

Activity-Based Budgeting Approach for Optimizing Budget Planning and Control at GDC Magelang Metrosquare Dental Clinic

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Abstract : This study aims to analyse the implementation of Activity-Based Budgeting (ABB) in improving budget planning and control at GDC Magelang Metrosquare Dental Clinic. The study addresses the limitations of conventional budgeting approaches that rely mainly on historical financial data without systematically considering operational activities and resource capacities. A descriptive exploratory design with a qualitative case study approach was employed. Data were collected through interviews, direct observation, and internal clinic documentation, with source triangulation applied to ensure validity. The ABB framework involved activity identification, cost driver determination, activity cost calculation, activity-based budget preparation, and managerial evaluation. The findings demonstrate that ABB enables more accurate service volume forecasting, resource requirement estimation, total budget calculation, and capacity analysis compared with conventional budgeting. The study also identified idle capacity in treatment rooms and several resources, which can be optimised through improved promotional strategies, patient education, and quality enhancement activities. Overall, ABB improves budget accuracy and strengthens managerial control in dental clinic operations. This study is limited by its single-site focus and short observation period.

Keywords : Activity-Based Budgeting, Budget Planning, Budgetary Control, Dental Clinic, Healthcare Management.

Abstrak : Penelitian ini bertujuan untuk menganalisis penerapan Activity-Based Budgeting (ABB) dalam meningkatkan perencanaan dan pengendalian anggaran pada GDC Magelang Metrosquare Dental Clinic. Penelitian ini mengkaji keterbatasan pendekatan penganggaran konvensional yang sebagian besar masih bergantung pada data keuangan historis tanpa mempertimbangkan aktivitas operasional dan kapasitas sumber daya secara sistematis. Penelitian ini menggunakan desain deskriptif eksploratif dengan pendekatan studi kasus kualitatif. Data dikumpulkan melalui wawancara, observasi langsung, dan dokumentasi internal klinik, dengan penerapan triangulasi sumber untuk memastikan validitas data. Kerangka ABB meliputi identifikasi aktivitas, penentuan cost driver, perhitungan biaya aktivitas, penyusunan anggaran berbasis aktivitas, dan evaluasi manajerial. Hasil penelitian menunjukkan bahwa ABB mampu menghasilkan peramalan volume layanan, estimasi

kebutuhan sumber daya, perhitungan total anggaran, dan analisis kapasitas yang lebih akurat dibandingkan penganggaran konvensional. Penelitian ini juga mengidentifikasi adanya kapasitas menganggur pada ruang perawatan dan beberapa sumber daya yang dapat dioptimalkan melalui peningkatan strategi promosi, edukasi pasien, dan aktivitas peningkatan mutu. Secara keseluruhan, ABB meningkatkan akurasi anggaran dan memperkuat fungsi pengendalian manajerial dalam operasional klinik gigi. Penelitian ini terbatas pada satu lokasi penelitian dan periode observasi yang relatif singkat.

Kata Kunci : *Activity-Based Budgeting, Perencanaan Anggaran, Pengendalian Anggaran, Klinik Gigi, Manajemen Kesehatan.*

INTRODUCTION

The healthcare industry has experienced substantial transformation over the past decade, driven by rapid technological advancement, changing patient expectations, and increasing competition among healthcare providers. These developments have significantly reshaped the operational environment of healthcare organisations, including dental clinics, requiring continuous improvement in service quality and organisational performance (Sadewa & Santoso, 2024). Healthcare organisations are no longer expected to focus solely on delivering high-quality clinical services but must also develop comprehensive managerial strategies involving clinical governance, financial management, and effective resource allocation. As healthcare technologies continue to advance, financial management has become an increasingly strategic function in ensuring organisational sustainability and operational efficiency (Karisma et al., 2024).

Dental clinics represent a distinctive type of healthcare organisation that operates within a socio-business framework, balancing their social responsibility to improve community oral health with the need to maintain financial sustainability (Rahmilia, 2015; Sadewa & Santoso, 2024). Unlike many other healthcare facilities, multispecialty dental clinics provide diverse services involving complex clinical procedures, specialised equipment, multidisciplinary healthcare professionals, and various medical consumables. Consequently, their operational costs are highly influenced by the volume and complexity of clinical activities performed. GDC Magelang Metrosquare Main Dental Clinic, located in Magelang Regency, Central Java, Indonesia, reflects this operational complexity by providing comprehensive multispecialty dental healthcare services as its main competitive advantage within the regional healthcare market.

