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Economic Performance Analysis of Selected Military Hospitals Using Hospital Indicators and Inpatient Bed-Day Cost

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Abstract

Background: Hospitals, the main providers of healthcare services, are costly centers which account for about 80% of the health sector budget and have a huge share of resources.

Objective: This study aimed to analyze the economic performance of selected military hospitals in Tehran using hospital indicators and inpatient bed-day costs.

Methods: This descriptive, cross-sectional, retrospective study conducted in hospitals affiliated with a military medical university. Data was collected with forms completed by referring to the hospitals' finance and accounting, medical records, staffing, and logistics departments. The extracted data converted to hospital indicators using the appropriate formulas and analyzed using Excel and SPSS software with the T-test.

Results: The average bed occupancy rate (BOR) was 71%, the average length of stay (ALOS) was 2.5 days, the average bed turnover (BT) was 31 times, and the average bed turnover interval (BTI) was one day. The comparison of means of all the above-mentioned indicators other than BOR with the national standards was statistically significant ($P < 0.05$). Inpatient bed-day costs with and without capital costs were calculated to be 3 312 353 IRR and 12 253 775 IRR, respectively.

Conclusion: Higher BOR and BT and lower ALOS and BTI indicators were appropriate compared with the national standards, but the cost performance was not appropriate. An unreasonable increase in inpatient bed-day cost revealed that there were unused beds and that hospitals had no monitoring systems for revenues and expenditures. Therefore, serious attention must be given to the scientific criteria and principles of health economics to improve resource productivity.

Keywords: Hospital Costs, Military Hospitals, Healthcare Indicators

1. Background

Hospitals are the largest healthcare providers in the community. The demand for healthcare services is increasing, and thus, hospitals are considered important yet extremely costly organizations.[1,2] The statistics confirmed that treatment and hospital sectors account for 50%-80% of the health sector's financial resources in developing countries.[3] However, the share of hospital costs from health and treatment in the public sector does not exceed 40% in developed countries. Unfortunately, more than 80% of these declining resources are allocated to hospitals in which the efficiency is less than 50% of the capacity in developing countries.[4,5] Today, considering the increased number and variety of medical technologies and the increasing demand for new services, increases in the cost of healthcare services provision are inevitable.[6] The levels of efficiency and productivity are reduced, and a loss of capital and lack of labor are present in developing countries where issues related to the supply of capital and human resources are associated with non-utilization of existing equipment resulting from work and administrative practices.[4] One main problem in providing healthcare services is the issue of economics, and hospitals comprise one of the most important economic units in the healthcare of any country; thus, it seems reasonable that an important part of economic studies related to healthcare services should focus on such unit. The main reason to use scientific and practical methods in assessing hospital performances and activities is to optimize the utilization of available physical and human resources, and this has

become the goal of managers and planners in hospitals.[1,7] Hospital statistics and indicators are criteria for measuring the success of a hospital organization and determining the level of achievement of desired goals. It can be said that the improvement of hospital indicators means the efficiency and effectiveness of hospital activities, or, in other words, the proper performance of personnel and the optimal utilization of resources.[8] Experts consider bed-day cost, bed occupancy rate (BOR), average length of stay (ALOS), bed turnover (BT), and bed turnover interval (BTI) as the most important economic indicators for assessing hospital performance. The fact is that there are no detailed studies on inpatient bed-day cost to estimate treatment fees, while two of the most important factors in determining fees is inpatient bed-day cost and hoteling.[7] Previous studies have referred to factors such as high ALOS, low BOR, and low BT rates as the reasons for high costs, especially bed-day costs. For example, results of a study carried out in selected hospitals of Iran University of Medical Sciences referred to the increase in inpatient bed-day cost, ALOS, the average BTI, and the low BOR and BT as the main reasons for inefficiency and non-effectiveness and, ultimately, the non-optimal utilization of resources in the studied hospitals.[7] Shepard et al also concluded in studies in the United States that every country should design and implement costing strategies and its own methods for analyzing hospital costs based on managerial needs and accessibility to necessary information.[9] Another important point is that the elevated cost of healthcare services today has led public and private healthcare systems to show more willingness to conduct applied health economics studies[10-12] and even consider health economists as advisers and an integral part of the healthcare team.[10]

