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Effect of Management Accounting Practices on Operational Efficiency in Public Hospitals in Homabay County

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Abstract

This research aimed at examining how management accounting activities influence the efficiency of operations of public hospitals in Homabay County, Kenya. It investigated the effects of the cost-variance analysis, financial forecasting, and cash flow analysis. Correlational research structure was applied, and 200 officers were targeted in 24 hospitals, where the data was gathered with the help of survey questionnaires, and analyzed with SPSS regression methodology. Correlation analysis showed that all financial management practices were significantly positively correlated, with CVA strongly correlated with FF ($r = .811$, $p < .001$), moderately correlated with CFA ($r = .706$, $p < .001$), and fairly moderately correlated with OE ($r = .422$, $p < .001$), whereas FF was weak-to-moderately correlated with CFA ($r = .536$, $p < .001$). Regression results indicated that the overall regression model was highly significant ($F = 48.288$, $p < .001$), whereas the coefficients showed that Cost Variance Analysis ($p = .026$), Financial Forecasting ($p = .012$), and Cash Flow Analysis ($p < .001$) exerted a statistically significant positive effect on operational efficiency, which implied that all three financial management practices are meaningful predictors of hospital efficiency. The findings of the research were that the implementation of these types of practices along with the continuous education of staff and enhancement of systems should be regarded as the key to providing sustainable and efficient care in resource-limited settings.

Keywords: *Management accounting, cost-variance analysis, financial forecasting, cash flow analysis, operational efficiency, public hospitals, Kenya*

1. Introduction

Management Accounting Practices (MAPs) offer important financial intelligence that is required to make efficient decisions, and these directly affect operational efficiencies of healthcare organizations. These include cost-variance analysis, financial forecasting, and assessment of cash flow; such practices are necessary to guarantee optimization of resources and enhanced service delivery, especially in limited-resource environments (Mishra et al., 2022). Operations efficiency in healthcare is demonstrated by an observer's ability to deliver and deploy resources efficiently and minimally wastefully in focusing on the treatment and quality of the patient. Resource-Based View (RBV) theory views MAPs as strategic assets that increase efficiency and competitiveness through the conversion of financial resources to better operations by hospitals (Barney, 1991). To complement this fact, Dynamic Capabilities Theory stresses the opportunity of an organization to

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adjust its accounting system to changing environments, whereas the Contingency Theory indicates that these practices must comply with the contextual aspect, like the patterns of financing and the type of governance (Teece et al., 1997).

Apparently, despite their significance, numerous public hospitals in Kenya continue to run weak or unreliable management accounting systems, which have continued to result in chronically inefficient performance, incurring budget overruns, inconsistent purchasing, stock-outs of key supplies, and delayed service provision (Omondi & Muturi, 2019; Wairimu & Ngahu, 2022). The challenges of scarce resources and rising healthcare needs in Homabay County make the situation even worse, as this adds pressure to financial decisions that managers must make. However, little empirical data exists on the impact of accounting practices on operational results in such settings. This research paper thus examines how cost-variance analysis, financial forecasting, and cash flow analysis affect the operational efficiency of the public hospitals in Homabay County, addressing a gap in both policy and practice.

1.2 Research Problem

Despite the acknowledged importance of management accounting practices (MAPs) in efficient health service delivery, public hospitals in Homabay County continue to experience serious operational challenges in quality and timeliness of service delivery. The problems include continuing waste of resources, ineffective cost control, frequent stock-out of key medicines, delays in treatment and deterioration of the quality of patient care (Omondi & Muturi, 2019; Wairimu & Ngahu, 2022). While devolution of healthcare in Kenya in 2013 was envisaged as an efficient and accountable system at the county level, the financial and managerial system in Homabay hospitals is weak and fragmented, especially in regard to modern management accounting techniques (Ministry of Health, Kenya 2016).

Whilst international studies suggest that advanced MAPs (e.g. cost variance analysis, financial forecasting and cash flow management) can improve operational performance through improving financial accountability and resource optimization (Mishra et al. 2022; Ninerola et al. 2021), their application in LMICs has been inconsistent and limited by weak technical capacity and systemic resource constraints (Allain & Laurin 2018; Anwar & Abdullah 2021). Kenyan experience also

shows that hospitals with improved management and inventory systems are more stable with respect to service delivery and shocks to operations (Kihara and Ngugi, 2021; Kirimi, 2023).

Hence, cost variance analysis in Homabay County hospitals is carried out superficially without explaining the reasons for the deviations, which limits corrective action. Cash economy remains humbly anchored to annual cycles with no allowance for contingency planning while cash flow management systems don't cater for irregular government disbursements leading to procurement hold-ups and disruption of services (Muturi & John, 2020; Musiega et al., 2023). This leads to a vicious cycle in which operational inefficiencies due to poor financial management in turn create demand on the financial systems.

Despite increased awareness of the importance of MAPs in health care management, there is a lack of empirical insight on how MAPs have a direct impact on operational efficiency in devolved health care systems such as Kenya's. The absence of contextualised evidence restricts the ability of administrators to choose the best contribution analysis approaches for resource-scarce settings and impairs policymakers' ability to build evidence-based policies aimed at improving health service delivery (Mwangi and Simiyu, 2024; County Government of Homa Bay, 2025).