Given this operational complexity, effective budget planning and budgetary control are essential managerial functions that directly influence organisational performance. Budgeting enables healthcare organisations to allocate financial resources efficiently, coordinate operational activities, evaluate performance, and ensure accountability in resource utilisation. Therefore, healthcare organisations require governance systems that are not only effective and efficient but also adaptive to continuously changing operational environments while maintaining high standards of patient care (Widjaja et al., 2025).

However, preliminary observations at GDC Magelang Metrosquare Dental Clinic indicate that the current budgeting process remains suboptimal. Budget preparation is primarily based on managerial assumptions rather than systematic analysis of historical service activities and actual operational requirements. Consequently, discrepancies frequently occur between planned budgets and actual resource demands, particularly regarding medical consumables. Certain expenditure categories experience overbudgeting, while essential operational components encounter insufficient allocation. During service delivery, shortages of high-priority items may occur, whereas other budget categories remain underutilised. These conditions indicate weaknesses in needs assessment, interdepartmental coordination, and integration between operational activities and financial planning.

Medical consumables represent one of the most critical operational components in dental healthcare services. These materials include disposable medical and non-medical supplies such as examination gloves, syringes, gauze, cotton rolls, microbrushes, tissues, and other single-use items required for clinical procedures. Continuous availability of these materials is essential to maintain uninterrupted healthcare delivery, ensure patient safety, and support healthcare professionals in providing effective treatment. Conversely, inadequate inventory planning and documentation may result in understocking, overstocking, unnecessary expenditure, and potential disruption of healthcare services (Wibowo & Arifin, 2020; Heryanto, 2021). Therefore, accurate budgeting of medical consumables is not only a financial concern but also an important determinant of service quality and clinical performance.

In addition to limitations in budget planning, weaknesses in budget monitoring and financial control further reduce organisational efficiency. Budget utilisation at the clinic is monitored inconsistently rather than through systematic and continuous evaluation. This practice increases the possibility of deviations between planned and actual expenditure while limiting opportunities for timely corrective action. Furthermore, reliance on manual administrative procedures increases the risk of recording errors, duplicate entries, inconsistent documentation, and delayed financial reporting. These weaknesses reduce managerial responsiveness and hinder effective budgetary control.

Previous studies have demonstrated that similar budgeting challenges occur across healthcare organisations. Nesi and Kristin (2018) reported that procurement planning in a regional public hospital relied primarily on historical consumption with an additional safety margin of 10–20%. However, this approach failed to accurately estimate actual demand, resulting in frequent medicine shortages. Similarly, Kusmini et al. (2016) identified significant discrepancies between procurement plans and actual pharmaceutical procurement through the Indonesian e-purchasing system, with approximately 23.9% of procurement activities failing to correspond with initial plans due to inaccurate forecasting assumptions and suppliers' inability to fulfil allocated quotas. These findings demonstrate that procurement decisions based solely on historical consumption and managerial assumptions are insufficient to address dynamic healthcare demand and supply conditions.

Recent studies further highlight the limitations of conventional budgeting approaches. Firmansyah et al. (2025) and Gaddafi et al. (2024) found that budgeting systems developed primarily from assumptions and managerial estimates without adequate operational data are among the major causes of budget failure. Inaccurate assumptions may generate substantial differences between budgeted and actual expenditure, resulting in inefficient budget absorption, resource misallocation, and failure to achieve organisational objectives. Furthermore, Homauni et al. (2023), through a systematic review of healthcare budgeting, concluded that inconsistencies between projected patient volumes, estimated costs, and actual operational conditions frequently lead to service restrictions, delayed investments, and reduced healthcare quality.

