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The Role of Activity-Based Budgeting in Evaluating Operational Performance: An Applied Study

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Abstract

The research aims to evaluate operational performance in health service units using time-driving Activity-based budgeting (TDABB). The research problem is the weakness of evaluating operational performance in health service units that rely on traditional budgeting systems. The research was conducted at Al-Hakim General Hospital, Department of Surgery, Gynecology and Obstetrics. It was based on field visits, personal interviews, and collecting information from documents obtained from the hospital. Based on the researcher's findings, using an activity-based budgeting approach can lead to a more precise, transparent, and effective operational evaluation. Moreover, this approach can provide accurate information and reduce time and costs when implementing cost shadowing. Advanced cost accounting techniques were introduced to improve the government accounting system, including costing technology based on activity-based budgeting. This helped in determining the costs of the services provided. Additionally, the culture of change and development was promoted through modern technologies to control costs and effectively manage human resources, among other areas. As a result, the government was able to better control costs and ensure effective allocation of resources.

Keywords: *TDABB, Evaluating, Performance.*

Introduction

Evaluation of operational performance has become paramount in health service units and no less important than economic units, so it was necessary to provide modern accounting and administrative techniques in the field of cost and management to evaluate better performance and conserve resources. One of these techniques is the balancing technique based on activity-based budgeting TDABB is one of the advanced technologies developed by researchers Kaplan and Anderson. The costing system helps based on activity-based budgeting create a budget with accurate estimates that play an effective role In evaluating operational performance, planning, and controlling the resources available within the health service units.

Health service units face difficulties in measuring and evaluating operational performance due to the wide range of activities they undertake. To overcome these challenges, service units must adopt advanced technologies in cost and management. Unfortunately, many health service units struggle with planning, control, and evaluation of operational performance due to poor accuracy in future expectations and the increased costs resulting from time loss and suboptimal use of energy, which prevents the use of modern technologies.

This research aims to demonstrate how budgeting based on activity-based budgeting can help evaluate operational performance accurately, increasing the efficiency of the evaluation process and improving future expectations.

The research hypothesis is based on the research problem. It can be summarized as follows: "Implementing activity-based budgeting at Al-Hakim General Hospital can help improve the accuracy of future expectations, increase operational performance efficiency, identify any unused resources, and evaluate performance more effectively."

Research plays a vital role in the modernization of accounting techniques used in healthcare service units. The traditional techniques are being replaced by alternative techniques, and the implementation of activity-based budgeting helps in evaluating operational performance and allocating costs accurately, fairly, and

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transparently. This method can also help in identifying untapped potential and raising future expectations, leading to improved performance, productivity, and service delivery. It provides better control over cost elements and helps service units plan resources, including financial and human resources more efficiently. TDABB contributes to improving the efficiency of work and the unit's operational performance, leading to better chances of achieving desired goals and ensuring continuity in the long run.

The Iraqi Ministry of Health serves as the research community within the service sector in Iraq. This sector is vital in the development of healthcare services in the country. Due to the large size of the research community and the difficulty of covering it, Hakim General Hospital has been chosen as the location to conduct research. This is because of the hospital's importance in the healthcare sector and its potential to achieve operational performance and utilize its resources effectively.