Therefore, there is an immediate need to empirically investigate the relationship between cost variance analysis, financial forecasting and cash flow analysis and their combined impact on operational efficiency at Homabay County hospitals. Filling this gap in knowledge will not only bring us one step closer to optimizing decision making and resource use but will also help establish a sustainable health care system better able to meet the needs of a predominantly rural and resource-poor population.

1.3 Research objectives

1.3.1 General Objective:

To investigate the impact of management accounting practices on the operational efficiency of Homabay County hospitals.

1.3.2 Specific Objectives:

a) To examine the effect of cost-variance analysis on operational efficiency in public hospitals in Homabay County.

b) To investigate the influence of financial forecasting on operational efficiency in public hospitals in Homabay County.
c) To evaluate how cash flow analysis influences operational efficiency in public hospitals in Homabay County, Kenya.

1.4 Research Hypotheses

$H_{0\ 1}$: Cost-variance analysis has no significant effect on operational efficiency in public hospitals in Homabay County.

$H_{0\ 2}$: Financial forecasting has no significant effect on operational efficiency in public hospitals in Homabay County.

$H_{0\ 3}$: Cash flow analysis has no significant effect on operational efficiency in public hospitals in Homabay County.

2. Theoretical Framework

This study is based on three key theoretical frameworks—Resource-Based View (RBV) Theory, Dynamic Capabilities Theory, and Contingency Theory— Together, these practices clarify the mechanisms through which management accounting practices (MAPs) affect operational efficiency in health care systems.

2.1 Resource-Based View (RBV) Theory

RBV theory argues that organizations achieve sustainable competitive advantage by deploying resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991). In healthcare, MAPs such as budgeting and variance analysis act as strategic resources that strengthen cost control and resource allocation, enhancing hospital efficiency (Muturi & Mwanga, 2022). Studies show that hospitals with robust accounting systems experience improved financial sustainability and operational stability compared to those with weaker systems (Mwanga, 2018; Mwangi & Simiyu, 2024). For Homabay County, RBV positions MAPs as organizational capabilities crucial for efficient and sustainable healthcare delivery.

2.2 Dynamic Capabilities Theory

Dynamic Capabilities Theory emphasizes the ability of organizations to adapt and reconfigure internal systems to respond to changing environments (Teece et al., 1997). Applied to healthcare, this means hospitals must continually revise financial practices to address shifting funding patterns and regulatory demands. Evidence from Tanzania and Kenya shows that dynamic adaptation of financial reporting and costing systems improves performance in resource-constrained hospitals (Ruhago et al., 2023; Nyaboga & Muathe, 2024). Thus, for Homabay hospitals, this theory highlights the need for flexible MAPs that align with evolving operational realities.

2.3 Contingency Theory

Contingency Theory posits that no single management approach is universally effective; success depends on contextual fit (Donaldson, 2001). In the case of MAPs, effectiveness is determined by how well practices like cash flow analysis and forecasting align with organizational structures, resource availability, and environmental conditions. Empirical studies confirm that tailored accounting systems improve resource utilization and reduce inefficiencies, especially in sub-Saharan Africa (Mishra et al., 2022; Ruhago et al., 2023). In Homabay, aligning MAPs with local capacity and healthcare demands is therefore essential for consistent service delivery.

2.4 Empirical review

2.4.1 Cost-Variance Analysis and Operational Efficiency

Muturi and Mwanga (2022), using a case study carries out a study in the Kenyatta National Hospital in Kenya and used the descriptive research design, the introduction of management accounting instruments, such as the Activity-Based Costing (ABC) enables a hospital to record cost drivers and assess the financial impact of its operations on activity. According to their findings, ABC played a significant role in enhancing the capacity of hospital managers to identify areas of inefficiency in resource distribution, thereby improving decision-making. Through such descriptive insights alone, operational managers will be in a better position to identify weak-performing areas, such as overuse of resources or wastage of services, and act on them sufficiently. For example, resource allocation gaps can be analyzed to enhance service delivery indicators, such as patient turnover and bed occupancy rates, by utilizing alternative staffing or equipment utilization.

In addition, Balkhi, Alshahrani, and Khan (2022) investigated the management of inventories in the Saudi Arabian healthcare industry using the empirical method in the pharmaceutical field. In their research, it was demonstrated that utilizing cost variance analysis and Just-in-Time (JIT) inventory systems minimized stock-outs, reduced waste, and led to better resource utilization. However, they also observed that JIT systems are less effective in settings with unreliable suppliers, which is a common issue in hospitals in developing locales.
On the same note, Ali Mohamad et al. (2023), did research on the hospital systems of the Middle East region in the form of quantitatively analyzing financial data of the hospital with references to hospital-strategic costs, studied the problem of the use of links between costs and outcomes as a means of improving budgeting and pricing. They found that outcome-based costing enhanced financial forecast reliability, led to tighter resource allocations, and resulted in more sustainable financing of patient care. However, they acknowledged that their findings were based on settings that were either well-resourced or less well-resourced and did not specifically focus on the impact of irregular funding patterns and technological issues on implementation in low-income healthcare systems.

In the Kenyan case, as the County Government of Homa Bay (2025) reveals, when county hospitals employ the mechanisms of cost variance analysis, their ability to identify inefficiencies and maximize limited resources increases significantly, and overall operations improve to a considerable degree. It has been suggested that cost variance analysis is a potential component of minimizing the cost of healthcare delivery by enhancing expenditure control and accountability at the county level.