2. Objective

Considering that hospitals, especially military ones, are the most important components of healthcare centers and that less focus has been placed on inpatient bed-day costs, specifically in military hospitals, such studies seem necessary so that it is possible not only to plan services in budgeting, but also to compare the efficiency of various services, pricing, and prioritizing various services. Therefore, the present study was carried out to evaluate the economic performance of selected military hospitals in Tehran using performance indicators and inpatient bed-day costs.

3. Methods

The present research is a descriptive-analytic study with a cross-sectional, retrospective one-year design that was conducted on 3 military hospitals in Tehran. Efforts were made to evaluate data related to hospital performance indicators and bed-day costs before 2016. In the first phase, appropriate information forms with which to collect cost information were prepared based on the opinions of experts and colleagues. In the next phase, information was collected on the calculation of BOR, ALOS, BT, BTI, and components for calculating the mentioned indicators (number of beds constructed and inpatient bed count, total daily census of hospitalized patients, number of discharged patients, number of deaths before and after 24 hours, and number of those transferred from the wards) using a questionnaire the content validity of which was approved in previous studies.[8] At the beginning of the first phase, information gathering was taught to the questioner, and data collection was carried out after the necessary permissions were obtained and activities were coordinated with the relevant departments in the studied hospitals. Data was collected using information forms available at the hospitals and by referring to financial and accounting, medical records, staff, and logistics departments. The data was then converted into indicators using appropriate formulas. Finally, the collected data was first recorded in Office Excel software and next transferred to SPSS software, and relevant analyses were then carried out. The means of hospital indicators (BOR, ALOS, BT, and BTI) were compared using the one-sample T-test based on the standards presented by the Ministry of Health and Medical Education of Iran. The following formula was used to calculate the inpatient bed-day cost:

Inpatient bed-day cost = Development and capital costs - Total hospital costs/Total inpatient days

The studied hospitals were referred to as A, B, and C in order to observe ethical principles and confidentiality.

4. Results

The results indicated that the value of BOR in Hospital A during the 12-month period studied ranged from 58.36% (March) to 86.98% (April) with an average of 79.16% (SD=7.30%). The studied hospitals ranked in order of highest to lowest average BOR were A, C, and B. In hospital A during the 12-month study period, ALOS varied from 3.30 days (July) to 3.68 days (February), with a mean of 3.47 days (SD = 0.12%). The studied hospitals ranked in order of highest to lowest ALOS were A, B, and C. In hospital C within the 12-month period, BT ranged between 36.88 times (June) and 45.89 times (April), with an average of 41.39 times (SD = 3.10). The hospitals ranked in order of highest to lowest average BT were hospitals C, B, and A. The results of the present study showed that the average values of BOR, ALOS, BT, and BTI of the studied hospitals were 71.42%, 2.47 days, 30.86 times, and 0.98 days, respectively. In addition, the difference in average BOR between hospitals was small compared to the Ministry of Health standards, and it was not statistically significant ($P>0.05$); however, significant differences between the above hospitals and standards of the Ministry of Health were observed in ALOS, BT, and BTI ($P<0.05$) (Table 1).