Concepts and Definitions TD-ABB

Activity-based budgeting (ABB) was a budgeting method developed before Time-Driven Activity-Based Costing (TDABC). With the adoption of TDABC, the budgeting process became more transparent, and simpler and provided more accurate cost information and profitability. This enabled better identification of priorities that needed improvement in the process (Anderson & Kaplan, 2007:75). TDABC technology coupled with TDABB can serve as a valuable planning tool for estimating the resources that need to be retained, increased, or decreased based on the projected workload in the upcoming periods. It also provides a means of monitoring costs in the current period as compared to the planned costs for the same period (Nasrawi and Al-Kawaz, 2023: 3). Balancing through activity-based budgeting is a completely different approach compared to time-oriented activity costing technique. Inactivity costing, the practical energy represented by time is calculated using equations and energy cost ratio, and resources and products are arranged based on that. Costs, and even customers, are managed accordingly. However, in activity-based budgeting, the customer's requests are determined first, and then an estimation is made of how much energy must be provided to meet the specific demand(Zurek, 2015: 64). Activity-based budgeting (ABB) is a budgeting method that works in reverse order when forecasting sales volume. It is used in conjunction with a costing technique based on ABB. To generate these estimates, the unit will have to determine the resource requirements in each process and department if production and sales forecasts for the coming period are to be met. Time equations can be used for each activity or process. Blocher's definition of budgeting based on activity-based budgeting (TDABB) aligns with this method (Blocher, et.al., 2019:380), Karim defines TDABB technology as one of the management accounting techniques used for planning, controlling costs, and facilitating decision-making. It provides essential information for decision-making, such as resource allocation, cost control, and pricing decisions, to enhance the decision-making process and improve overall performance (Karim, 2019:1), According to Elias, planning and control processes are crucial in achieving reasonable expectations for resources and activities, as well as identifying the future direction of activities. These processes play an essential role in the development of unified policies. TDABC is relied upon to accomplish this (Elias,2022:2), The researcher defines activity-based budgeting as a planning tool that works with TDABC to provide accurate cost-specific information for economic and service units. It helps to evaluate the performance of units and control costs by dividing the unit into several activities.

Advantages of TD-ABB System

According to (Adıgüzel, 2008:73), budgeting based on activity-based budgeting has the following advantages:

a) To plan activities effectively, it's important to accurately forecast the requirements for products or services provided to customers. These requirements can be driven by time or budget, and once you have determined them, you can then determine the resources needed for these activities.

b) Attention should be paid to reducing production input costs in line with competitors' costs.

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c) The effectiveness of budgets based on TD-ABB activities is determined by a set of indicators that show how much profit is added to economic units and how it affects operational profitability. This is measured by subtracting the cost from the revenue on the financial statement.

d) To measure the success of a budget, there's a set of financial and non-financial indicators that can be used. These indicators are based on time-oriented activity and can be decisive in determining success. To achieve this, it's important to identify the activities and classify them based on the time for each activity.

e) The budget is prepared using activity-based budgeting, describing future activity and resource needs.

f) Balancing activities based on budgeting can uncover unused resources, minimizing time loss through proper allocation.

g) Eliminates a lot of unnecessary work in the traditional weighing process.

The researcher believes that the importance of TDABB in health service units is no less significant than in economic units. The most noteworthy advantage of TDABB is the identification of untapped energy, and its application in health service units is especially important for unit managers.

Steps to Prepare TDABB

The main steps being implemented to form a time-oriented activity-based budget (TDABB) can be listed as follows (Kazim, 2020:48):

1. Defining forecasts for upcoming activities in the next period is necessary.
2. The estimated future resource demand must be considered.
3. The calculation of future resource provision costs is necessary.
4. Officials should be briefed on the system and procedures should be established in the economic and service unit.
5. Assign and implement activities for each subprocess, and determine the expected time range and timelines with participants.
6. Distribute the time for each subprocess among the employees and calculate the total duration required for each activity with stoppage details.
7. Calculate the practical power of the participants in these operations, considering the downtime.
8. Calculate the time losses for each activity by comparing the time required to carry out the activities with the time capacity of the employees related to these activities.
9. Calculating the percentage of idle energy by comparing the practical energy with the actual energy and working to determine its percentage.

The appropriateness of using TDABC in service units

The application of TDABC is of particular importance for service units, as the researchers (Ahmed and Al-Shafei, 2019: 23) found the appropriateness of using TDABC in service units, which are as follows:

1. Identify sources of high cost by time drivers to provide accurate cost information for different cost objectives, helping to effectively determine the cost of services.

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2. Use time equations to compare activities and departments within the same unit to improve efficiency and better utilize resources.

3. Implement simulations to study the impact of new policies on service costs, such as providing consulting or applied research.

4. Provide predictions about the required resources using advanced time equations enabling improved performance with fewer or shorter resources.

5. The time expression of the period of use of the cause contributes to the calculation accuracy of the costs of service activities This enables managers to obtain accurate information about the performance of activities within their department during a certain period using time equations.

