Journal of Engineering, Management and Information Technology

ASPUR PUBLISHING

Vol. 03, No. 02 (2025) 101-112, doi: doi:10.61552/JEMIT.2025.02.004 - http://jemit.aspur.rs

FINANCIAL KEY PERFORMANCE INDICATORS (KPIS) IN HOSPITAL: A REVIEW STUDY

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Received 18.01.2024.
Revised 21.03.2024.
Accepted 22.04.2024.

Keywords:

KPI, Financial Key Performance Indicator, Hospital.

Original research

A B S T R A C T

This study is a comprehensive and in-depth review using documents and reviewing library resources and searching Persian and English articles through the Internet by entering the desired keywords in reliable information banks including ISI Web of Sciences, PubMed, Scopus, ProQuest, Elsevier, Civilica, MagIran., Google Scholar and Google search engine in the period from 2000 to 2022 and after applying the entry and exit criteria, it was selected and analyzed.

Key performance indicators in 8 areas of liquidity (10 indicators), profitability (11 indicators), capital structure (11 indicators), income (29 indicators), cost (44 indicators), efficiency-assets (10 indicators), safety (1 indicator) and others (25 indicators) were categorized. Cost and income indicators were among the most important indicators of all the studied articles, respectively.

Considering that cost and income indicators are among the most important indicators, hospitals need to monitor financial performance and predict financial problems in order to reduce costs, increase income and continue operations. The use of financial indicators, especially cost and income indicators, will reveal problems.

Also, paying attention to key indicators of financial performance in order to design accounting and financial management dashboards doubles the importance of determining and using them.

1. INTRODUCTION

The mission of each hospital is to provide special health services that can solve patients' health problems in the best and most economical way. In as much as performance refers to efficiency, effectiveness and quality, awareness of the hospital's performance means an understanding of how to carry out its mission (Ioan et al., 2012). One of the performance measurement criteria is the *key performance indicators* (KPIs) (Barr, 2014). They are in fact tools and criteria for measuring the progress and determining the efficiency and effectiveness of the performance of organizations in line with their goals (Gonzalez et al., 2017; Reiesi Nafchi et al., 2014). These indicators must be specific, measurable, achievable, relevant, and time-bound so as to ensure the success of the organization and improve its performance (Murphy et al., 2016). Also, in the case of not reaching a final agreement on the concept and application of these indicators in any organization regardless of organizational goals, they not only fail to serve as an incentive for organization to focus on effectiveness and efficiency, but also cause chaos (Warren, 2011). Indeed, the indicators can be leveraged to identify the gap between the current and desired performance of the organization (Weber & Thomas, 2005).

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The KPIs are generally divided into two distinct categories: financial and non-financial (Sawang, 2011). Consuming more than 50% of the total health resources, the hospitals nowadays have been recognized as an important unit of the healthcare system (Rahimi et al., 2017). Due to the beginning of the growth of the importance of the financial structure of hospitals in Iran in 2013 and the special view of the government towards the health sector and the implementation of the health system transformation plan, which has caused an increase in various diagnostic, treatment and hotel costs in hospitals, therefore attention to It has exposed financial indicators in hospitals more than before (Ameen & Ahmad 2011; Mazdaki et al., 2019; Tabibi et al.,2009). Effective financial indicators, due to the information they provide in relation to the vital activities, resources and costs of the organization, increase organizational knowledge and as a result analyze the organization's financial situation and identify problems and predict the financial situation (Abdalshah et al., 2015). By predicting and analyzing the financial situation of the hospital, paying attention and recognizing these indicators and comparing the results with standards and other similar organizations, it is possible to identify and understand the gaps better in order to increase profitability, reduce costs, improve service delivery. , deficiencies and improvement of the strategic plans of the organization in terms of quantity and quality and planning to support innovation in every organization, which is useful not only for hospital managers but also for policy makers at the level of the Ministry of Health and Medicine (Allahverdi 2011; Ameen & Ahmad, 2011; Suarez et al., 2011; Rahimi et al., 2017).

On the other hand, the lack of knowledge of these indicators leads to the use of inefficient systems, failure to reflect the goals of the organization and the creation of negative changes, which causes waste of time, cost, resources and the provision of low-quality services (Weber & Thomas 2005; Jahanbakhsh et al., 2018;).

Henceforth, considering the lack and waste of financial resources in hospitals, the better the recognition of these financial indicators and the higher their application in the hospital management, the superior is the organization performance. This in turn indirectly promotes the hospitals performance in the health system (Mazdaki et al., 2019).

Although numerous studies have been conducted on the performance of the health and medical care sector of Iran, there is relatively little research into the key indicators of hospital financial performance. It is also noteworthy that failure to provide a definition and calculation method for the indicators has sometimes resulted in some differences in calculations in similar studies. Taking these into account, the present study aimed to provide the financial KPIs that can be exploited in health organizations, especially hospitals, along with the provision of a definition and calculation method for each one of them.