2.3.2 Financial Forecasting and impact on operational efficiency

Financial forecasting as a Management Accounting Practice (MAP) is a crucial aspect that enables effective decision-making by healthcare managers. Forecasting tools give a financial roadmap. With these tools, the manager can allocate resources wisely, plan ahead, and act before budgetary shocks create pressure.

A case study by Muturi and Mwanga (2022) on budgeting and forecasting at Kenyatta National Hospital in Kenya, based on a descriptive research design, analyzed how it aids in operational

decisions, such as hiring and equipment procurement. Their findings showed that financial forecasting enabled managers to correlate costs with their corresponding cost drivers. This allowed investments in areas that enhanced service provision while practicing financial prudence. However, the study did not determine the relevance of budgeting and forecasting in county hospitals. These facilities often lack consistent government funding and experienced managers.

In a mixed-methods study of county hospitals in Kenya under the universal health coverage scheme, Kihara and Ngugi (2021) explored the association between budgeting practices, inventory management, and operational efficiency. They found that effective budgeting in resource allocation reduced stockouts while avoiding unnecessary spending. This had a particularly positive impact on operational efficiencies. However, their study failed to clearly demonstrate how financing constraints in resource-limited environments, such as Homa Bay County, compromise the long-term sustainability of these practices.

Ali Mohamad et al. (2023) used quantitative research in the Middle East to study healthcare systems. They focused on how technological advancements, including big data analytics, contribute to financial forecasting through predictive analytics on patient demand and cost fluctuations. The research concluded that predictive tools could improve the accuracy of managerial decisions and lessen dependence on reactive measures. However, the study assumed advanced digital infrastructure was available and did not consider access and affordability issues in low-resource hospitals.

Muturi (2020), in a doctoral dissertation on financial management practices in public hospitals in Nyeri County, Kenya, focused on the correlation between budgeting and forecasting and actual results through feedback flows. The research concluded that this feedback loop enabled managers to develop effective strategies, utilize resources efficiently, and enhance the organization's overall performance. However, Muturi's study did not consider major barriers to implementation. Minimal hospital information systems can hinder real-time monitoring, a crucial feature of effective forecasting.

2.3.3 Cash Flow Analysis and operational efficiency

In the literature on healthcare managers' perceptions of cash flow analysis, a fundamental Management Accounting Practice (MAP), both advantages and disadvantages of undertaking the practice have been identified.

A study by Muturi and Mwanga (2022), conducted at Kenyatta National Hospital, Kenya, and employing a descriptive research design, suggests that cash flow analysis can provide hospital managers with a clear picture of both the inflows and outflows of funds. Their results suggested that monitoring cash flow enabled financial managers to maintain liquidity for critical operations, such as paying employee wages and purchasing medical supplies. This, in turn, facilitated better resource mobilization and prevented disruptions to service delivery and ongoing medical activities. Nevertheless, the question of whether the smaller hospitals located at the county level, which are frequently associated with inconsistent funding, can utilize cash flow analysis efficiently was not examined in their study.

On the same note, Balkhi, Alshahrani, and Khan (2022), who carried out an empirical study in the pharmaceutical healthcare industry in Saudi Arabia, found that inventory management is directly facilitated by cash flow analysis. They found that when they employed a sensible approach to ensuring that cash availability aligns with procurement cycles, hospitals were able to maintain the lowest inventory levels, minimize wastefulness, and remain cost-efficient. The downside to this research, however, is that it utilized a relatively stable supply chain environment and did not incorporate the unreliable procurement systems characteristic of developing economies. In a quantitative study conducted on hospitals across the Middle East, Ali Mohamad et al. (2023) posited that cash flow management could also be improved through the use of highly advanced technologies, such as AI-based analytics, which allow for real-time monitoring of financial trends. Their paper recognized that cash flow analysis using technology enhanced the effectiveness of revenue collection and improved operational capabilities. The limitations of this work, however, are that it does not account for the technological and infrastructural constraints within which resource-constrained hospitals operate, where the price and feasibility of AI-based systems can be cost-prohibitive.

In another study, Muturi (2020) conducted doctoral research examining financial management practices in Nyeri County, Kenya, and further noted that the proper implementation of cash flow analysis involves technological financial skills that are not currently possessed by many hospital employees. His conclusions highlighted the regular fragmentation of hospital information systems, and such economic conditions make it difficult to integrate cash flow data, thereby slowing decision-making. The research also observed that managers' reluctance to adopt new accounting practices and approaches acts as another delay in their widespread adoption. Irrespective of such obstacles, Muturi concluded that hospitals, where cash flow analysis is successfully integrated, participate in a positive cycle (improved liquidity management, operational effectiveness, and patient care outcome).

2.4 Conceptual Framework

This paper is devoted to the analysis of the impact of management accounting practices (MAPs) on operational efficiency of public hospitals. In particular, the framework combines three dimensions of MAP (cost variance analysis, financial forecasting, and cash flow analysis) with specific financial indicators designed to measure each dimension.

Dependent variable: operational efficiency; throughput time in hours and staff productivity ratio (patients/staff hour).