The Concept of Performance Evaluation

Performance evaluation is one of the most important pillars on which the control process is based, and evaluating the performance of programs and plans is one of the most important tasks performed by unit departments, so there is no benefit to control without taking decisions on deviations, which are performance evaluation, so performance evaluation is useful directly in diagnosing and solving problems by knowing the strengths and weaknesses (Abdulrahman&Sait,2022:10) & (Al-Rikabi and Al-Ameri) defines performance evaluation as measuring the extent to which units achieve their objectives through the use of appropriate measures in order to identify strengths and weaknesses and investigate their causes to strengthen the positive aspects and eliminate the negatives (Al-Rikabi and Al-Amiri, 2009: 124) Performance evaluation is defined as a systematic review process that is conducted to help the economic or service unit reach a specific goal andthe goal The key to performance appraisal is to maximize the level of performance within the unit while maintaining a degree of efficiency and effectiveness (Chen,2011:2).

Functions in Operational Performance Evaluation

The functions of performance appraisal are summarized in four main functions as follows (Abdulwahid,2022: 192), (Dulaimi & Kadhim, 2022: 9)

1. Follow-up of the implementation of the objectives of the unit: It is the extent to which the unit achieves the set goals, whether quantitative or qualitative, in a specific period, and this is done through the information and data provided by the control body, which follows up the implementation of the specified objectives accurately.

2. Control over performance efficiency: It is the unit's practice of various activities and the implementation of plans with the highest degree of efficiency through the use of all inputs, whether material or human inputs with the highest possible efficiency and required.

3. Evaluation of results: It is to work to identify the administrative centers responsible for the deviations that occurred within the framework of the development that occurs as a result of the implementation of the plans with the greatest possible accuracy required.

4. Research and investigation: In the process of research and investigation, appropriate solutions and means are found to address deviations, with the need to choose the available alternatives at the lowest possible cost.

The operational performance of health service units is evaluated using TDABB

The budget based on activity-based budgeting provides a framework for evaluating the operational performance of health service units. This budget is based on identifying the main activities that will take place during a specific period and allocating financial and human resources, equipment, and materials necessary for the implementation of those activities, in general, the use of TDABB enhances the unit's

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ability to plan, control and achieve its financial and non-financial objectives better. The method of preparing the budget based on activity-based budgeting can provide the health service unit with future estimates of the contents of the budget, most notably the cost, which helps in the success of the performance evaluation process by comparing the actual performance with the planned performance according to the budget in a way that ensures the search for and analysis of the causes that lead to the emergence of deviations between the two performances **(**Kaplan & Norton, 2008: 127) Activity-Based Budgeting is a powerful tool that helps improve the performance of units and evaluate performance. It involves identifying the activities that need funding, determining the resources and costs necessary for each activity, and setting objectives and expected outputs for each activity. This enables units to allocate resources and costs effectively and efficiently, ensuring ideal performance and continuous improvement. TDABB is useful for performance evaluation and helps determine the extent to which the unit has achieved its objectives and expected outputs for each activity. This information can be used to identify areas that need improvement and development. The technology has been applied in Al-Hakim General Hospital, where it has clarified the role of the budget in overcoming some of the obstacles and negatives facing the performance evaluation process that traditional budgeting methods couldn't resolve.

Research Methodology

Health service units face difficulty in measuring and evaluating operational performance because they deal with a variety of activities. Service units must also adopt advanced techniques in the areas of cost and administration, and given what health service units suffer from weakness in the planning, control, and evaluation process of operational performance and the lack of accuracy in future expectations and increased cost resulting from wasting time and not utilizing energy optimally, which prevents the use of modern technologies. This research demonstrates the role of budgeting based on time-oriented activities in evaluating operational performance to increase the accuracy of future forecasts and the efficiency of evaluating operational performance.

Based on the research problem, the research hypothesis is summarized as follows: Applying TDABB at Al-Hakim General Hospital contributes to raising the degree of accuracy of future forecasts, increasing the efficiency of evaluating operational performance, detecting unused energy, and evaluating performance properly.

The importance of the research stems from the need for health service units for modern accounting techniques that are alternative to the traditional techniques in use. Therefore, working on applying TDABB contributes to evaluating operational performance and allocating costs in a more accurate, fair, and transparent manner, while working to uncover unused energy raise the degree of Future expectations, and improve the service unit's performance and productivity, which leads to better service provision, providing greater control over cost elements while allowing an accurate understanding of the time each activity takes to complete, thus allowing the service units to plan resources better, whether financial or human resources in general. TDABB contributes To improving the work efficiency and operational performance of the unit, this enhances the chances of success and continuity in achieving the desired goals.