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(Abdalshah et al., 2015), conducted aParametric Study on Design of P.E building Using IS-800-2007 steel code and AISC 360-2010, 13th edition.

Janati et al., (2014), did a comparative study of PEB by designing a P.E.B & C.S.B using IS-codes &American codes and found that the design of PEB and CSB structure using an AISC code gives 3% to 10% light weight sections as compared to IS-codes.AISC code has less factor of safety compared to IS- code. Being a less factor of safety, AISC code resulting a light weight sections which is not suitable for india to erect the pre-engineered building.

2. METHODOLOGY

In general, in this review study, the search keywords were explored and examined based on research objectives and by using the Persian and English keywords presented in Table 1 in the relevant scientific databases. Further, this study tried to use a single search strategy with connective letters and/or a combination of these keywords using logical operators such as AND and OR in the various databases. It is worthy of note that the criteria considered for the inclusion of articles were as follows: having a title relevant to the research topic, being published in the period 2000 to 2022, the possibility of access to the full text of the article and the language of the article (English and Persian). In the same vein, the exclusion criteria included not introducing any indicator, having content and presenting an indicator irrelevant to the research. The process of screening and the results of the search was as follows: at first, the titles of the articles were evaluated according to the entry criteria, and after searching, 94 sources were obtained. Then, by reviewing the abstract of the article, irrelevant articles were deleted, and finally, by applying the exclusion criteria, only 35 articles were reviewed, and after reviewing the articles and extracting the indexes, completely duplicate indexes (with the same titles) were removed, but to be sure after completely removing duplicate indicators, in the second step, the identity card of the remaining indicators was prepared (including the definition and presentation of the calculation method). By searching the retrieved sources and reliable accounting websites, the calculation formula and definition of each of these indicators were extracted and compiled. Then, in the third step, using the formula and definition of indicators, other duplicate indicators were removed. Finally, the remaining indicators were categorized based on the texts in different fields (refer to Figure 1). It should be pointed out that out of the remaining 141 indicators, an appropriate formula and definition were found for 100 indicators. However, no suitable formula and definition were discovered for the other 41 non-duplicate indicators. As a consequence, a total of 100 indicators were identified that have been presented in Table 3.

Table 1-Search Strategy Table

Keyword	**Substitute Keyword**	**Search Period**	**Search Language**	**Type of search scientific resources**	**Inclusion & Exclusion Criteria**	**Search Scientific Databases**
Key Performance Indicator (KPI)	Key performance index, KPI	2000-2020	Persian & English	Article, books and valid websites	Inclusion criteria, including: 1. Relevant title 2. Published in period 2000-2020 3. Access to the full text of article 4.Article language (Persian and English)	ISI web of sciences
Financial information system	Finance information system, Fiscal information system				Exclusion criteria, including 1- Non-existence of indicator 2- Irrelevant content Irrelevant indicator	PubMed
Accounting information system						ProQuest
Health						Elsevier
Hospital						Scopus
						Civilica
						Google Scholar
						Mag Iran
						Google search engine

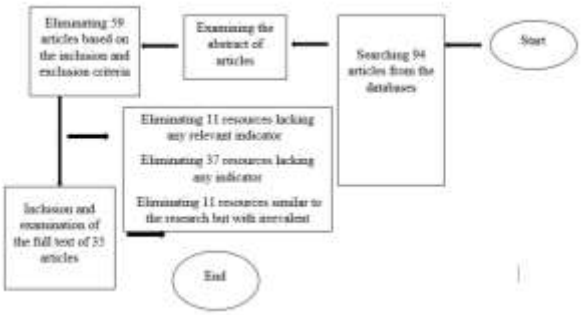

Figure 1. Process of articles elimination

3. FINDINGS

On the basis of results obtained from reviewing and extracting information from the included articles, the majority of the studies successfully have identified the financial KPIs of any organization focusing on the organization's strategic plan. The identification of indicators in the examined research has been realized via different techniques, including examining the status of the relevant organization, holding numerous meetings with organization's financial managers and managers, using methods such as balanced scorecard (BSC) (5 articles), Delphi technique (5 articles), Analytic Hierarchy Process (AHP) technique (10 articles), focus group discussion session (5 articles) and other methods. From among the indicators extracted from all articles were cost indicators (31.2%) and revenue indicators (20.5%). The cost indicators (31.2%) and revenue indicators (20.5%) were two indicators extracted from all the articles. Similarly, nearly 21 articles had cited the profitability indicators (7.8%) while 14 articles had made reference to liquidity indicators (7.09%). Besides, capital structure indicators (7.8%) and efficiency-assets indicators (7.09%) have been introduced in 7 and 8 articles, respectively. In contrast, only 1 article has dealt with safety indicators (0.7%). In addition to the mentioned indicators, all articles introduced miscellaneous indicators which were subsumed under the others area (17.7%) by the authors.