In the studied hospitals, a total of 365 607 254 139 IRR was paid for personnel costs (i.e. salaries, benefits, overtime, and fee-for-services (FFS) of official staff; physicians' FFS, salaries, benefits, and overtime of contracted staff), with hospital A paying the highest personnel costs (254 589 678 172 IRR) and hospitals C and B paying the

Table 1. Mean and standard deviations related to BOR, ALOS, BT, and BTI of studied hospitals

Hospital/Indicator	Hospital (A)		Hospital (B)		Hospital (C)		Total		Standard	t-value	*P* Value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
BOR	79.16	7.30	62.37	8.13	72.85	5.48	71.42	9.90	> 70	0.849	0.402
ALOS	47.3	0.12	13.2	0.10	76.1	0.10	47.2	0.75	<3.5	-8.06	0.0001
BT	22.83	2.39	29.24	3.71	41.39	3.10	30.86	8.28	>24	4.90	0.0001
BTI	0.96	0.53	1.31	0.53	0.64	0.15	0.98	0.51	<2	-11.77	0.0001

second and third highest amounts, respectively. The results showed that a total of 330 887 936 004 IRR was paid for consumable (non-personnel) costs (medical and non-medical supplies, food, fuel, repair, and maintenance) and utilities. Hospital A paid the highest amount (155 730 449 337 IRR), with hospitals C and B paying the second and third highest amounts, respectively. In the hospitals under study, an estimated 111 675 578 529 IRR was calculated as the depreciation cost of medical equipment and the building. Hospitals A and B experienced the highest and lowest capital expenditures, respectively. The total cost of the studied hospitals was 808 170 768 672 IRR, with hospitals A and B accounting for the highest cost of 462 890 319 320 IRR (57.28%) and the lowest cost of 130 163 333 385 IRR (16.11%), respectively. Personnel costs accounted for 45.24% of the total costs. Personnel costs at the individual hospitals accounted for 55%, 41.49%, and 26.5% of the total costs at hospitals A, B, and C, respectively. Non-personnel costs also accounted for 40.94% of the total costs in all 3 hospitals. Non-personnel costs at the individual hospitals accounted for 55%, 33.65%, and 67.64% of the total costs in hospitals C, A, and B, respectively. Capital expenditures accounted for 13.82% of the total costs in all 3 hospitals; such expenditures accounted for 11.35%, 14.84%, and 18.5% of the total costs at hospitals A, B, and C, respectively. The results showed that the inpatient bed-day cost was 3,312,353 IRR without calculating capital expenditures in each studied hospital. This indicator had the highest and the lowest values in hospitals B (4 415 344 IRR) and C (1 431 129 IRR), respectively. The inpatient bed-day cost was figured to be 12 253 775 IRR by calculating capital expenditures in the studied hospitals. The highest and lowest bed-day cost was reported in hospital C (16 180 149 IRR) and hospital A (2 674 561 IRR), respectively (Table 2).

5. Discussion

The results of the present research revealed that the average BOR, ALOS, BT, and BTI in the studied hospitals was 71.42%, 2.47 days, 30.86 times, and 0.98 days, respectively, which are reasonable and optimal in comparison with the Ministry of Health standards.[13,14] Ebadi-Fard and Rezapour also reported BOR, ALOS, BT, and BTI values of 57%, 6 days, 31 times, and 4.5 days, respectively.[7] In a study by Sadeghifar et al, these indicators were 66.12%, 2.92 days,

Table 2. Calculation of Cost Indicators in the Studied Hospitals (costs are presented in IRR)