The research seeks to achieve the following objectives

1. Highlighting the role of TDABB in evaluating operational performance.

2. Disclosing how to prepare TDABB in the health service sector in the Department of Surgical, Gynecological, and Obstetrics Operations.

The Practical Framework

The research was conducted at Al-Hakim General Hospital in Najaf Al-Ashraf, which is one of the branches of the Iraqi Ministry of Health. The hospital was established in 1962 and is situated in the heart of the province in the health district. It is located on the road linking Najaf Al-Ashraf and Kufa and covers an area of 75,000 square meters. The hospital provides various healthcare services to the community and a

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large number of patients. The Department of Surgery, Gynecology, and Obstetrics applied TDABB. The steps involved in its preparation are as follows:

Step 1: Identify activities within the Department of Surgery, Gynecology and Obstetrics

The patient goes through several activities within the operating departments, divided into four types, and each type of activity has a specific time, the types of activities can be summarized in the following equation:

Total time (min) = processing time + test time + completion time + follow-up time

Step 2: Determine the costs of the Department of Surgery, Gynecology and Obstetrics

There are two types of costs, namely the costs of the department and the general costs, the cost of resources for the supporting sections is the salaries of medical staff, medical supplies, medicines, stationery, publications, and all other supplies needed by each department, they vary from one department to another in terms of type and quantity, and also it is necessary to allocate a share for each section of the general costs of electricity, maintenance, and other costs.

The total costs of surgeries amount to 5107960610.7762, of which 272007626.7762 are general costs, while obstetrics and gynecology are 2789209155.0138, of which 161879811.0138 are general costs.

Step 3: Determination of the practical capacity of the Department of Surgery, Gynecology, and Obstetrics

1. Department of Surgical Operations

Practical capacity (14713920) = number of staff (131) ×number of minutes of work per day(360) ×number of working days per month (26)×12 months

- Staff (Surgery Specialist 6, Senior Surgical Resident 12, Surgical Practitioner 1, Anesthesiologist 8, Nurses 85, Technicians 19)

2. Department of Obstetrics and Gynecology

Practical capacity (22014720) = number of staff (196) ×number of minutes of work per day (360) ×number of working days per month (26) ×12 months

- Staff (Gynecological Practitioner 2, Senior Female Practitioner 19, Nurses 174, Art1)

Step 4: Calculate the cost unit time rate for the Department of Surgery, Gynecology and Obstetrics

The cost per unit time for the surgical department is calculated through the following equation:

Average cost per unit time (347.151 dinars/minute) = total costs (5107960610.7762) ÷ practical energy (14713920)

As for obstetrics and gynecology operations equal to:

Average cost per unit time (126.697 dinars/min) = total costs (2789209155.0138) ÷ practical energy (22014720)

Step 5: Determine the time required to complete each activity based on time equations.

There are three types of operations divided according to their seriousness and each type of operation has a specific time for surgeries the hospital conducts the following types of operations for patients:

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1. Supermajor operations include recurrent thyroidectomy, recurrent thyroid lift, and chest opening surgery.

2. Major Operations include Cholecystectomy, Exploratory laparotomy, and Intestinal obstruction process

3. Central operations include Breast knot operation, Appendix operation, and Amputation of fingers

The types of operations for the obstetrics and gynecology department are as follows:

- Supermajor operations include recurrent cesarean section, Therapeutic cervical endoscopy, and Pipe reconnection.
- Major Operations include Caesarean, first cold, Pipe nodes in Medical endoscope, and Diagnostic laparoscopy
- Central operations include Cervical ligation, Diagnostic uterine dredge, and Examination under general anesthesia

The following tables show the time required to complete each activity in the surgical department.

First: The time required for surgical supra-major operations according to their type

Table (1) shows the time required for surgical supra-major operations

Table (1) Time required for surgical supra major operations

t	Type of operation	Unit Time				Total Unit Time (min)	number Operations	Total time Precise/Operation
		Processing (min)	Examination (min)	Coming through (min)	Follow-up (min)			
1.	Recurrent thyroidectomy	10	5	180	10	205	16	3280
2.	Recurrent thyroid lift	6	5	210	12	233	13	3029
3.	Chest opening surgery	8	7	300	9	324	8	2592
Total								8901

Second: The time required for major surgeries according to their type

Table (2) shows the time required for major surgeries.