After reviewing the articles, 369 key performance indicators were extracted from them. In the first step, after checking the obtained indicators, 173 duplicate indicators (with the same titles) were removed. Then, using the prepared birth certificate (using the formula and definition of indicators), 55 duplicate indicators were removed.

Finally, the remaining 141 indicators according to the texts in 8 areas of liquidity (10 indicators), profitability (11 indicators), capital structure (11 indicators), income (29 indicators), cost (44 indicators), efficiency-assets (10 indicators), safety (1 indicator) and others. (25 indicators) were categorized (Table 3).

Finally, it should be said that most of the studies conducted in the field of health had provided key indicators of financial performance in this field. However, the current research tried to collect and present key indicators of financial performance in the field of health for easy decision-making by users, especially managers and financial managers of hospitals. Also, the definition and calculation method of each of the indicators was presented in order to increase the information about the key indicators of the financial performance of this area for the correct use of each indicator (see Table 3). It should be noted that among the remaining 141 indicators, 100 indicators that had a suitable formula or definition were presented (Table 3).

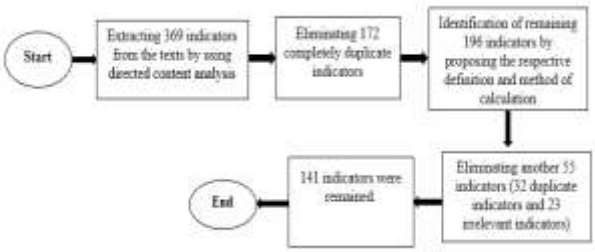

Figure 2. Process of indicators elimination

Table 2. Identified Financial KPIs

Indicator	Number of indicators	Percentage (%)
Liquidity indicators	10	7.092
Profitability indicators	11	7.801
Capital structure indicators	11	7.801
Revenue indicators	29	20.567
Cost indictors	44	31.205
Efficiency-assets indictors	10	7.092
Safety	1	0.709
Other indicators	25	17.730

4. RESULTS AND DISCUSSIONS

Employing a review study, the present research focused on examining the key indicators of hospital financial performance. At last, all the indicators were identified and categorized into 8 areas, namely liquidity (10 indicators), profitability (11 indicators), capital structure (11 indicators), revenue (29 indicators), cost (44 indicators), efficiency-assets (10 indicators), safety (1 indicator) and others (25 indicators). This categorization was done based on the texts after eliminating the duplicate indicators. Today, different sections of society, especially hospitals, tend to maintain the optimal performance of their economic and financial system; nevertheless, it is unfortunately observed that some hospitals continue to face the problem of insufficient hospital revenues to cover their fixed, current and development costs. Given the complexity of the processes in the cost and revenue system of hospitals, the intervention of the hospital managers will not lead to improvements in the economic processes of hospitals unless they follow the scientific models (Mirzaei et al., 2015). In consequence, by determining the KPIs, the hospital can be assisted in achieving its strategic goals. In a study, according to Wadongo et al. (2010), the use of KPIs in the presentation of organization's vital information will allow tracing and procasting the organization's financial performance when moving towards its strategic goals. In the same vein, study, Saghaeiannejad-Esfahani et al. (2015), have asserted that the hospital indicators should comply with the needs of the country and available infrastructures and hospital information systems. On the other hand, given that hospitals account for the bulk of the healthcare costs in most countries, there is an ample scope for improving the management of these financial resources (Jahanbakhsh et al., 2018). Zeng et al. (2013) in their study concluded that each country should want and be able to design and implement its own specific costing strategies and methods for analyzing hospital costs based on management needs and access to vital information. In this regard, collecting the necessary data from many countries to calculate the costs of hospital services units, the World Health Organization (WHO) has reported that costs of services units greatly vary among the countries.

Hegazi and his colleague have also stated that even though there exist various methods of analyzing the financial performance of an organization, the use of KPIs is known as the most popular and significant method. Additionally, according to Rahimi et al. (2017), the identification of hospital indicators will assist with determining and measuring the performance of the hospital in different wards. Thus, it is certainly necessary to give due consideration to hospital indicators. They classified the hospital indicators into 4 areas, including finance, internal process, learning and growth, and client (patient). Identifying the hospital KPIs is also an opportunity for managers to detect the hospital critical areas to reduce costs. In the present study, approximately 31.2% of the indicators are cost indicators, accounting for the largest portion. Applying these indicators (i.e. cost indicators) will allow planning for cutting the hospital surplus costs. It should also be mentioned that based on another study by Sajjadi et al. (2011) when determining and examining the organization status, it is essential to ensure the validity of the indicators and their calculation accuracy so as to meet the requirements of accurate and proper evaluation and judgment and to avoid any hasty conclusion. Moreover, since each indicator is calculated as per a scientific and valid formula, each indicator is considered as an information system like the statistical information system. Consequently, the calculation accuracy of the indicator must be taken into account more than ever (Saghaeiannejad-Esfahani et al., 2015).