Figure 1: Conceptual Framework

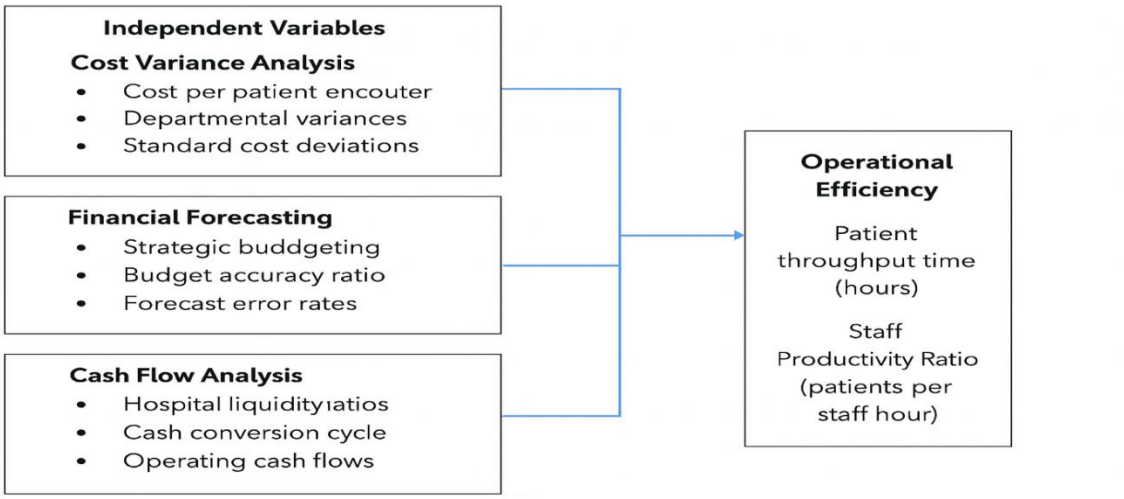

Figure 1 shows the conceptual model for the study in which MAP components affect hospital performance outcomes.

3. Methodology

3.1 Population, Scope, Sources of Data and Sample Size

The population used in the study was 665 healthcare professionals in the 24 public hospitals in Homabay County, one Levels 5 and 23 Level 4 facilities (County Government of Homa Bay, 2025). Participants were senior managers, administrative staff, clinical staff, matrons and resource allocation staff. Using the sampling table by Krejcie and Morgan (1970), a total of 200 respondents were chosen so that the sample is statistically valid. Primary data was collected by using structured questionnaires; the secondary data was gathered from hospital publications and policy documents. A pilot study was carried out on a sample of 24 respondents from Kisumu County to test the reliability and validity of the instruments.

3.2 Study Design and Data Analysis

In the study, a correlational research design was used to explore the influence that management accounting practice has on the operational efficiency of public hospitals in Homabay County. This design was deemed suitable because it enables the researcher to determine the nature and the strength of the relationship among the variables without making manipulated changes to the variables since they cannot be easily randomized in an actual healthcare environment. The sampling of the research was carried out based on the 24 public hospitals within Homabay County, which consisted of a total population of 665 officers who included administrators, clinical managers, finance officers, and other officers involved in the running of the hospital. Based on this population, a sample of 240 respondents was identified based on stratification and proportionate sampling to make sure that the views of various categories of staff were adequately depicted.

The information was gathered using a descriptive, structured online questionnaire, which was sectioned into segments addressing the cost variance, financial forecasts, cash flow, and operational efficiency. All constructs were rated on a five-point Likert-type scale to reflect the level to which the respondents agreed with the statements about management accounting practices.

The instrument was pilot tested in a sample of 24 officers selected across the hospitals in Kisumu County, which have similar operational perspectives to those of Homabay County. The pilot checked the validity and internal reliability of the tool, and Cronbach's Alpha values were above the 0.70 level of reliability. Validity was also evident in that experts reviewed the instrument and diagnostic checks indicated that statistical assumptions of regression analysis were not violated, including linearity, normality, multicollinearity, and homoscedasticity. The collection of data occurred during 6 weeks through Google Forms sent by email with reminders regularly to achieve the highest possible response rates.

Data analysis was performed using SPSS 27. The response was summarized by descriptive measures like means, percentages, and standard deviations, whereas inferential statistics were employed to test the study hypotheses.

3.3 Model Specifications

To conduct the regression analysis to examine the connection between management accounting practices and operational efficiency of government hospitals in Homabay County, a multiple linear regression model was used as follows:

$Y=\beta 0X0+\beta 1X1+\beta 2X2+\beta 3X3+\varepsilon$……1

Where:

- **Y** = Operational Efficiency
- β_0 = Intercept/constant term
- β_1 , β_2 , and β_3 = are the coefficients of the independent variables
- X_1 , = Cost-variance analysis
- X_2 = Financial Forecasting practices
- X_3 = Cash Flow Analysis practices
- ε = Error term

All the analyses were done using the Statistical Package for the Social Sciences (SPSS) version 27. Tables were used to present the data results.

4. Results and Discussion

The study attained an excellent response rate of 80 percent, with 200 out of 240 targeted healthcare professionals participating in the survey. This was a good result, as this high rate of returns was a strength in analyzing the findings statistically. To achieve comprehensive coverage of the health system, the respondents were selected in all 24 public hospitals in Homabay County. Eight primary referral and teaching hospitals were used as sources of the largest proportion of participants (mostly identified as level II and above). The increased level of their involvement was explained by the high number of employees and well-organized administrative departments in centers termed as level II institutions and above, which made it easier to distribute and complete the questionnaire.