Based on these challenges, healthcare organisations require budgeting systems that systematically integrate operational activities, resource utilisation, and financial planning. Budgets should not merely function as financial planning instruments but also as management control systems that support operational coordination, performance evaluation, and efficient resource allocation (Fauzan, 2020, cited in Purwanti et al., 2025). Akbar et al. (2025) emphasised that healthcare organisations should adopt activity-based budgeting approaches to move beyond incremental budgeting practices and develop financial plans that accurately reflect actual healthcare service costs. Similarly, Sari et al. (2025) highlighted that budgeting systems integrating operational activities with financial information improve organisational capacity to anticipate cash-flow constraints and respond effectively to reimbursement delays.

Therefore, Activity-Based Budgeting (ABB) provides a strategic approach for improving budget planning and budgetary control in multispecialty dental clinics. ABB enables organisations to identify relationships between activities, resource consumption, and service outputs, resulting in more accurate, transparent, and evidence-based financial planning. Despite the increasing importance of ABB in healthcare financial management, empirical evidence regarding its

comprehensive implementation in multispecialty dental clinics remains limited. This study addresses this gap by investigating the application of ABB at GDC Magelang Metrosquare Main Dental Clinic, Indonesia. Specifically, this study examines how ABB can be utilised to forecast service demand, identify operational activities, estimate resource requirements, determine activity capacity, and optimise budget planning and budgetary control. By developing an activity-based budgeting framework aligned with the operational characteristics of dental clinics, this study contributes theoretically to healthcare management literature and practically to the development of more adaptive, transparent, and evidence-based budgeting systems for dental healthcare organisations.

RESEARCH METHOD

This study uses a qualitative descriptive-exploratory case study design focused on GDC Magelang Metrosquare Dental Clinic. The original thesis defines the study site as a single dental clinic unit in Mertoyudan, Magelang, Central Java, selected because it faces practical problems in planning and controlling operational budgets under growing service demands. The case study approach is appropriate because the purpose is to understand how ABB can be operationalized within the real managerial context of a healthcare service organization rather than to test a statistical model. Data were obtained through interviews, direct observation, and internal documentation, while source triangulation was used to strengthen validity. The analysis followed the ABB sequence applied in the thesis, including activity identification, cost-driver determination, calculation of activity costs, preparation of an activity-based budget, and evaluation of managerial implications. The study specifically examines four analytical dimensions: estimating future service volume and activity demand, estimating required resources, determining total resource needs, and assessing activity and resource capacity.

RESULT AND DISCUSSION

Results

Identification and Classification of Activities

The implementation of Activity-Based Budgeting (ABB) at GDC Magelang Metrosquare Dental Clinic began with the identification of activities performed throughout the patient service process. Data were obtained through interviews with the clinic supervisor, front-office staff, dental nurses, dentists, and office boys, as well as through direct observation and internal documentation. Triangulation of interview, observation, and documentary data indicated consistency in the identification of operational activities and supported the credibility of the findings. The clinic's operational activities include medical services, medical support, administration and management, logistics and facilities, and marketing and quality-related activities.

The identified activities were subsequently classified according to their contribution to patient value. The main medical service activities, including examination and consultation, direct restorative treatment, endodontic treatment, periodontal treatment, prosthodontics, orthodontics, oral surgery, and dental radiology were classified as value-added activities because they directly contribute to diagnosis, treatment, and rehabilitation. Patient education and counseling were also classified as value-added activities. Activities such as sterilization, treatment-room preparation, patient registration, claims administration, equipment and building maintenance, and quality accreditation were categorized as non-value-added but necessary because they do not directly create clinical value for patients but are essential for patient safety, regulatory compliance, service quality, and operational continuity. Marketing and promotional activities were classified as non-value-added from the patient's perspective, although they remain strategically important for increasing patient visits and maintaining competitiveness. The activities were further classified into unit-level, batch-level, product-sustaining, and facility-sustaining activities. This classification is important because different activity levels consume resources according to different cost drivers. The resulting classification is presented in Table 1.