To accurately determine the financial performance of a hospital, Burkhardt and Wheeler (2013) in their study have measured five indicators of returns on assets profitability, returns on investment, return on equity, cash flow and profit margin (total margin + operating margin) as the most important indicators. By comparison, only about 7.8% of the total indicators identified in this study belonged to the category of profitability indicators. Profitability indicators measure an organization's capacity in generating the returns on resources.

In the study by Kryukov and Strauss (2009), the net profit margin indicator was the most important indicator introduced in this area. The liquidity indicators presented in the Kryukov and Strauss's (2009) study measure an organization's capacity to pay off its debts as they mature with the quick ratio indicator being the most important indicator introduced. In the present study, about 7.09% of the indicators belonged to this domain. The next indicator identified in this study was the safety indicators. These indicators have only been addressed in Kryukov

and Strauss's (2009) study and there was no reference to them in other studies. Besides, as this indicator reflects the level of vulnerability of the organization against risk and debt, it has been introduced as one of the popular indicators in the study by Kryukov and Strauss (2009). The most important and only indicator in this area is debt to equity indicator. Further, the next area is efficiency-assets indicators (about 7.09%), the most important of which is sales to total assets. Using indicators of this area, managers can better evaluate the assets of their organization and plan for their optimal use. On the other hand, financial indicators can determine not only the financial but also the non-financial aspects of an organization.

The difference between the key indicators of each organization compared to another organization mainly stems from the differences in the management, structure and operational and strategic goals of that organization (Kryukov & Strauss 2009).

In their study, Mirzaie et al. (2017) classified the indicators teachable for the hospital managers into 9 areas, from which the indicators of profitability, liquidity and capital structure enjoyed the highest priority, respectively, for being taught to the hospital managers. Also, to apply these indicators for comparison purpose, evaluation of financial performance and analysis of hospital status, their nature and mission should be considered. The share of capital structure indicators in the present study was found to be about 7.8%. These indicators measure the capability of meeting the long-term debts and how the organization's capital assets (equipment) are maintained (Pink et al., 2007). Likewise, Pink et al., (2006) have subsumed the indicators under 5 distinct areas of liquidity, capital structure, cost, productivity and revenue. Accounting for nearly 20.5% of the indicators extracted in this study, the revenue indicators evaluate the revenue of organization earned via different resources.

To conclude, it should be noted that the financial performance indicators measure different aspects of financial performance. All the information obtained from measuring different indicators are prerequisite for making judgment on the financial structure and performance of a health organization. The liquidity indicators, for instance, may warn of a problem in paying bills, or revenue indicators may introduce a new source of revenue. Furthermore, the capital structure indicators provide information on the existence and increase of the organization's debt (Pink et al., 2007). Therefore, in Janati et al. (2014). study, paying due attention to the financial indicators has been enumerated as an effective tool for monitoring the financial situation and predicting the possible financial problems of the organization. By using the identified financial KPIs of the hospitals, the health managers and policy-makers can achieve goals such as realizing the economic management of hospitals, making efficient decisions for the optimal management of hospital affairs, making the total cost of hospital services transparent and ultimately making the hospital products and services competitive.

Table 3. Identified Financial KPIs

Row No.	Indicator	Definition	Calculation Formula
Liquidity Indicators			
1	Current Ratio	It indicates the organization's ability to pay off its short-term debts by using its short-term assets (cash, inventory, accounts receivable). The higher this ratio, the higher is the organization's capacity to pay off its debts.	Current assets/current Liabilities
2	Days cash on hand	This solvency indicator measures the number of days an organization can pay its cash operation expenses if none of the accounts receivable were collected. This liquidity indicator shows the minimal survival period of an organization.	(Cash + marketable securities + unrestricted investments)/ [(total expenses-depreciation)/days in period]
3	Net days revenue in accounts receivable	According to Formula	(Net patient accounts receivable)/(net patient service revenue/days in period)[90]
4	Accounts receivable (days)	It is a measure of the efficiency of the collections function.	(Accounts Receivable – allowances for uncollectible) / (Total Operating revenue / 365)
5	Average payment period (days)	It is a measures of how efficiency an organization pays its bills.	Total current liabilities / ([Total operating expenses + Total other expenses - Depreciation] /365)
6	Replacement viability	According to Formula	Restricted plant fund balance+ unrestricted investments)/price-level adjusted accumulated depreciation
7	Acid test ratio	It indicates whether the business has sufficient short-term assets to cover its immediate liabilities.	(cash +marketable securities)/ current liabilities
8	Quick ratio	The scale is an alternative to liquidity and is similar to current ratio. However, it does not include the inventory in the current assets as they may not readily be convertible into cash. Quick ratio represents a more accurate overview of an organization's financial health compared to the	(total current assets –inventory)/ total current liabilities