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Table (2) Time required for major surgical operations

t	Type of operation	Unit Time				Total Unit Time (min)	number Operations	Total time Precise/Operation
		Processing (min)	Examination (min)	Coming through (min)	Follow-up (min)			
1.	Cholecystectomy	10	5	90	5	110	38	4180
2.	Exploratory laparotomy	6	5	160	12	183	67	12261
3.	Intestinal obstruction process	8	7	180	6	201	44	8844
Total								25285

Third: The time required for intermediate surgeries according to their type

Table (3) shows the time required for intermediate surgical operations

Table (3) Time required for intermediate surgical operations

t	Type of operation	Unit Time				Total Unit Time (min)	number Operations	Total time Precise/Operation
		Processing (min)	Examination (min)	Coming through (min)	Follow-up (min)			
1.	Breast knot operation	10	6	120	10	146	78	11388
2.	Appendix operation	6	5	40	12	63	336	21168
3.	You are throwing the hit on	8	7	60	14	89	103	9167
Total								41723

The following tables show the time required to complete each activity in the Obstetrics and Gynecology Department:

Table (4) shows the time required for major operations of the Department of Obstetrics and Gynecology

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Table (4) Time required for major operations of the Department of Obstetrics and Gynecology

t	Type of operation	Unit Time				Total Unit Time (min)	number Operations	Total time Precise/Operation
		Processing (min)	Examination (min)	Coming through (min)	Follow-up (min)			
1.	Recurrent caesarean section	16	7	125	12	160	135	21600
2.	Therapeutic cervical endoscopy	6	5	60	6	77	73	5621
3.	Pipe reconnection	7	4	120	4	135	87	11745
Total								38966

Second: The time required for major operations of the Department of Obstetrics and Gynecology according to its type

Table (5) shows the time required for major operations of the Department of Obstetrics and Gynecology

Table (5) Time required for major operations of the Department of Obstetrics and Gynecology

t	Type of operation	Unit Time				Total Unit Time (min)	number Operations	Total time Precise/Operation
		Processing (min)	Examination (min)	Coming through (min)	Follow-up (min)			
1.	Cesarean, first cold.	16	6	45	12	79	150	11850
2.	Pipe nodes in Medical endoscope	5	5	30	5	45	79	3555
3.	Diagnostic laparoscopy	7	6	35	4	52	66	3432
Total								18837

Third: The time required for the middle operations of the Department of Obstetrics and Gynecology according to its type

Table (6) shows the time required for the middle operations of the obstetrics and gynecology department

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Table (6) Time required for intermediate operations of the Department of Obstetrics and Gynecology

t	Type of operation	Unit Time				Total Unit Time (min)	number Operations	Total time Precise/Operation
		Processing (min)	Examination (min)	Coming through (min)	Follow-up (min)			
1.	Cervical ligation	7	5	25	4	41	30	1230
2.	Diagnostic uterine dredge	6	5	15	4	30	15	450
3.	Examination under general anesthesia	4	6	30	3	43	18	774
Total								2454

Step 6: Calculating the cost of activities for the Department of Surgery, Gynecology, and Obstetrics

The cost of the activities of the Department of Surgery, Gynecology, and Obstetrics is calculated by multiplying the cost of the unit of time found in the fourth step and the time required to complete each activity in the fifth step and on this basis the total cost allocated is equal to:

Cost of activities = cost per unit of time × time required to complete each activity

a) Department of Surgical Operations

Table (7) shows the cost allocated for the surgical activity

Table (7) Cost allocated for surgical activity

figure	Type of operation	Total time	Cost of time	Cost of operations
1.	Supermajor operations	8901	347.151	1 3089991.05
2.	Major Operations	25285	347.151	8777713.035
3.	Central operations	41723	347.151	14484181.173
Total				26351885.259

The cost of unused energy for the surgical department is determined by the following equation:

Unused Energy Cost = Total Available Energy Cost – Utilized Energy Cost

1- Total available energy cost = 5107960610.7762

2- Cost of energy utilized = 26351885.259 from Table

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3- Unused Energy Cost = 5081608725.517