4.1 Cost-variance analysis

Data Type 4.1 presented below provides the descriptive statistics for all constructs in cost-variance analysis. The findings suggest that the majority of respondents agreed that cost-variance analysis is commonly used, useful in determining over- and underspend, and that management is responsive to it. They also indicated that this approach has led to better resource allocation outcomes and a reduction in operational inefficiency. The overall mean value of 4.40 implies a strong agreement on the constructs, indicating that the results of cost-variance analysis are a well-established practice in Homa Bay County public hospitals.

Table 4.1: Descriptive Statistics on Cost-Variance Analysis Constructs

Construct	**Mean**	**Std. Deviation**	**Variance**	**N**
Regular practice of cost variance analysis	4.25	0.624	0.389	200
Effectiveness in identifying over- and underspending	4.70	0.459	0.211	200
Management response to cost variance analysis findings	4.30	0.716	0.513	200
Improvement of resource allocation decisions	4.55	0.742	0.550	200
Use of cost variance analysis to reduce operational inefficiencies	4.20	0.680	0.462	200
Composite Mean	**4.40**			

The data demonstrates that the practice of cost-variance analysis is a well-established management accounting practice at hospitals in the sample. The respondents strongly agreed that it is efficient in identifying over- and underspending, and that management takes the necessary corrective action depending on the findings. Practice has also played a significant role in enhancing better resource allocation decisions and curbing operational inefficiencies. This shows that staff agrees that cost-variance analysis is a key financial monitoring and operational decision-making tool with a high composite average (Ali Mohamad et al., 2023).

4.2 Financial Forecasting

The descriptive statistics for the entire construct of financial forecasting are summarized in Table 4.2 below. Results were characterized by high means on all items, with a composite mean of 4.41, indicating that respondents are highly confident that financial forecasting is a fundamental management accounting practice that promotes hospital planning, decision-making, and sustainability.

Table 4.2: Descriptive Statistics on Financial Forecasting Constructs

Construct	Mean	Std. Deviation	Variance	N
Practice of developing comprehensive financial forecasts	4.45	0.671	0.450	200
Effectiveness in anticipating future financial demands and problems	4.70	0.558	0.312	200
Use of forecasts in strategic operational decision-making	4.45	0.591	0.349	200
Impact of financial forecasting on resource planning	4.30	0.783	0.613	200
Regular updating of financial forecasts in response to changing conditions	4.15	0.855	0.731	200
Composite Mean	4.41			

High scores on all measures of the mean indicate a strong perception among respondents that financial forecasting is considered an efficient habit for planning, decision-making, and sustainability. Employees reported that financial predictions can be used to plan future financial requirements and issues, as they are commonly employed in strategy-making and are useful in resource planning. Although the forecast, regularly updated, has lower mean scores, it nonetheless shows that its significance is being taken into consideration (Muturi & Mwanga, 2022).

4.3 Cashflow Analysis

The results indicate that cash flow analysis is heavily institutionalized among the hospitals in Homa Bay County. Strong agreements were recorded by respondents on the measurement of cash inflows and outflows made by hospitals (M = 4.60), the use of cash flow analysis to ensure that hospitals maintain sufficient liquidity (M = 4.40), and to time major expenses (M = 4.45). In the same vein, employees reported that cash flow estimates are always used whenever providing constant services (M = 4.40). The construct on the reduction of operational disruptions had a lower mean (M = 3.80), and greater variability (SD = 1.13), meaning that while cash flow analysis is helpful in terms of financial stability, it has variable effects on the reduction of operational disruptions across facilities.

These results are reminiscent of Muturi and Mwanga (2022), who point out that keeping track of cash flows is also essential to ensuring the organization's liquidity and fulfilling all necessary financial needs, including staff salaries and purchases. Just as Balkhi et al. (2022) demonstrate, cash flow analysis in the context of just-in-time systems guarantees continuity in service delivery. Ali Mohamad et al. (2023) specify further that revenue receipts and financial flexibility are reinforced by technology-enabled, real-time tracking.

Table 4.3: Descriptive Statistics on Cash Flow Analysis Constructs

Construct	Mean	Std. Deviation	Variance	N
Regular monitoring of cash inflows and outflows	4.60	0.665	0.442	200
Effectiveness in maintaining adequate liquidity	4.40	0.802	0.643	200
Use of cash flow analysis in the timing of significant expenditures	4.45	0.807	0.651	200
Impact of cash flow analysis on reducing financial operational disruptions	3.80	1.125	1.266	200
Use of cash flow projections to ensure continuous service delivery	4.40	0.665	0.442	200
Composite Mean	4.36			

4.4 Operational Efficiency

Table 4.4 below provides the frequency statistics of all the constructs of situations of operational efficiency. The results indicate that the overall perceptions of OE in Homa Bay County hospitals are relatively high, with a total composite mean of 4.07, implying that personnel mostly agree that their hospitals employ resources efficiently, eliminate wastefulness, and achieve patient-based outcomes. However, a certain degree of disparity still exists between items.

Table 4.4: Descriptive Statistics on Operational Efficiency Constructs

Construct	Mean	Std. Deviation	Variance	N
Effective utilization of bed capacity	4.60	0.665	0.442	200
Reduction of patient waiting times through improved processes	4.10	0.833	0.693	200
Frequency of stock-outs of essential medicines and supplies	2.90	1.047	1.095	200
Optimal utilization of resources (staff, equipment, facilities)	3.70	0.902	0.814	200
Improvement in patient satisfaction with service delivery	4.40	0.665	0.442	200
Consistency in meeting service delivery targets and standards	3.75	0.700	0.490	200
Balancing cost control and service quality	4.05	0.807	0.651	200
Composite Mean	4.07			

The results prove what has been observed in the past, that operational efficiency relies substantially on the availability and consumption of resources. Muturi and Mwanga (2022) state that the higher financial efficiency enhances the productivity of the hospital, and Balkhi et al. (2022) show that with the help of efficient deployment of personnel and resources, waiting and patient outcomes will be reduced. In the same accord, Ali Mohamad et al. (2023) note that efficiency in healthcare greatly depends on efficient utilization of financial and material resources.