		current ratio, because it ignores liquid assets such as inventory.	
9	Inventory turnover ratio	It indicates how a company sells and replaces its stock of goods during a particular period. Therefore, it shows the production capability of the organization.	Sale/inventory or cost of sold goods/average inventory
10	Accounts Payable Turnover	It indicates the average payment rate of an organization to the suppliers, banks and other creditors. If the turnover ratio decreases compared to previous periods, it may indicate that an organization has problems in paying off its debts, and if it increases, it means that the organization is making its payments faster than before.	Total purchases of suppliers / (start of accounts payable + end of accounts payable) / 2)
Profitability Indicators			
11	Total margin	The total margin examines the organization's revenue as a function of its costs. Unlike operating margin ratios, which account for only the revenue from business activities, the total margin ratio includes the revenue of all resources. The high ratio shows that an organization controls its costs and makes a profit. While any type of organization can use its revenue and expense accounting data to calculate the total margin ratio, this ratio is particularly common in the healthcare and public accounting industries.	Net income/total revenues
12	Cash flow margin	This indicator measures the organization's ability to generate resources to meet its current debts.	((Net income − (contributions, investments, and appropriations)) + depreciation expense + interest expense)/(net patient revenue + other income − (contributions, investments, and appropriation))
13	Return on equity	This indicator shows the capacity of a business that can generate high profits for the investors by taking advantage of effective investment. Return on equity indicates how much revenue an organization generates for each unit of stock it generates.	Net income/fund balance or Excess of revenue over expenses / fund balance [80]
14	Operating Margin (%)	This profitability indicator shows income derived from patient care operations. It is use to assess the extent to which the organization is using its financial and physical assets to generate a profit.	(Total operating revenue - total operating expenses) / Total operating revenue * 100
15	Return on assets	The organization invests in its organization to provide services and generate financial resources in the future by using its assets. This indicator is increasingly used to measure the performance of individual projects or investments within the organization as well as the performance of the organization as a whole. Return on assets reflects how the organization has used the resources and assets at its disposal to make a profit and generate returns for its investors and creditors.	Net income/total asset Or Average assets/net profit * (100)
16	Return on investment	It is a performance measure used to evaluate the performance of an investment or to compare the performance of a number of different investments.	(Revenue and gains in excess of expenses and losses + depreciation +interest) / Price-level adjusted total assets
17	Net profit margin	It shows the income of an organization in comparison with the profit of that organization and the manner of significant progress of the organization.	Net profit/income
18	Gross profit margin	It is a great indicator of the financial health of the organization and indicates whether a business is able to pay its operating costs, while seeking progress.	Gross Profit /income
19	Net profit	The amount of money that is returned from the sale of goods and services to business customers, with the exception of commercial goods, and any discounts or benefits offered to the customers. This income can be obtained in the form of cash sales or credit sales.	Income of the financial period - Income acquisition expenses during the period
Capital Structure Indicators			
20	Equity financing	It refers to the shares financing for the purpose of issuing shares and the process of raising capital through the sale of shares to investors so as to support the business operations of the organization. By selling stocks, individuals sell their property in their organization instead of cash.	Fund balance/ Total assets