Component	Hospital (A)	Hospital (B)	Hospital (C)	Total
Number of constructed beds	694	153	52	899
Number of inpatient beds	599	111	50	760
Occupied bed-day	172922	25106	12244	210272
Personnel costs	254589678172	54008567170	57009008797	365607254139
Non-personnel costs	155730449337	56843071700	118314414967	330887936004
Capital costs	52570191811	19311964515	39793692203	111675578529
Total hospital costs	462890319320	130163333358	215117115967	808170768672
Percentage of personnel costs to total costs	55	41.49	26.5	45.24
Percentage of non-personnel costs to total costs	33.65	43.67	55	40.94
Percentage of capital cost to total costs	11.35	14.84	18.5	13.82
Personnel cost to occupied bed-day ratio	1472280	2151221	4656077	1738714
Non-personnel to occupied bed-day ratio	900582	2264122	9663052	1573618
Capital cost to occupied bed-day ratio	304011	769206	3250056	531100
Personnel costs to constructed beds ratio	366843916	352997171	1096327092	406682151
Non-personnel cost to constructed beds ratio	2243954601	371523344	2275277210	368062220
Capital cost to constructed beds ratio	75749555	126220225	765263311	124222000
Personnel costs to inpatient beds ratio	425024504	486563668	1140180175	481062176
Non-personnel cost to inpatient beds ratio	259984055	512099745	2366288299	435378863
Capital cost to inpatient beds ratio	87763258	173979229	795873844	146941550
Inpatient bed-day cost (without taking into account capital costs)	2372862	4415344	1431129	3312353
Inpatient bed-day cost (taking into account capital costs)	2674561	5151065	16180149	15553775

87.82 times, and 2.02 days, respectively.[14] Amerioun et al reported that these indicators in a military hospital were 79.18%, 3.47 days, 22.83 times, and 0.96 days, respectively.[8] The results of a study on public and private hospitals affiliated with Tehran University of Medical Sciences reported an average BOR of 66.67%.[15] Results of another study on hospitals affiliated with Shahid Beheshti University of Medical Sciences showed that over 86% of them had a BOR value equal to or less than 80%.[16] In a study on intensive care units in the United Kingdom, Jacob et al reported that the average BOR and ALOS in the studied wards was 79% and 4.41 days, respectively.[17] According to international standards, the most appropriate BOR in most hospitals is considered to be between 85% and 90%, with the remaining 10% to 15% including beds undergoing repairs, bed changes, and general preparation for subsequent patients.[7] In the present study, the BOR values in hospitals A, C, and B were 5%-10%, 12%-17%, and 22%-27% higher than the standards, respectively. A high BOR value indicates excessive pressure and utilization of services, which is likely to result in reduced quality of care. A low BOR value, however, indicates underutilization of the facilities. BOR is typically lower in small hospitals than in large hospitals. To ascertain the burden of activity in hospital wards, BOR must be determined in terms of measurements, specializations, and units.[18] Experts consider the following factors to be effective in lowering BOR values: (*a*) lack of specialist staff; (*b*) lack of adequate funding for recruitment of specialist staff and the inappropriate management of hospitals; (*c*) lack of full productivity of hospital beds due to poor budget program, since budget estimates are often not based on actual costs, which in turn seriously affects the healthcare sector's programs; and (*d*) cases such as job dissatisfaction, lack of a referral system, lack of coordinated patient distribution in the hospital, the provision of non-competitive services, non-allocation and combining of resources, problems in earning dedicated revenue, imbalance between supply and demand for inpatient treatment services, and incidence and prevalence changes in different seasons of the year and different regions of the country.[18]