Table 1. Classification of Activities by Activity Level

Activity Group	Activity	Activity Level
Main dental services	Examination and consultation	Unit
	Direct restorative treatment	Unit
	Endodontic treatment	Product
	Scaling and periodontal treatment	Unit
	Prosthodontics	Unit
	Orthodontics	Product
	Oral surgery	Product
Medical support	Dental radiology	Unit
	Dental instrument sterilization	Batch
	Treatment-room preparation	Batch
	Dental unit utilization	Unit
Administration and management	Medical waste management	Batch
	Patient registration	Unit
	Medical record management	Unit
	Insurance billing and claims	Batch
	Central management, promotion, reporting, and accounting	Facility
Logistics and facilities	Inventory storage	Batch
	Medical equipment maintenance	Product
	Building maintenance	Facility
	Utilities	Facility
Marketing and quality	Patient education and counseling	Batch
	Patient complaint management	Unit
	Accreditation and quality management	Facility

The classification demonstrates that the clinic's cost structure is driven by a combination of patient volume, treatment volume, batch frequency, and facility-level activities. Consequently, applying a single volume-based allocation approach would not fully represent the actual pattern of resource consumption. The identification of different activity levels provides the basis for assigning costs through more appropriate cost drivers. The original study similarly emphasizes that the activity-level classification enables costs to be allocated according to the cause-and-effect relationship between activities and resources consumed.

Estimation of Service and Activity Volumes

The next stage of ABB was to estimate the volume of activities for the 2026 budget period. An 8% growth assumption was applied to the 2025 activity volume. The study selected this assumption as a moderate growth estimate within the 5–10% range considered appropriate in the study's budgeting framework. The estimated activity volumes were then used as the basis for determining resource requirements and the corresponding budget.

Table 2. Estimated Cost Driver Volume for 2026

Activity Group	Activity	Cost Driver	2025 actual	2026 estimate
Main dental services	Examination and consultation	Number of patients	1823	1969
	Direct restorative treatment	Number of treatments	1535	1658
	Endodontic treatment	Number of treatments	735	794

Medical support	Scaling and periodontal treatment	Number of treatments	1418	1531
	Prosthodontics	Number of treatments	107	116
	Orthodontics	Number of treatments	3496	3776
	Oral surgery	Number of treatments	797	861
	Dental radiology	Number of treatments	970	1048
	Dental instrument sterilization	Number of batches	1080	1074
	Treatment-room preparation	Number of patients	8947	9663
	Dental unit utilization	Number of patients	8947	9663
	Medical waste management	Waste volume	4	4
	Patient registration	Number of patients	8947	9663
Administration and management	Medical record management	Number of claims	458	495
	Insurance billing and claims	Number of employee	12	12
	Central management	Number of reports	180	180
Logistics and facilities	Inventory storage			
	Medical equipment maintenance	Maintenance frequency	2	2
	Building maintenance	Maintenance frequency	12	12
	Utilities	Number of operating days	358	358
Marketing and quality	Patient education and counseling	Activity frequency	2	4
	Patient complaint management	Number of patients	4	4
	Accreditation and quality management	Activity frequency	1	1

The projection shows that most patient- and treatment-driven activities increase in line with the assumed growth in service demand. For example, orthodontic treatments are projected to increase from 3,496 to 3,776 treatments, while examination and consultation services increase from 1,823 to 1,969 patients. In contrast, facility-level activities such as reporting, human resources, equipment maintenance, building maintenance, utilities, and accreditation remain relatively fixed because their consumption is not directly proportional to the number of patients. This finding illustrates an important characteristic of ABB: not all costs should automatically be increased by the same percentage. Costs associated with unit-level activities respond to changes in service volume, whereas batch-, product-, and facility-level costs depend on different operational drivers. Thus, ABB provides a more activity-sensitive basis for forecasting than simply applying a uniform percentage increase to the previous year's budget.

Cost Pools and Cost Components

Following activity identification and volume estimation, costs were grouped into five cost pools according to similarities in activity characteristics and resource consumption. These included (1) main medical services, (2) medical support, (3) administration and management, (4) logistics and facilities, and (5) marketing and service quality. The next step was to calculate the cost per cost driver for each activity. The resulting cost-driver rates are presented in Table 3.