21	Debt service coverage	In organizational finance, debt service coverage is the measurement of cash flow to pay off the current debt.	(Net income+ depreciation expense+ interest expense)/ ((current portion of long-term debt * Days in period/365) + interest expense)) or (Revenue over expenses+ depreciation + interest) / (Current portion of long-term debt + interest expenses)
22	Long-term debt to capitalization ratio	Long-term debt to capital ratio is one of the traditional types of debt-to-equity ratios that shows financial leverage of a company.	Long-term debt/ (Long-term debt + fund balance) or Long-term debt / (Long-term debt + equity)
23	Total debt/total asset (Debt ratio)	The ability of the organization to compensate for all its outstanding debts. Debt ratio measures the sum of liabilities relative to the sum of assets. This ratio indicates the percentage of funds secured through debts.	Total liabilities / total assets
24	Cash flow to total debt	It demonstrates the ability of a business to support the debts from its operating cash flows. This is a type of debt coverage ratio. A higher percentage indicates that the business is likely to be able to support its current debt.	(Net income + Depreciation expense) / Total liabilities
25	Long-term debt to equity	This ratio indicates how much of the financial resources are obtained by debts compared to the funds provided by the owners. This ratio is an important criterion of the ability to pay debts as the high amount of debt in the capital structure can create problems for the payment of interest and the principal debt at maturity.	Long-term liabilities / fund balance
26	Long-term debt to total assets	It indicates the percentage of the organization's assets that are secured by long-term debt and includes loans with maturity more than one year. This ratio includes a general component of a firm's long-term financial condition, including its ability to meet its financial obligations for long-term loans.	Long-term debt/total assets
27	Fixed assets financing	Making investment in fixed assets involves allocating funds for longer periods in the future and is often difficult and costly due to rising prices. Fixed assets represent a permanent investment of funds; As a result, they must initially be funded by the owners of the fund or the owners' funds.	Long-term liabilities /Net fixed assets
28	Capital expense	Capital expenditure is the financial resources used by an organization to earn, upgrade, and maintain physical assets such as property, buildings, and equipment.	(Interest cost + depreciation cost) /(total costs) * 100
29	Cash flow to assets	Cash flow (cash) refers to the activities and operations of an organization to the total assets.	(Cash from Operations\ Total Assets)
		Revenue Indicators	
30	Outpatient revenues to total revenues	According to Formula	Total outpatient revenue/Total patient revenue
31	Patient deductions	According to Formula	(Contractual allowances + discounts)/Gross total patient revenue
32	Non-operating revenue	Non-operating income is the portion of an organization's income that comes from activities unrelated to its core business operations, which can include items such as profit or loss on investment, profit or loss on foreign exchange, and impairment of assets.	Non-operating revenue/Operating revenue
33	Drug revenue to total revenues	The share of total revenue coverage of pharmaceutical revenue	Pharmaceutical income / Total income
34	Drug revenue to drug expense	The amount of coverage of pharmaceutical costs from pharmaceutical revenue	Pharmaceutical income / total pharmaceutical cost
35	Revenue per client	Assess the revenue capacity of the hospital over time or relative to other hospitals.	Total revenues \total clients
36	Revenues per capita	Compare tax and fee revenues over time or relative to other governments	Total revenues \total population
37	Total medical revenues as a percentage of total revenues	The amount of coverage of total revenues from total medical revenues	Total medical revenues\total revenues
38	Operating surplus (or deficit)	It indicates the surplus or deficit obtained from production prior to deducting any interest, rent or other payable charges on financial non-produce assets.	Total revenues\total expenditures

39	Budgeted revenues received as a percentage of budgeted revenues in annual operating budget	According to Formula	Budgeted revenues received \ total revenues in annual operating budget
40	Inpatient revenue to total revenue	The amount of total income coverage from the income of hospitalized patients	Inpatient income/Total income
41	Operating income	Sales revenue. Operating income, also called operating profit or operating before interest and taxes indicates the amount of residual income after deducting direct and indirect operating expenses from sales revenue.	Total revenue - Direct costs - Indirect costs Or Gross profit - Operating expenses - Depreciation of tangible and intangible assets Or Net Function + Interest Cost + Tax
42	Days of revenue in accounts receivable	According to Formula	Accounts receivable balance \ total customer balance/365 days
43	Inpatient gross revenue (%)	Hospital revenue typically consists of inpatient and outpatient services. This measure reflects inpatient revenue as a percentage of total.	Total inpatient revenue / Total inpatient revenue
44	Outpatient gross revenue (%)	This indicator represents outpatient revenue as a percentage of the total for both inpatient and outpatient services.	Total outpatient revenue / Total outpatient revenue
45	Revenue growth rate	Growth rate refers to the change in the percentage of a particular variable over a specified period of time and considering a specific context. For investors, the growth rate typically represents the annual growth rate of an organization's revenue, dividends, or even macro concepts such as gross domestic product (GDP) and retail. The revenue growth rate is a comprehensive indicator of the speed of starting the business of an organization.	Income from service in this period / Income from service in the previous period
46	Revenue	It represents the increase in capital resulting from the sale of goods or services to customers.	
47	Earnings per share (EPS)	It represents an organization's net income per each share of shares.	Net income minus dividends / weighted average number of shares
48	Average collection period	The time it takes to collect billing amounts from customers. This index is calculated to ensure that there is enough money to meet the financial obligations of the organization.	Average accounts receivable / (Annual sales/365)
49	Dedicated revenues to total financial resources	It determines the share of total financial resources of allocated revenue.	Allocated revenue/total financial resources
50	Dedicated revenue to total expenses	It determines the amount of coverage of expenses from the allocated revenue.	Allocated revenue / total expenses
51	Revenue per discharge	It determines the income of each patient discharge.	(Net Patient revenue + Non-Patient revenue) /Adjusted discharge
Cost Indicators			
52	Salaries to total expenses	It determines the share of salary costs in the total costs of the organization.	Salary expenses/total expenses
53	Average age of plant	According to Formula	Accumulated depreciation / (Annual depreciation fee × 365/day in the period)
54	FTEs per adjusted occupied bed	FTE: The ratio of the total number of hours spent in a period (part-time, full-time, contract) to the number of working hours in that period. (Her, this indicator shows the workload of the person or the bed.)	(Number of FTEs / [((Inpatient days − NF swing days − nursery days) * (total patient revenue/(total inpatient revenue − inpatient NF revenue − other LTC revenue)))/days in period
55	Average length of stay (days)	The indicator describes the average stay of all or a class of inpatient discharged over a given period. It is use as an indicator of efficiency in containing inpatient service costs.	Total patient days / total discharges
56	Total expenses to the total financial resources	It determines the ratio of total financial resources to total expenditures.	Total expenditures/total financial resources
57	Drug and supply expenses to total expenses	It determines the share of costs paid for the medicine and supply.	Drug and supply expenses/Total costs
58	Welfare personnel costs to total hospital costs	It determines the share of hospital costs that are spent on staff welfare expenditures.	Employee welfare expenses / Total hospital expenses
59	Training expenses to total hospital expenses	It determines the share of hospital costs spent on training costs.	Training costs / Total hospital costs
60	Expenditures per capita		Total costs/total shareholders
61	Ratio of full-time staff to occupied beds	It determines the ratio of full-time personnel to occupied beds.	Full-time staff /occupied beds
62	Ratio of capital expenditures to current costs	It determines the share of current expenditures that are spent on capital expenditures.	Capital costs/running costs