4.5 Correlation Analysis

Correlation analysis was used to test the relationship between all the variables in the study. As shown in table 4.5 below; Cost variance analysis (CVA) was strongly positively related to financial forecasting ($r = .811$, $p < .001$), moderately strongly related to cash flow analysis ($r = .706$, $p < .001$), and weak-to-moderately related to operational efficiency ($r = .422$, $p < .001$) as depicted in

Table 4.5. Financial forecasting (FF) was positively correlated with cash flow analysis (r = .752, p < .001) and operational efficiency (r = .536, p < .001), with moderate effects. Finally, the cash flow analysis (CFA) demonstrated a moderate to strong relation with operational efficiency (r = .635, p < .001).

Table 4.5: Correlation Analysis

		Cost Variance Analysis (CVA)	Financial Forecasting (FF)	Cash Flow Analysis (CFA)	Operational Efficiency (OE)
Cost Variance Analysis (CVA)	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	200			
Financial Forecasting (FF)	Pearson Correlation	.811**	1		
	Sig. (2-tailed)	<.001			
	N	200	200		
Cash Flow Analysis (CFA)	Pearson Correlation	.706**	.752**	1	
	Sig. (2-tailed)	<.001	<.001		
	N	200	200	200	
Operational Efficiency (OE)	Pearson Correlation	.422**	.536**	.635**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

4.6 Diagnostic test results

In order to apply inferential statistics, the data were subjected to the diagnostic tests for data normality, linearity, multicollinearity, and homoscedasticity, and the results were as follows:

4.6.1 Test for Normality

According to the Kolmogorov-Smirnov and Shapiro-Wilk tests, there were significant indications that the data on operational efficiency were not normally distributed (all p-values were less than .001 in terms of the various score categories). This deflexion of normalcy implies that the value is skewed and thus not suitable in its raw form to be used in parametric test statistics (as shown in table 4.6.1).

Table 4.6.1: Test for normality

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Operational Efficiency (OE)	Statistic	df	Sig.	Statistic	df	Sig.
Uptake	3.0	.	20	.	.	20	.
	3.4	.	10	.	.	10	.
	3.6	.	10	.	.	10	.
	3.8	.335	20	<.001	.641	20	<.001
	4.0	.	10	.	.	10	.
	4.4	.423	30	<.001	.597	30	<.001
	4.6	.335	20	<.001	.641	20	<.001
	4.8	.335	20	<.001	.641	20	<.001
	5.0	.214	60	<.001	.859	60	<.001

a. Lilliefors Significance Correction

To overcome this limitation, data normalization by taking logarithm transformation was used to minimize skewness and to make the distribution closer to normal. This process will make the data stable in variance and reduce the effects of extreme values and make the data suitable for further analysis. After transformation, the determination of the extent of normalistic had been re-evaluated to determine whether the assumptions provided were adequately fulfilled. As observed in the literature, the concept of transforming non-normal data is an acceptable and commonly used method of enhancing statistical authenticity in cases when the underpinning assumptions have been compromised (Field, 2018). This action guaranteed that the analysis given was conducted on more solid and dependable grounds. The result of the log-transformed data showed that the data was normally distributed whereby the P-values were > .05 as shown in the table below.

Table 4.6.2: Tests of Normality (Log-Transformed Data)

Operational Efficiency (OE)	Kolmogorov–Smirnov Statistic	df	Sig.	Shapiro–Wilk Statistic	df	Sig.
Uptake 3.0	.	20	.	.	20	.
3.4	.	10	.	.	10	.
3.6	.	10	.	.	10	.
3.8	.092	20	.200	.972	20	.215
4.0	.	10	.	.	10	.
4.4	.105	30	.176	.968	30	.148
4.6	.088	20	.200	.975	20	.231
4.8	.090	20	.200	.981	20	.324
5.0	.067	60	.200	.961	60	.221

4.6.2 Linearity test

To test the assumption of linearity in the regression model of Operational Efficiency (OE), a scatterplot of standardized residuals against standardized predicted values was created. One behavior that turned out to be an indicator of success in this assumption is the absence of a definite curve or pattern in the distribution of the points. In the current instance, the scatterplot indicates that the residuals are dispersed along the horizontal axis, but not in any particular pattern, such as a U-shape or inverted U-shape. This randomness suggests that the relationship between the predictors (Cost Variance Analysis, Financial Forecasting, and Cash Flow Analysis) and Operational Efficiency is suitable for a linear model. Thus, it becomes clear that the assumption of linearity in the regression analysis was fulfilled, which confirms the further statistical testing using regression.