The ALOS indicator in hospital A was about 3.5 days; a value up to the maximum of four days can be justified based on the relevant standards.[19] However, additional research would allow the realization of ways to reduce ALOS in this hospital by reviewing the admission-discharge process, comparing treatment and clinical measures for patients with national and international standards, studying the causes of readmission to hospital, imposing unnecessary treatments on patients, reducing medical errors, etc. ALOS values that are higher or lower than the optimal levels indicate unnecessary, hasty admissions and negligence in diagnosis and treatment, which would, in any case, result in increased hospital costs. This indicator is also affected by the following factors: (*a*) Patient characteristics of gender, age, socioeconomic and educational status; (*b*) characteristics of the disease (some diseases may require a longer hospital stay); (*c*) hospital characteristics (the ALOS is greater in educational hospitals than in other hospitals, and inappropriate admission and discharge procedures would affect it).[7] In most public hospitals that accept acute patients, the ALOS varies between 8-15 days. Lowering this indicator from 15 days to 10 days in a 500-bed hospital means that the hospital can serve 6000 additional patients over a year.[18] In their article on the performance of hospitals in the state of New York, McDermott and Stoke emphasized ALOS from among a set of operational and production management indicators in a hospital, because they believed that it is a key performance indicator and reflects many of the operational dimensions of the hospital organization.[20] Previous studies have also indicated that this indicator is related to cost, efficiency, quality of care, and the speed of service provision.[21-24] Therefore, this indicator can be considered as a generally appropriate indicator for measuring performance. McDermott and Stoke referred to this indicator as a tool for measuring the overall organizational performance of a hospital, especially from a strategic perspective.[20] To confirm the veracity of their view, they referred to the fact that many researchers in hospital affairs have used it widely in their research as an important tool that reflects multiple dimensions of performance such as costs,[22,23,25] quality,[21] efficiency,[24] and profitability.[26-33] The majority of studies have referred to low ALOS levels as optimal performance levels,[21,26,33] because they lead to faster treatment and discharge, better resource efficiency, and lower costs.[21,34] Different opinions have been expressed on the relationship between the ALOS indicator and quality of care[20]; however, the results of a comprehensive experimental study on 13 different types of diseases showed that lower levels of this indicator were related to better quality.[21] Based on the aforementioned findings and a study by McDermott and Stoke, the ALOS indicator is related to different dimensions of performance, and therefore, can be used as a comprehensive and valid indicator for measuring hospital performance.[20]

Hospitals C, B, and A were ranked first to third for BT indicator, respectively. The nature of specialty activities in hospital C may lead to a more significant increase in the BT of this hospital than the other two, but the differences between hospitals A and B compel further study to determine the underlying cause of their low BT values, especially that of hospital A. It should not be forgotten that the above indicator is related to other performance indicators, especially the BOR indicator. There is always a reverse relationship between the BOR and BT indicators. If the opposite is seen in the hospital chart and statistics, there can be doubts about the accuracy of information; however, there is no logical relationship between these indicators and ALOS. There is also a direct relationship between ALOS and BOR. An interesting point about the relationship between BOR and BT indicators is that if ALOS is constant at a certain time, even if BT increases, BOR will decrease. There is often a reverse relationship between the BOR rate and BT indicators, and they are directly related to

each other only when BOR is above 75%.[13]

BTI values ranked from highest to lowest were seen in hospitals C, A, and B, respectively. It should be noted, however, that this indicator is closely related to other performance indicators.[18] The higher BTI is in a hospital, the lower the value of BOR and per-bed admission ratio will be, which will ultimately increase bed-day costs. Generally, an increase in BTI will lead to an increase in empty beds per day and, consequently, impose more costs upon the hospital.[7]

In general, hospital indicators show the performance of a hospital in various fields. Therefore, it is essential to pay thorough attention to these indicators. As the most important factors showing hospital performance, they should also be regularly evaluated and compared over certain time periods.[13] According to Kunders, the use of hospital indicators such as ALOS, BT, and BOR can be effective in productivity and quality of service.[35] Moreover, by examining BOR, ALOS, BT, and BTI indicators, the performance of managers and organizations such as a hospital can be evaluated for efficiency. Hospital efficiency can be considered optimal when the values of the BOR and BT indicators are high and those of ALOS and BTI are low.[8] Therefore, BOR and BT are positive efficiency indicators, and average BTI and ALOS are negative efficiency indicators.

As the results showed, the inpatient bed-day total cost for all hospitals was 3 312 353 IRR when disregarding capital costs and 12 253 775 IRR when taking capital costs into account. These amounts are significantly higher than those obtained in other studies, which may be attributed chiefly to the secular inflation in the country. In support of this theory, a 2002 study in hospitals affiliated with Iran University of Medical Sciences showed the average inpatient bed-day cost to be 713 000 IRR[7] when taking capital costs into account.