63	Overhead Cost Percentage	It includes indirect costs of sales, execution, and production, meaning they cannot naturally be attributed or linked to a specific commodity, source of income, or organizational unit.	Overhead costs / total costs
64	New investments to total expenses	It determines the share of total costs that are spent on new investment costs.	New investments / total costs
65	Percentage of personnel expenses to total financial resources	It determines the share of total financial resources spent on personnel costs.	Percentage of personnel costs / total financial resources
66	Percentage of personnel expenses to total expenses	It determines the share of total costs that are spent on personnel costs.	Percentage of personnel costs / total costs
67	Personnel expenses to total dedicated revenues (excluding drug revenues)	It determines the share of total dedicated revenue that is spent on personnel costs.	Personnel costs / total dedicated revenue (excluding drug revenue)
68	Expended charges for Global surgeries to received revenue for Global surgeries	It determines the share of revenue generated for surgeries spent on surgery costs.	Expenditure on global surgeries / Earnings on global surgeries
69	The total cost of staff salaries for overtime	It determines the share of overtime expenses accounting for the payable costs.	Total costs paid / staff salaries for overtime
70	Expense per discharge	It determines the cost of each discharge.	Total operating expenses + other expenses) / adjusted discharge
71	Average insurance claim processing time and cost	It indicates the average time and cost spent on processing various receivables.	
72	Average treatment charge	It indicates the average amount that a center spends to treat a patient. This indicator measures the effectiveness and efficiency of organization's treatment.	
Assets Efficiency Indicators			
73	Total asset turnover	Fixed turnover and total return on assets are two factors used to evaluate the effectiveness of management in generating sales of assets investment. Total asset turnover measures the efficiency of managing all the assets of an organization.	Total operating revenue / Total assets
74	Fixed asset turnover	Fixed assets turnover determines the efficiency of long-term investment and considers only the organization's investment in property, plant and equipment, and capital-intensive is of high important for the organization.	Total operating revenue / Net fixed assets
75	Current asset turnover	Current turnover shows the organization's effective use of its current assets for revenue generation and productivity.	Total operating revenue / current assets
76	Maintained bed occupancy (%)	This indicator is a measure of the volume and utilization of inpatient services.	Total patient days / (total beds×365)
77		One of the simplest and most widely used definitions of performance is "doing the right thing." Efficiency shows us when we have reduced the resources or time required to complete a process; hence, we need this indicator in marketing and the business process.	(Cost / Income Structure) * 100
78	Sales to total assets	It determines the share of total assets spent on service provision costs.	Sales (services) / Total assets
79	Assets	Assets refers to anything valuable or a source of value that can be converted into cash. Individuals, companies and governments are each an asset.	Debt + shares
80	Available beds to licensed beds ratio	According to Formula	Available beds / Licensed beds
81	Number of surgeries to operating rooms	It indicates that the operating room beds are active. (Ratio of surgeries performed in one period to the operating room's beds of the same period)	Number of surgeries / Operating rooms
82	Depreciation rate	It means the reduction of the value of a fixed asset due to factors such as the passage of time, erosion caused by work, change in technology, etc..	(Total cost - scrap value) / Useful life
Safety Indicators			
83	Debt to equity	It measures the outstanding debt of the hospital for each Rial of investment in the organization.	Total long-term debt / Total stock value
Others			
84	Contractual allowance write-off (%)	The difference between hospital charges for a service and the amount actually paid is referred to as the contractual allowance. Generally, it is a discount regulated by governmental programs such as an insurance company.	Total contractual allowances/Total patient revenue