Table 3. Cost Pools and Cost Components

Activity Group	Activity	Cost Pool
Main dental services	Examination and consultation	Cost Pool I
	Direct restorative treatment	
	Endodontic treatment	
	Scaling and periodontal treatment	
	Prosthodontics	
	Orthodontics	
	Oral surgery	
	Dental radiology	
Medical support	Dental instrument sterilization	Cost Pool II
	Treatment-room preparation	
	Dental unit utilization	
Administration and management	Medical waste management	Cost Pool III
	Patient registration	
	Medical record management	
	Insurance billing and claims	
	Central management	
	Inventory storage	
	Medical equipment maintenance	
	Building maintenance	
Marketing and quality	Utilities	Cost Pool IV
	Patient education and counseling	
	Patient complaint management	
	Accreditation and quality management	

The cost-driver rates vary substantially across activities. Prosthodontics has a relatively high cost per treatment (Rp648,167.10), while scaling and periodontal treatment has a considerably lower rate (Rp6,278.95). This variation indicates that the resource requirements of dental services differ substantially according to the complexity and nature of each treatment. Therefore, the use of differentiated cost drivers provides more meaningful information than a uniform allocation approach.

Resource Capacity Estimation

ABB was subsequently used to estimate the resources required to support the projected activity volume. The resources identified included dentists, dental nurses, front-office staff, office boys, treatment rooms, radiology equipment, dental units, and other physical facilities. Labor was found to be a major resource consumed throughout the pre-treatment, treatment, and post-treatment stages.

Table 4. Treatment-Room Capacity

Treatment room	Allocation time (minutes)	Mon-Sat capacity/day	Sunday capacity/day	Annual Capacity
Room 1	45	13	8	4.324
Room 2	45	13	8	4.324
Room 3	45	13	8	4.324

Room 4	60	10	6	3.102
Room 5	90	7	4	2.162
Total		56	34	18.236

The clinic therefore has a theoretical treatment capacity of 18,236 procedures per year. This capacity is particularly important because treatment rooms represent a physical resource that directly limits the volume of services that can be delivered. The resource-capacity analysis therefore allows management to distinguish between insufficient resources and resources that remain underutilize.

Table 5. Resource Consumption by Treatment Stage

Treatment stage	Main activity	Resources involved	Consumption unit
Pre-treatment	Patient registration	Front-office staff	Labor hours
	Medical record management	Front-office staff	Labor hours
	Treatment-room preparation	Dental nurse	Labor hours
	Preparation of instruments and materials	Dental nurse	Labor hours
During treatment	Examination and consultation	General/specialist dentist and nurse	Labor hours, treatment room
	Conservative treatment	General/specialist dentist and nurse	Labor hours, treatment room
	Scaling and periodontal treatment	General/specialist dentist and nurse	Labor hours, treatment room
	Prosthodontics	General/specialist dentist and nurse	Labor hours, treatment room
	Orthodontics	General/specialist dentist and nurse	Labor hours, treatment room
	Oral surgery	General/specialist dentist and nurse	Labor hours, treatment room
	Radiology	Radiographer	Labor hours, treatment room
	Dental unit utilization	Treatment room	Room-hours
Post-treatment	Instrument sterilization	Dental nurse	Number of batches
	Medical waste management	Nurse and office boy	Waste volume
	Room cleaning	Office boy	Cleaning frequency
	Billing and administration	Front office staff	Labor hours

This mapping demonstrates the relationship between activities and resources and supports the fundamental ABB principle that resources are consumed by activities. The mapping also makes it possible to identify the resource implications of changes in patient volume and treatment mix.

Total Resource Requirements and the 2026 ABB

The estimated volume of each cost driver was multiplied by its respective cost-driver rate to obtain the projected resource costs for 2026.

Table 6. Estimated Cost Each Cost Pool

Cost Pool	Estimated Cost (Rp)
Main medical services	549.144.601,99
Medical support	53.296.933,86

Administration and management	717.165.891,60
Logistic and facilities	119.671.984,80
Marketing and quality	3.876.820,00
Total	1.443.156.232,00

The results indicate that the increase in projected service volume directly affects the estimated resource requirements. An 8% increase in service activity produces higher requirements for labor, medical consumables, facilities, and other operational resources. This is consistent with the ABB concept in which the budget represents the financial consequences of planned activities rather than a simple adjustment of the previous year's budget.