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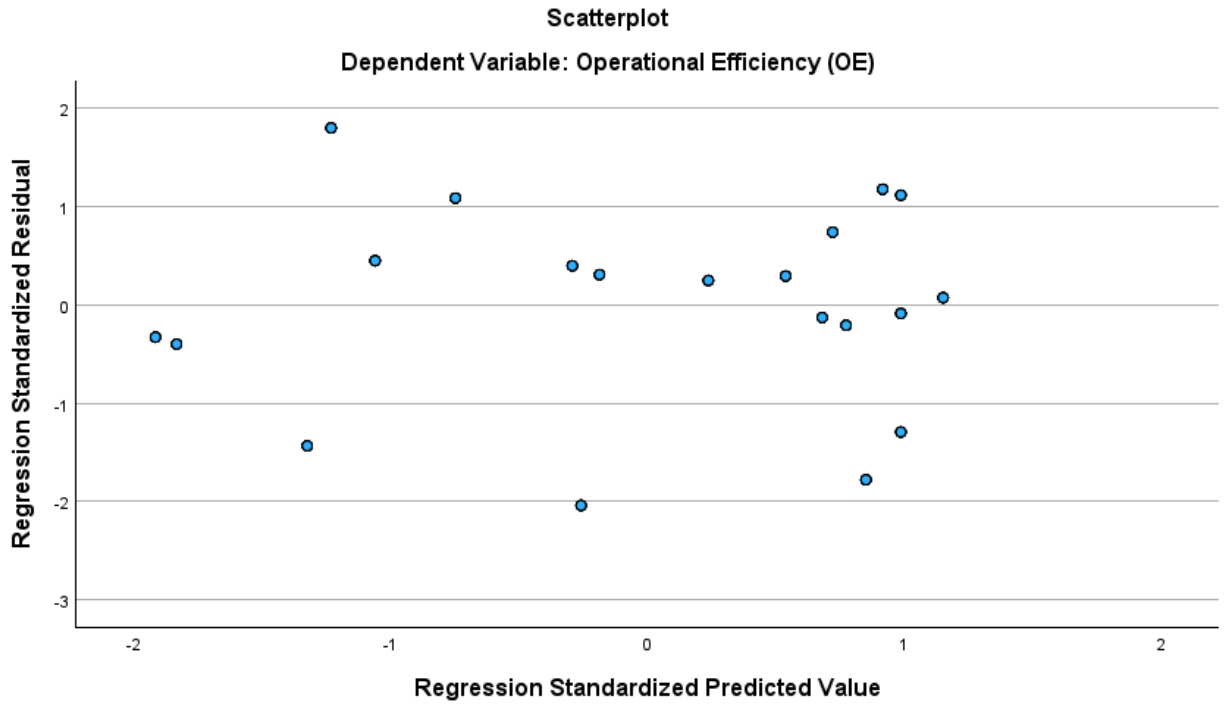

. Figure 4.6.2: Linearity test

4.6.3 Multicolinearity test

The coefficients table above presents the results of the multicollinearity test. The tolerance of the Variance Inflation Factor (VIF) was obtained to check for multicollinearity. A tolerance measurement of less than 0.1 (/0.2 by other standards) and a high VIF (greater than 10) are typical signs of a multicollinearity issue (Hair et al., 2018).

Referring to the results in the table, since all the VIF values are under the limit of 10, and tolerance scores are higher than 0.1, it can be concluded that the regression model does not present any problem of multicollinearity. Consequently, the independent variables (CVA, FF, and CFA) are acceptable in the analysis because there are no problematic levels of collinearity among these variables to bias or distort the regression findings**.**

Table 4.6.3 Multicolinearity test

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1(Constant)	1.392	.302		4.278	<.001		
Cost Variance Analysis (CVA)	.218	.115	1.193	2.164	.040	.322	3.110
Financial Forecasting (FF)	.309	.122	.261	2.542	.012	.278	3.595
Cash Flow Analysis (CFA)	.536	.079	.578	6.800	<.001	.407	2.457

a. Dependent Variable: Operational Efficiency (OE)

4.6.4 Heteroscedasticity

Heteroscedasticity was tested using the Glejser test where absolute residuals of the model were regressed against the independent variables. When the independent variables explain the absolute residuals significantly ($p < 0.05$), there is a high likelihood of heteroscedasticity i.e. unequal error variances. According to the results, Cost variance analysis (CVA) had a coefficient of -0.052 and significance level of 0.213, Financial Forecasting (FF) had a coefficient of 0.036 and a significance of 0.271, and Cash flow analysis (CFA) had a coefficient of 0.045 and a significance of 0.399. The p-values of all three predictors were higher than 0.05 and, hence, none of them significantly determined the absolute residuals. This indicates that the model shows no degrees of heteroscedasticity, that is the variance of the residuals is homogeneous across the levels of the predictor. In turn, the assumption of homoscedasticity was also not violated, which also means that the regression model could be considered as statistically viable.

Table 4.6.4 Heteroscedasticity

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	1.392	1.392		5.878	<.001
Cost Variance Analysis (CVA)	.218	.218	.797	3.065	.213
Financial Forecasting (FF)	.309	.309	.161	3.522	.271
Cash Flow Analysis (CFA)	.536	.536	.878	7.810	.399

a. Dependent Variable: Operational Efficiency (OE)

4.7 Regression Analysis results

The regression model was analyzed to establish the relationship between the cost variance analysis (CVA), financial forecasting (FF) and cash flow analysis (CFA) and operational efficiency (OE) of the Homabay County public hospitals.