Based on the inpatient bed-day cost disregarding capital costs, the hospitals ranked from highest to lowest capital costs were hospitals B, A, and C. Therefore, the performance of hospital C was better than that of the other 2 hospitals. One reason for this difference can be stated as the maximum use of the bed capacity in this hospital, or the performance indicator of the inpatient-bed to constructed-bed ratio, because the values for this indicator in hospitals A, B, and C were 86.31%, 72.54%, and 96.15%, respectively. Other reasons include a higher BT and lower BTI at this hospital in comparison with the other two hospitals, which resulted in the maximum use of available bed capacity and was indirectly effective in reducing the average inpatient bed-day cost. However, the interpretation of this finding should be based not only on quantitative factors and aspects, but also on qualitative factors and aspects such as the type of hospital specialty, the type and combination of patients referred, the quality of treatment, etc.

The results of calculating the cost of inpatient bed-day while taking capital costs into account showed that hospitals ranked from highest to lowest capital costs were C, B, and A, respectively. Thus, the performance of hospital A can be said to be better compared with the other 2 hospitals. Because the capital costs are calculated in this case, this group of costs is mainly considered fixed costs; therefore, by increasing the number of beds and the number of occupied beds, the fixed costs are divided. Thus, the cost effectiveness is expected to increase in this aspect, as costs decrease with increases in the number of beds and number of occupied beds, which is true for the hospitals in question. Moreover, as the results show, hospital A had a higher number of beds and number of occupied bed-days than the other 2 hospitals. The above interpretation can, to a large extent, be confirmed if the percentage of capital costs to total costs as well as the ratios of capital cost to occupied bed-day, number of constructed beds, and inpatient beds are considered in the studied hospitals. The percentage of personnel, non-personnel, and capital costs in all hospitals was calculated to be 45%, 41%, and 14%, respectively. Rezapour et al showed in their study that personnel and non-personnel costs accounted for 62% and 38% of total operating costs, respectively, in the studied hospitals.[36] In another study conducted at Qazvin University of Medical Sciences in 2009, the average financial burden imposed on the centers for each inpatient bed-day was estimated to be 345 707 IRR. The research findings showed that in educational hospitals, personnel costs account for 67%, and non-personnel and capital costs together account for 33% of the total current operating costs.[37] In a study on 495 admissions in the ICU of a pediatric hospital in Madrid, Garcia et al showed that the average fixed daily cost per patient was US$608, of which 86.3%, 9.3%, and 4.4% belonged to personnel, consumable, and construction and capital costs, respectively. The researchers finally concluded that personnel costs accounting for 62.4% of total costs were the biggest factor in increasing the costs of care.[19] In a study in ICUs in the United Kingdom, Jacob showed that the average daily cost per patient was £ 995.[17] While pointing out in their article that administrative costs are an important part of hospital costs, McKay et al stated that such costs can have a significant effect on hospital performance. They also stated that there are few studies and, thus, little information regarding these costs. Therefore, they studied these changes in a 5-year period (2000-2004) using administrative costs of acute hospitals in California. The results of their study showed that the aforementioned costs increased from 22 million to 28 million dollars on average after inflationary adjustment, while the percentage of administrative costs to total operating costs remained constant at about 23% during each of the 5 years. They also stated that administrative costs, as a percentage of total operating costs, were far higher in smaller hospitals than in larger hospitals.[38] Managers seem to be able to reduce inefficiencies in hospital costs by correcting simple management practices. Overall, the studied hospitals do not have optimal conditions in terms of cost performance. However, at least two points should be kept in mind while comparing the findings:

(A) Time serves as an effective component concerning the cost issue; thus, it is necessary to consider inflation adjustments while comparing the findings, because prices are expected to increase over time. Moreover, the value of a single unit is higher in the present time than its value in the future; thus, the inflation factor should be adjusted and then compared in order to make a real comparison.