Table 7. Estimated Cost Group

Cost group	Incremental budget (Rp)	ABB budget (Rp)	Difference (Rp)	Difference (%)
Medical consumables	360.000.000	580.725.031	220.725.031	-61,3
Medical support	50.000.000	53.295.834	3.295.824	-6,6
Administration and HR	705.840.000	717.526.012	11.686.012	-1,7
Logistic and utilities	115.000.000	119.672.101	4.672.101	-4,1
Marketing and quality	3.000.000	3.876.822	876.822	-29,2
Total	1.233.840.000	1.475.095.800	241.255.800	-19,6

The comparison shows that the incremental budget is lower than the ABB estimate across all major cost groups. The largest discrepancy occurs in medical consumables, where the incremental budget allocates Rp360 million compared with an ABB requirement of Rp580.73 million. This represents the most substantial underbudgeting risk. The administration and human-resource budget shows the smallest difference, indicating that the historical budgeting approach is relatively close to the activity-based estimate for this particular cost group. Overall, the incremental budget of Rp1.23384 billion is lower than the ABB estimate of Rp1.47510 billion, indicating an overall underbudgeting risk of approximately 19.6%. This finding demonstrates that a historical budgeting approach may fail to capture changes in resource requirements associated with changes in service activity. ABB, by contrast, explicitly links budget requirements to activity volumes and cost-driver rates. The study therefore demonstrates that ABB can provide more traceable and activity-sensitive information for budget planning and control.

Capacity Utilization and Idle Capacity

The final stage of the ABB analysis was to compare projected resource requirements with the clinic's available operational capacity. In 2025, the clinic recorded 10,881 actual procedures against a theoretical annual treatment-room capacity of 18,236 procedures.

Table 8. Treatment-Room Capacity and Utilization in 2025

Indicator	Value	Unit
Maximum theoretical treatment-room capacity	18,236	Treatments/years
Actual treatment volume	10,881	Treatments/years
Idle capacity	7,355	Treatments/years
Actual capacity utilization	59,68	%
Optimal utilization target	80-85	%
Optimal target volume	14,589-15,500	Treatments/years
Gap between actual and optimal target	3,708-4,619	Treatments/years

The actual utilization rate of 59.68% indicates that approximately 40.32% of the clinic's theoretical treatment-room capacity remained unused in 2025. The resulting idle capacity was 7,355 treatments. Based on the study's target utilization of 80–85%, the clinic could potentially increase its annual treatment volume to approximately 14,589–15,500 treatments without immediately requiring additional treatment-room investment. The capacity analysis further indicates that dentist capacity of 16,432 hours and nurse capacity of 16,640 hours are considered

sufficient to accommodate the optimal target volume. Front-office capacity of 8,320 hours is also considered sufficient. Thus, the treatment rooms constitute the principal capacity constraint, rather than the available labor resources.

Table 9. Capacity Analysis and Recommended Strategies for Dental Clinic Operations

Aspect	Current condition	Managerial implication	Recommended strategy
Treatment-room capacity	Utilization 59,68%; idle capacity 40.32%	Significant room for volume growth without new investment	Intensify promotion, patient education, and insurance/ corporate partnerships
Dentist capacity	16.632 hours/year	Sufficient to support optimal target	Optimize schedules and distribute workload
Nurse capacity	16.640 hours/year	Sufficient to support optimal target	Improve efficiency of room preparation and sterilization
Front-office capacity	8320 hours/years	Sufficient for target volume	Digitalize registration and online queue management
Bottleneck capacity	Treatment rooms; 18.326 treatments/year	Treatment rooms represent the main operational restraint	Evaluate additional rooms or extended operating hours when utilization approaches 85%

The idle-capacity findings have important managerial implications. At the current utilization level, the clinic does not appear to require immediate investment in additional treatment rooms. Instead, management can focus on increasing demand and improving the utilization of existing resources. Strategies identified in the study include strengthening promotional activities, patient education, cooperation with insurance providers and companies, optimizing dentist schedules, improving nurse efficiency, and digitalizing registration and queue management.