The percentage of idle energy for the surgical department is calculated by the following equation:

Inert Energy Ratio = Unused Energy Cost ÷Total Energy Available Cost

Percentage of idle energy = 99.484%

b) Department of Obstetrics and Gynecology

Table (8) shows the cost allocated to the activity of the Department of Obstetrics and Gynecology

Table (8) Cost allocated to obstetrics and gynecology activity

figure	Type of operation	Total time	Cost of time	Cost of operations
1-	Supermajor operations	38966	126.697	4936875.302
2-	Major Operations	18837	126.697	2386591.389
3-	Central operations	2454	126.697	310914.438
Total				7634381.129

The cost of unused energy for the Department of Obstetrics and Gynecology is determined by the following equation:

Unused Energy Cost = Total Available Energy Cost – Utilized Energy Cost

1- Total available energy cost = 2789209155.013

2- Cost of energy utilized = 7634381.129 from Table

3- Unused Energy Cost=2781574773.884

The percentage of idle energy for the Department of Obstetrics and Gynecology is calculated by the following equation:

Inert Energy Ratio = Unused Energy Cost ÷Total Energy Available Cost

Percentage of idle energy = 99.726%

Table (9) shows the planned costs of providing the operational health service at Al-Hakim General Hospital.

Table (9) Planned Costs of Operating Health Service at Al-Hakim General Hospital

Surgeries	
Activity	Planned costs
Supermajor operations	1 3089991.05

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Major Operations	8777713.035
Central operations	14484181.173
Total Surgical Costs	26351885.259
Obstetrics and Gynecology	
Supermajor operations	4936875.302
Major Operations	2386591.389
Central operations	310914.438
Total costs of obstetrics and gynecology operations	7634381.129

Conclusions and Recommendations

First: Conclusions

This section contains the conclusions related to the theoretical and practical side of the selected research sample

They are as follows:

1. Health service units in Iraq rely on the government accounting system, which provides data on the amount of expenditures within the allocations specified in the budget.

2. Health service units that apply cost accounting in all their units are lacking.

3. One of the weaknesses of the traditional budget is that it does not determine the cost of the service provided.

4. The budget is prepared based on activity-based budgeting by applying cost based on activity-based budgeting, the technology determines the practical energy and then determines the time vectors through equations and links the time vectors to the cost.

5. The emergence of time-oriented activity-based budgeting technology is the result of the evolution of activity-based costing technology into activity-based budgeting-based costs.

6. Better, more accurate, and transparent operational performance evaluation is achieved when the budget is applied based on activity-based budgeting.

7. Get accurate cost information under TDABC.

8. The performance at Al-Hakim General Hospital is evaluated by the traditional budget prepared by the state by comparing allocations with actual expenses.

9. One of the most important things that the budget works on based on activity-based budgeting is the calculation of unused energy, and this reduces the loss of time.

10. The budget is determined based on activity-based budgeting for each time-directed activity using time equations.

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11. The time guides for the service unit are difficult to determine, they need more accuracy, and accountants in the cost specialization and experts from the same field of health service do not give an appropriate time standard.

12. Evaluating operational performance under TDABB is done by comparing planned times with actual times and also comparing the health cost provided.

Second: Recommendations

Through the conclusions, the researcher reached the recommendations, which are as follows:

1. Developing the government accounting system by introducing advanced cost accounting techniques, including cost technology, based on activity-based budgeting to determine the costs of the service provided.

2. Motivating the health service unit to adopt the balancing technique based on activity-based budgeting.

3. Avoid working with the traditional budget in place and work on time-oriented budgeting to identify deficiencies and to identify untapped and idle energy.

4. Designing a single work system among all departments and increasing cooperation among them to determine the activities of the health service unit.

5. Spread the culture of change and development with modern technologies to control costs and effective control over human resources and others.

6. Follow up on the disbursement of medical supplies, medicines, and all commodity and service supplies and know if they have been disbursed or not.

7. We recommend conducting training workshops for computer staff and involving experts specialized in cost accounting.

8. Provisions of control and performance evaluation on all cost elements.

9. We recommend using costs based on activity-based budgeting to provide information instead of the traditional system.

10. Encouraging researchers in the cost specialization by applying research in the health service sector.

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