and accounting unit personnel and discharge on these surgical procedures and their instructions and their related guidelines, and an increase in global tariffs in hospitals in 2004 compared to 2003.

Also, a significant difference between global costs of surgeries and their real cost in each of the years of 2003 and 2004 was attributed to lack of attention to the real rate of inflation, type of hospital, the presence of comorbidities in patients in determining the amount of global tariffs. Finally, they recommended consider the factors such as real rate of inflation in the community, type of hospital, the presence or absence of comorbidities in the calculation of these tariffs (3). A study was conducted by Nooryadi et al. (2019) under the title of the role of direct cost based on the unit cost in the activity-based cost of the general hospital in a public hospital. According to the results of this study, direct cost per unit was more than indirect cost (21). A review study was conducted by Malard et al. (2018) under the title of outpatients' management in head and neck plastic and restoration surgeries in France. In this study, the main principles of outpatients' management in the French health system were identified in 2018, especially in plastic head and neck plastic surgery. The main limitation of this study was in the implementation of outpatients' medical records related to a variety of plastic and head and neck restoration surgeries. This study showed that head and neck outpatient surgeries with the aim of further care without more cost may be available for most patients, but more research is needed (10).

Najhaf et al. (2015) conducted a case study was conducted in Italy under the title of activity-based costing method for determining the ineffectiveness of health care processes. The aim of this study was to determine the methodological framework for examining how logical integration of activity-based costs of accounting system of healthcare organizations in identifying the inefficiency of its previous diagnostic treatment is related to DTP-cost and engineering re-interventions. This study showed that the business process management of activity-based costing (BPM -ABC) could produce remarkable information on the use of resources and the cost of activities with emphasis on improving diagnostic-therapeutic pathways. Second, barriers related to a previous accounting system that is based on the cost of centers can prevent the implementation of the BPM-ABC model. This study represents

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a significant reference on increasing awareness of accounting systems that play a major role in managing organizational processes (4).

Methods

Research question

Is minimum diagnostic-therapeutic pathway cost is more economical than the tariff approved by the High Health Council to diagnose the efficiency of the plastic surgeries of Bu-Ali Hospital affiliated to Islamic Azad University of Tehran, economically and strategically and in terms of policies of the Ministry of Health and Medical Education?

Procedure

Since this hospital has been active in the plastic surgical group for 5 years, the year of 2018 was randomly selected among these five years. In this regard, a study was conducted to investigate the loss of profit of this unit. The present study is applied in terms of aim and a retrospective and descriptive-comparative study that compared the minimum cost of diagnostic-therapy pathway cost with tariffs approved for diagnosing the efficiency of the plastic surgical procedure of Bu-Ali hospital affiliated to Islamic Azad University of Tehran in financial year of 2018. In the next step, for allocation of support center support for diagnostic and operational activity centers, the relationship between support centers (matrix columns) with diagnostic and operational activity centers (matrix rows) was formed using EDD matrix, so that EAD (i, j) represents the relationship of diagnostic or operational activity center I with activity support center j. According to the cause and effect relationships of these activities and stimuli, the defined cost of the EAD matrix was quantified and the share of each operating and diagnostic activity centers from the support activity center was determined and the indirect cost of shared from support activity centers was allocated to all diagnostic and operational activity centers (Bahador et al., 2016). Then, based on the stimuli in diagnostic activity centers, the cost of diagnostic centers was shared to the operational activities centers and the cost of services was extracted as bed/day. Then, the tariff that was received by the surgical group patients based on the tariffs approved according to the existing financial lists of patients was calculated as bed/day. Finally, the mean costs of hospital were compared with received tariffs Excel software, version 16, was used for required calculations.

Formula 1: The formula for calculating the shared cost of support activity centers to diagnostic or operating activity center i is as follows (22).

Table 1: Comparison of the costs of diagnostic-therapeutic pathway with approved tariffs

Results

Activity-based costing (ABC) of plastic surgical group and tariff approved to receive from patients are presented in following tables. By comparing these two tables, it is found that it has been profitable or loss making.

Table 4: Comparison of the diagnostic-therapeutic pathway cost with the approved tariff

Discussion and Conclusion

Since activity-based cost of patients in the plastic surgical group of Bu-Ali Hospital in Tehran as bed/day of patients was lower than the tariff approved, we conclude that the plastic surgical group has been profitable for hospital and the provision of services should continue. Also, a comparison between patients and staff in 2010 and 2018 indicated that the number of patients in this hospital compared to 2010 showed a mean reduction of 30%, but the number of staff showed a reduction of only 9%. Hence, it was expected that the hospital to be loss making in this unit, but the management in hospitals could have a very high impact on control of costs and quality of service provision.

It should be noted that the cost of all units of the hospital's services indicated that the cost of services varies in different units, for example, the internal unit had the lowest bed/day cost and the pediatric unit has the highest bed/day cost along the hospitalization units. For this reason, it is necessary for managers to consider these points to reform the processes and focus

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on reducing and controlling the cost of all service units so that the high cost of service provision does not have a negative impact on the quality of service provision. On the other hand, majority of studies in Iran have concluded that the cost of services provision is higher than tariffs. Given what was stated above, a 30% reduction in patients can cause serious economic challenges foe hospital. In a retrospective study in 2016, Beyranvand et al compared the cost of physiotherapy in Sina Hospital in Tehran with a tariff approved in 2013 and concluded that this unit was profitable for the hospital (16). Sherbafizadeh et al. (2018) compared the services of radiological and CT scan units in two hospitals A and B with tariffs approved and concluded that these units were loss making for Hospital A, but profitable for Hospital B (15). Kalhor et al. (2018) compared the cost of radiology services and tariffs and concluded the cost of service was higher than tariffs (13). Ghanbari et al. (2015) compared the dialysis unit services of Imam Sajjad Hospital, Shahriar, with government tariffs and concluded that this unit was loss making for hospital (17).

Jannati et al. (2017) analyzed the cost of eye surgery, and compared it with government tariffs and concluded that cost of service was higher than tariffs (14). Chatr Rooz et al. (2015) compared the cost of global surgeries with tariffs approved and concluded that global surgeries were loss making for hospital (18). Nooryadi et al. (2019) compared direct and indirect costs and concluded that direct cost was more than indirect cost (21). Zarei et al. (2020) examined the difference between the approved tariff and real cost of global surgical procedures and concluded that each surgery imposed $ 142 loss on average for the hospital (12). Sarlak et al. (2015) compared cesarean section, normal delivery and painless delivery services costs in two Izadi and Hazrat-e Zahra hospitals and concluded that the cost of services in the Izadi hospital was higher than Hazrat-e Zahra Hospital (S), and the tariffs approved by the Ministry of Health did not compensate the cost of a main service unit in these two centers (19). Abutorabi et al. (2020) compared the global surgery tariff and real costs and concluded that costs were more than that tariff of global surgery (11).

Recommendations: First, further studies are recommended in order to find solutions to reduce the cost of the service and increase the quality of service, and find the root of high cost of services in Iran hospitals. Second, it is recommended to design software to show profits and losses of units and total hospital at any moment so that hospital managers can make accurate decisions and correct the executive processes of different units.

Acknowledgements: We thereby appreciate honorable professors and staff of Faculty of Health and Research Department of Islamic Azad University of Tehran, and all staff of Bu-Ali Hospital in Tehran who helped to conduct this research.

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