85	Debt per capita	It monitors the outstanding debt change over time or relative to other organizations.	Total long-term debt/total shareholders
86	Gross profit	It indicates the money that is resulted from the total sales revenue after deducting the cost of goods sold and sales returns or sales discounts.	Sales revenue/Total cost of the product
87	Added value	It shows the excess wealth generated by the organization through the process of production or service delivery, which is obtained by deducting the intermediate inputs (such as purchasing costs) from revenue. For instance, inputs such as cables, switch centers, and specialized manpower in a process generate a new value (customer service) that actually adds to the value of our inputs.	Sales revenue - (total expenses - employees costs) / Number of employees
88	Ratio of total revenue to total costs	It determines the share of total hospital costs that cover total revenue.	Total revenue / Total costs
89	Operation Cash Flow	It indicates the cash that is obtained from the continuous activities of the organization and these funds are used in various cases according to the opinion of the board of directors.	Operating profit - (+) Changes in current assets + (-) Changes in current liabilities + Depreciation
90	Free Cash Flow	It is equivalent to cash flow payable to the capital suppliers of the organization (including shareholders and lenders) after payment of all operating expenses and necessary investments (including: working capital and fixed assets).	Operating cash flows - Gross investment in capital assets (Gross investment in capital assets = Net investment in capital assets + Depreciation) Or Operating cash flow - Investment costs
91	Operating Cash Flow	It shows the total amount of money generated by an organization's daily business operations. This indicator reflects whether an organization is able to generate positive cash flow for growth or requires external financing to cover all costs.	Net revenue + Noncash expenses - Increase in working capital Or Net revenue + Compensation based on shares + Deferred tax + Other noncash items - Increase in Accounts Receivable - Increase in inventory + Increase in payments hub account + Increase in added costs + Increase in deferred revenue
92	Debt Financing Percentage	According to Formula	Total Assets -Net Assets / Total Assets
93	Staff Turnover	According to Formula	(Contract staff + Employment staff)/Average staff) * 100
94	Time interest earned	It is a measure of an organization's ability to meet its debt obligations based on its current revenue.	Revenues before interest and taxes/Interest expenses
95	Payback period	The repayment period is the time required to receive cash from a project to offset the initial cash flow.	Predicted annual cash flow / Expected initial cost for assets Or Annual cash flow - the initial cash flow (Until the repayment period)
96	Ratio of payroll of non-university hospitals' personnel	This ratio determines the payroll share of non-university hospitals devoted to covering the personnel salaries.	Ratio of Personnel's payroll/non-university hospitals payroll
97	Number of K-coefficient of surgeries per month to total surgeons	According to Formula	Number of K-coefficient of surgeries per month/total surgeons
98	Herfindahl-Hirschman Index (HHI) index	It is a commonly accepted measure of market concentration.	Squared sum of (acute care patient days for hospital /Total acute-care patient day in the county
99	Market share	Every industry has a target market, a part of the whole market that the organization has occupied and prepares, organizes and implements its marketing programs in order to meet its needs.	Patient revenue (discharge) /Total county patient revenue (discharge)
100	HMO penetration	According to Formula	Percentage of revenue from managed care patient

5. CONCLUSIONS

Altogether, it can be said that the optimal performance of the economic and financial system in hospitals depends on the existence of an efficient and powerful financial sector. Nowadays, some hospitals are facing the problem of insufficient hospital revenues to cover the fixed, current and development costs. Considering the complexity of the processes available in the cost and revenue system of hospitals, the intervention of hospital heads will fail to improve the economic processes of hospitals unless they follow the scientific models. In addition, giving consideration to the key indicators of financial performance when designing the accounting and financial management dashboards intensifies the importance of determining and using them in hospitals. As a result, the use of financial indicators, especially cost and revenue indicators, has been cited as a proposed solution to remove barriers to the financial performance of hospitals. Yet, it should be noted that these indicators help to discover problems and do not necessarily provide solutions. So, to ensure the usefulness, it is better for the

managers to comprehensively utilize the appropriate indicators by taking the nature and goals of their organization into account. Therefore, to provide such a context, some strategies including making attempt to create a common literature for calculating the indicators and using valid guidelines and methods to accurately determine, define and periodically extract the hospital financial performance indicators are suggested. Additionally, regular and continuous monitoring of hospitals' performance based on various financial charts so as to enhance the utilization of hospital resources and avoid the loss of financial resources is also deemed as another proposed strategy to be used by the managers.

Acknowledgement:

The authors would like to extend their deep gratitude to all those who have cooperated in conducting this research and promoted it by providing their valuable comments. Special thanks also goes to the budget performance monitoring expert of Isfahan University of Medical Sciences and the Finance Vice Chancellor of Isfahan University of Medical Sciences for their kind assistance.

There is no conflict of interest.

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