Discussion

The findings of this study demonstrate that the implementation of *Activity-Based Budgeting* (ABB) at GDC Magelang Metrosquare Dental Clinic begins with the identification and classification of service activities as the foundation for budget preparation. Activity identification is essential because operational costs are generated by the activities performed within the organisation. The clinic provides various dental services, including examination and consultation, restorative treatment, scaling and periodontal treatment, oral surgery, prosthodontics, orthodontics, and radiography, each of which consumes different resources in terms of labour, consumable materials, service time, equipment, and facility utilisation. Therefore, budgeting based on activities enables costs to be traced according to the actual operational processes that generate resource consumption. This finding supports the principle of *Activity-Based Budgeting* proposed by Hansen and Mowen (2018), which states that activities consume resources and therefore should become the basis for determining budget requirements. Kaplan and Cooper (1998) further explain that service organisations have cost structures influenced by variations in activities, making activity identification a fundamental stage in developing accurate budgets. In this study, activities were classified into *unit-level activities*, *batch-level activities*, *product-sustaining activities*, and *facility-sustaining activities*. This classification strengthens the relationship between activities and resource consumption because costs can be assigned based on appropriate cost drivers and causal relationships (Horngren et al., 2021). Consequently, ABB enables the development of an activity-driven budgeting system that reflects the actual operational characteristics of dental healthcare services.

The findings also indicate that forecasting service volume is a critical stage in ABB implementation because projected demand determines the activities and resources required in the subsequent budget period. In this study, the projected 2026 budget was developed using an 8% increase in service volume compared with the actual 2025 activity level. This assumption was considered appropriate based on healthcare industry growth trends, including increasing healthcare demand, technological development, and improved access to healthcare services. The Business Research Company (2015) reported that healthcare service markets demonstrated annual growth rates between 7–9%, while Deloitte (2025) highlighted that demographic changes, increasing chronic disease prevalence, and evolving healthcare delivery models continue to drive future healthcare demand. Therefore, the projected growth assumption provides a rational basis for estimating future activity requirements. Unlike incremental budgeting, which primarily adjusts previous expenditure levels, ABB begins with service demand forecasting and translates expected activity volumes into required resources (Al-Zubaidi, 2023). This approach allows the resulting budget to become more responsive to operational changes and reduces the risk of underbudgeting or overbudgeting. Hansen and Mowen (2018) emphasise that activity demand forecasting provides the basis for determining organisational resource capacity, enabling healthcare organisations to balance service requirements with available resources.

Following activity identification and service volume forecasting, the next stage of ABB implementation involves estimating resource requirements. The findings show that resource estimation at GDC Magelang Metrosquare Dental Clinic was conducted by identifying the labour, treatment rooms, equipment, service time, and consumable materials required for each activity. This approach demonstrates that different healthcare activities generate different patterns of resource consumption, meaning that resource requirements cannot be determined uniformly. Under ABB, resources are derived from projected activities rather than from historical budget adjustments, creating a direct relationship between activity demand and financial requirements (Khzaee et al., 2023; Al-Zubaidi, 2023). Hansen and Mowen (2018) state that activities drive resource requirements, meaning that the amount of resources allocated in the budget represents a logical consequence of expected operational activities. In dental healthcare services, inaccurate resource estimation may result in shortages of healthcare personnel, insufficient consumable materials, increased waiting times, or reduced service quality. Conversely, excessive resource estimation may create unnecessary costs due to unused capacity. Therefore, ABB provides a more rational approach by ensuring that resource allocation corresponds with actual service requirements.

The calculation of total resource requirements represents the core stage of ABB, where identified activities and required resources are converted into financial values to determine the overall budget requirement. The findings indicate that the total budget at GDC Magelang Metrosquare Dental Clinic was calculated based on the accumulation of resource requirements associated with each activity group. This approach demonstrates that the budget is a consequence of planned activities rather than a simple modification of previous expenditure. Hansen and Mowen (2018) explain that ABB converts activity and resource information into cost estimates by determining the resources consumed by each activity. Kaplan and Cooper (1998) further highlight that activity-based approaches provide stronger cost traceability because expenditures can be linked directly to the activities responsible for resource consumption. This characteristic improves budget transparency and accountability because every cost component has a clear operational basis. The projected 8% increase in service volume resulted in increased resource requirements, including labour, consumable materials, facility utilisation, and other operational costs. Within the ABB framework, this budget increase reflects changes in expected service demand rather than arbitrary financial adjustments. Therefore, ABB enables management to prepare budgets that are more realistic, measurable, and aligned with organisational objectives.