Table 4.7.1: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.652[a]	.525	.416	.47385

a. Predictors: (Constant), Cash Flow Analysis (CFA), Cost Variance Analysis (CVA), Financial Forecasting (FF)

The statistics of the regression model indicate that the coefficient of determination (R^2) value is 0.425, meaning that the three predictors together explain 42.5% of the variation in operational efficiency. The adjusted R^2 of 0.525 indicates that the model performs well and can be reliably generalized to a large population, despite the adjustment for the number of included predictors. This means that 47.6 percent of the variation in operational efficiency can be attributed to other variables that will not be included in the present study, and hence, there is a general interplay between financial management practices and other variables in terms of organizational factors, structure, or managerial factors. The ANOVA indicated that the model was significant, with an F-value of 48.055 and a p-value of less than 0.001. The usage of CVA, FF, and CFA would add value in forecasting the operational efficiency of hospitals. As the level of significance was vastly lower than 0.05, the conclusion was that the null hypothesis—that the predictors have no sufficient explanatory power—was rejected. This thus makes the regression model an adequate indicator that there is significant correlation between the financial management practices and the operational efficiency of the hospitals involved in the study to an extent.

Table 4.7.2: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.279	3	.093	48.288	<.001[b]
	Residual	.377	196	.002		
	Total	.655	199			

a. Dependent Variable: Operational Efficiency (OE)
b. Predictors: (Constant), Cash Flow Analysis (CFA), Cost Variance Analysis (CVA), Financial Forecasting (FF)

The regression coefficients helped to give an insight into the kind of relationships that exist among the predictors and the operational efficiency. Operation efficiency was positively and significantly impacted by Cost Variance Analysis (CVA) (0.215, p = 0.026). This implies that the application of CVA increases the efficiency of operations since hospitals will be able to detect waste and employ remedial actions, which improves accountability. Financial Forecasting (FF) also had a good and significant effect (beta = 0.275, p = 0.012), meaning that proper planning and resource allocation based on the forecasting will be improved and enhance efficiency. In the same regard, Cash Flow Analysis (CFA) had the most dominant influence on operational efficiency (after gaining a positive 0.579, p < 0.001). It is basics of hospital operations that cash flow management in a facility is paramount in ensuring that there is no operational hitch. All these findings prove that the financial management practices make a significant contribution to the enhancement of the operational efficiency of healthcare institutions. It can be efficient when used strategically, as it exposes waste (Allain & Laurin, 2018), as contend other scholars such as Muturi and Mwanga (2022), to direct financial accountability.

Table 4.7.3: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.447	.028		15.998	<.001
	Cost Variance Analysis (CVA)	0.24	.011	.215	2.064	.026
	Financial Forecasting (FF)	.030	.011	.275	2.542	.012
	Cash Flow Analysis (CFA)	.050	.007	.579	6.800	<.001

a. Dependent Variable: Operational Efficiency (OE)

Financial forecasting showed a significant positive impact on operational efficiency (0.447, $p = 0.012$). This highlights the importance of predicting future resource requirements and financial flows to improve hospital performance. Benzidia, Makaoui, and Bentahar (2021) support this, noting that forecasting boosts organizational resilience by enabling proactive resource allocation and reducing uncertainty. Similarly, Ali Mohamad et al. (2023) found that promotional forecasting improves efficiency in resource-scarce settings when accurate data and competent employees are present.

The cash flow analysis became the most significant and influential factor on the efficiency of operations, with an outstandingly high and significant coefficient (0.579, $p < 0.001$). The centrality of liquidity management in supporting hospital operations is evidenced by this finding. Efficient cash flow analysis enables hospitals to maintain just enough liquidity to support their day-to-day operations, reduce service disruptions, and accurately forecast major expenditures. This aligns with Balkhi et al. (2022), who note that an efficient cash flow management system minimizes operational disruptions within healthcare organizations. At the Kenyan level, Kihara and Ngugi (2021) also noted that good cash management practices are a crucial factor in the stability of operations in public institutions. In summary, financial forecasting and cash flow analysis have a significant positive impact on operational efficiency in public hospitals, whereas cost variance analysis exhibits a weaker, positive effect. These findings suggest that financial controls should balance mechanisms, adaptive planning, and liquidity management in resource-constrained healthcare settings.

5 Conclusion

The primary research question of the study was to determine how management accounting practices affect the effectiveness of hospital operations in Homabay County. There are three general findings based on the results. First, the results validate the fact that cost-variance analysis has a statistically significant influence on operational efficiency. This means that financial control, which helps with the better allocation of resources in public hospitals, can be reinforced with viable cost-variance analysis. Through routine and detailed cost-variance analysis, management teams can identify forms of inefficiencies, control any runaway expenditures, and maintain financial sobriety in their activities. Second, the results indicate that financial forecasting is not only

practical but also has an immense impact on operational efficiency. Hospitals in resource-deprived environments need future-oriented financial planning. The proactive use of financial forecasts enables hospital managers to plan, allocate resources effectively, and make informed, strategic decisions. This leads to improved stability and maximizes performance. Thirdly, the research indicates that the most significant management accounting practice in improving operations is cash flow analysis. The monitoring and management of cash flows are crucial to sustaining the service delivery process without disruption. An appropriate cash flow analysis enables managers to ensure that they carry out managerial spending effectively and thereby retain liquidity to deliver optimal services to patients. Overall, the research concludes that management accounting practices, especially cost-variance examination, monetary outlook, and cash flow estimation, are vital to the operational excellence of Homabay County's open hospitals. Empowering these practices can thus help to improve the management of finances, increase stability, and improve the quality of services produced in the health sector.

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