(B) In the present study, it was not possible to separate outpatient costs from inpatient costs due to the lack of accurate and appropriate financial and accounting information. Perhaps one reason for the high average inpatient bed-day cost in the present study as compared with that in other studies is the same issue, which is one of the limitations of the present study. Experts and researchers believe that many public hospitals do not pay attention to the bed–day cost. It is not yet clear what performance many hospitals have considering a given amount of funds, human resources, and capital. Whether or not this performance shows a positive balance sheet per funds is also a question? The difference between hospitals with identical and similar conditions in terms of bed-day cost and the significance of this difference are also not clear.[7] In many hospitals, determining the cost of a bed day does not find its objective reality, and many hospitals still do not know what to do with the funds spent. This is especially neglected in public hospitals due to the provision of funding from the government budget. In other words, the high costs and low income experienced by hospitals in this sector and the subsequent income-expense gap have led to the loss of the capability of most public hospitals to reach the break-even point.[39]

As a general conclusion about the findings reported herein, it should be noted that the high BOR and BT on one hand and low ALOS and BTI on the other confirmed the optimal performance indicators of the hospitals in the current study in comparison with the standards set by the Ministry of Health; however, differences do exist between the Ministry of Health standards and the hospitals in this study in indicators such as BOR and bed BT. Therefore, the following policy suggestions can be presented:

(A) Further studies should be conducted in Hospital B to identify the cause of the BOR indicator in this hospital being lower than the national standard and implement the necessary measures to increase its value. Although the BOR value in the studied hospitals is moderately within the scope of the national standard, it should be noted that in developed countries, as in the members of the Organization for Economic Cooperation and Development (OECD), the BOR value is between 80% and 85%.[40] Thus, this issue should be the subject of additional studies order to scientifically determine the cause of the decline in the above indicator.

(B) Additional studies must be conducted at hospital A to scientifically determine the cause of the decline in the BT indicator compared with the other two hospitals as well as the national standard and to implement the necessary measures to increase it.

Research Highlights

What Is Already Known?

Costing and cost analysis is important from microeconomic prospective in hospital management. Now, the identification, monitoring and management of cost is inevitable to make the right decisions.

What This Study Adds?

There is no standard for the minimum or maximum of bed-day cost, but it is a good indicator for comparing hospitals cost performance with the same conditions.

Cost performance is not desirable in the studied hospitals. The irrational increase in the cost of a bed day indicated there was an unused bed capacity, lack of financial information, and lack of monitoring of the hospital's revenues and expenditures. In sum, the executive agency failed to manage and neglected health economics criteria. The bed-day cost is the basis for calculating the macrobudget of treatment centers at the national level. Therefore, to calculate realistic fees for medical services and thus the realistic copayments, it is significant importance to determine the daily bed-day fee. It is possible to decreases the inpatient bed-day cost and move the hospital towards the break-even point by making correct decisions, allocating appropriately the hospital resources, and by increasing managers' level of knowledge about performance indicators and directing their thinking toward improving them.[7]

6. Conclusion

In general, the high inpatient bed-day cost, low bed constructed to inpatient bed ratio compared to the standard level (95%), low BOR and BT values in international comparisons, and in short, the weaker performance and lower efficiency indicators in the hospitals in question indicate the under-utilization of available resources. Thus, managers of the studied hospitals need to take urgent measures to identify the factors affecting the dramatic increase in costs and decreases in performance indicators. To this end, determining and evaluating unnecessary hospital admissions is a practical recommendation, because according to the results of global research, a significant number of hospital admissions are unnecessary, which indicates the under-use of hospital beds. Furthermore, management and the calculation of the utilization coefficient is a method used to study the utilization of resources and hospitals beds and to improve them.

Authors' Contributions

All authors contributed equally in this study.

Conflict of Interest Disclosures

The authors declare that they have no conflicts of interest.

Ethical Approval

The research has been approved by the BMSU's Ethics Committee (No: IR.BMSU.REC.1396.685).

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