Furthermore, the calculation of total resource requirements provides important information for budget monitoring and managerial decision-making. Activity-based cost information enables organisations to identify major cost-consuming activities, evaluate resource efficiency, and analyse budget deviations according to their operational causes (Horngren et al., 2021). Unlike

conventional budgeting systems that compare planned and actual expenditure without considering activity performance, ABB provides detailed information regarding why cost variations occur. In healthcare organisations, this information is strategically important because management can determine resource allocation priorities, evaluate operational efficiency, and develop improvement strategies without compromising service quality. Increased accountability and transparency in healthcare management can encourage organisations to implement continuous improvement strategies (Aini & Sukanto, 2025, cited in Budiasih et al., 2026).

The final stage of ABB implementation involves determining activity and resource capacity to ensure that available organisational resources are sufficient to support projected service demand. The findings indicate that capacity analysis at GDC Magelang Metrosquare Dental Clinic was conducted by assessing treatment room availability, the number of dentists, operating hours, and standard treatment durations. This analysis enabled comparison between projected activity volume and available operational capacity, providing information regarding capacity utilisation and potential idle capacity. Hansen and Mowen (2018) explain that ABB aims to align activity demand with resource supply, ensuring that organisations provide sufficient but not excessive capacity. Kaplan and Cooper (1998) further emphasise that identifying unused capacity is one of the major advantages of activity-based approaches because it enables organisations to optimise resource utilisation. In this study, the available clinic capacity exceeded projected service demand, indicating that future service growth could potentially be accommodated without immediate investment in additional facilities. This information provides strategic value for management in determining whether future expansion requires additional personnel, extended operating hours, or new infrastructure.

Overall, the findings demonstrate that ABB provides a comprehensive framework for improving budget planning and budgetary control at GDC Magelang Metrosquare Dental Clinic. By linking service activities, resource consumption, capacity requirements, and financial planning, ABB produces budgets that are more accurate, transparent, and responsive to operational changes. The implementation of ABB enables management to understand the causes of costs, optimise resource utilisation, identify potential inefficiencies, and develop evidence-based financial strategies. Therefore, ABB represents an appropriate approach for supporting sustainable financial management and improving operational performance in multispecialty dental healthcare organisations.

CONCLUSION

This study concludes that the implementation of *Activity-Based Budgeting* (ABB) improved budget planning and budgetary control at GDC Magelang Metrosquare Dental Clinic by establishing a systematic relationship between projected service volume, activity demand, resource requirements, total budget estimation, and operational capacity. The findings demonstrate that ABB provides a more appropriate budgeting approach than assumption-based conventional budgeting for multispecialty dental clinics, where costs are influenced by variations in clinical procedures, material consumption, labour requirements, and facility utilisation. By linking financial planning with actual operational activities, ABB enhances budget accuracy, transparency, and accountability. Furthermore, ABB functions not only as a budgeting method but also as a managerial control system that supports resource optimisation, identifies potential idle capacity, and provides a stronger basis for operational decision-making and future investment planning.

Future research should examine the implementation of ABB across different types of healthcare organisations and healthcare service settings to evaluate its broader applicability and effectiveness. Further studies may also incorporate longitudinal analysis, digital financial systems, and integration with healthcare information systems to assess the sustainability of ABB implementation over time. For healthcare practitioners, particularly managers of dental clinics and other healthcare facilities, ABB is recommended as a strategic approach for improving financial planning by ensuring that budget allocation is based on operational activities and actual resource consumption. From a policy perspective, healthcare organisations and regulators should encourage

the development of activity-based financial management frameworks that promote transparency, efficiency, and evidence-based resource allocation within healthcare service delivery systems.

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