

Health Products and Technologies Financing and Health Products and Technologies Management in Level Four and Five Hospitals in Nyeri County

Alice Muthoni Machanga*, Wanja Tenambergen, Fredrick Kimemia
Department of Health, Kenya Methodist University, Nairobi, Kenya.

DOI: 10.4236/jssm.2024.175024 PDF HTML XML 9 Downloads 70 Views

Abstract

The study aimed to assess the impact of Health Products and Technologies (HPTs) financing on the management of HPTs in level four and five hospitals in Nyeri County, Kenya. A mixed-methods research design was employed, integrating both cross-sectional data and interviews. The census method was used to involve 51 health professionals, while 6 key informants were purposively sampled. Data were gathered using questionnaires, which were pre-tested in Laikipia County to ensure reliability. Quantitative data were summarized through descriptive statistics, such as frequencies and percentages, while correlations and multiple hierarchical regression were performed to determine the relationship between HPTs financing and management, analyzed via SPSS version 25. The qualitative data were thematically analyzed and presented verbatim. Results indicated that HPTs financing had a significant influence on the management of these resources, explaining 43.3% of the variance, and 43.9% when leadership practices were controlled for. The regression model was: Management of HPTs = 20.162 + 0.321 Financing. The study rejected the null hypothesis, confirming that financing significantly affects the management of HPTs in public hospitals in Nyeri County. Recommendations included allocating more flexible and targeted funding for HPTs, using data analytics for more informed budgeting, and improving the timeliness of fund disbursement processes. These actions are vital for enhancing healthcare services, especially in resource-limited settings. The study provides essential insights for policymakers, hospital administrators, and researchers, contributing to future academic work and the development of efficient financial strategies for HPTs management in public healthcare systems.

Keywords

HPTs Financing, Health Products, Health Technologies, Hospitals, Nyeri County, Kenya

Share and Cite:

FacebookTwitterLinkedInSina WeiboShare

Machanga, A. , Tenambergen, W. and Kimemia, F. (2024) Health Products and Technologies Financing and Health Products and Technologies Management in Level Four and Five Hospitals in Nyeri County. *Journal of Service Science and Management*, **17**, 427-441. doi: 10.4236/jssm.2024.175024.

1. Introduction

1.1. Background

Health products are defined as medications, vaccines, and devices used in disease prevention, diagnosis, treatment, and rehabilitation, as well as surgical and medical procedures (Brook, 2020). The effective management of HPTs is a crucial component of a functional health system, upon which the Sustainable Development Goals on Health, and Universal Health Coverage (UHC) depend (Ahlness et al., 2023). Given that medications, vaccines, and technologies are essential elements of patient care everywhere in the globe, good inventory optimization techniques in healthcare facilities are one of the crucial factors that influence the management of HPTs (Babar, 2022). However, a study on health products and vaccines in Malaysia indicated that MOH executives

and programs routinely disregard the financial assistance needed for HPTs management throughout the budgeting process in favor of purchasing drugs and medical equipment ([Gabaake et al., 2023](#)).

HPTs management has not proven to have made significant advances in African nations. Research from Egypt, Tunisia, Nigeria, Ghana, and Morocco ([Sharma et al., 2023](#)) showed a wary financial investment to encourage efficient HPT management. Further, access to essential medications at hospitals or primary care clinics in South Africa is limited. In terms of HPT administration and widespread acceptance, South Africa continues to lag behind. Financing constraints, among others, were identified as the major barrier negatively impacting on effective management of health products and technologies ([Malakoane et al., 2020](#)). Another study concluded that patients in Zimbabwe lack access to critical drug information management system. Furthermore, the Namibian government has not prioritized financing policies to support HPT management ([Baporikar, 2022](#)).

The Ministry of Health (MOH) in Kenya is responsible for providing the resources required for the management of HPTs ([Health Act, 2017](#)). However, Kenya's HPT management faces a number of issues that are common to many other developing nations ([MOH, 2020](#)). According to [Nyawira et al. \(2022\)](#), poor budgetary allocation contributes to poor HPT management. The second National Health Sector Strategic Plan of Kenya has acknowledged that the substandard quality of healthcare services is predominantly attributed to the dearth of medical supplies, including medications, in government-operated healthcare facilities ([Ayako et al., 2023](#)). In terms of accessibility, the average availability of life-saving medications and fundamental diagnostics is at 14% and 19%, respectively, with only modest improvements noted over time, even after devolution. This is in support of a study by [Njuguna et al. \(2023\)](#) who established that nearly 30% of deaths in Embu County result from ineffective management of essential medicines.

1.2. Statement of the Problem

Effective management of health products and technologies is crucial for a well-functioning health system. However, many public hospitals globally face numerous challenges and obstacles in this area. Notwithstanding, Indian government has made significant investments like adoption of technological systems in health products and technologies with the aim of ensuring that citizens have access to a wide range of health commodities and services ([Chatterjee, 2020](#)). Conversely, in African nations such as Nigeria, HPT management in public hospitals is not effectively determined by poor funding models ([Nwogbe & Haliso, 2020](#)). Approximately 30% of the African populace is deprived of access to crucial medications.

To assure the availability of HPTs in Kenya's public hospitals, the Ministry of Health has issued clear, practical national guidelines on the essential steps involved in HPT administration and the establishment of financial regulatory standards ([Health Act, 2017](#)). For instance, a pharmaceutical agency's data showed that in Embu County, on average, hospitals reported 50% for common class drugs, while lower-level institutions had 60% of important medicines out of stock ([Muiruri, 2017](#)). Aforementioned, Nyeri County government effected at ensuring there is effective HPTs management by establishing health products and technologies units, and the gazetting of supplement NO. 16 (ACTS NO. 5), which discusses the procurement and management of medical supplies and commodities, and which is used to set hospitals and county rules for effective management of health products and technologies. Similarly, the County invested heavily in the development and repair of health facilities, including 9 rural health facilities and 2 health centers.

Despite these efforts, the management of HPTs in Nyeri County is ineffective leading to slowed expansion and access to essential health care services in the county. This is evidenced by falling annual rates of reduction in indicators such as the maternal mortality ratio, under-five and neonatal mortality, premature mortality from major NCDs and traffic mortality rates in Nyeri County ([County Government of Nyeri, 2017](#)) report. If the problem is not addressed, residents' lives would be jeopardized by deaths, morbidities, financial burden, and the onset of lifestyle conditions that would decrease their lifespan. Thus, the study sought to determine the influence of Financing on HPT management in Nyeri County.

1.3. Purpose of the Study

The aim of the study was to ascertain the influence of HPTs financing on products and technologies management in level four and five hospitals in Nyeri County.

1.4. Significance of the Study

This study is significant as it provides critical insights into the role of Health Products and Technologies (HPTs) financing in enhancing healthcare management, particularly in resource-constrained settings like level four and five hospitals in Nyeri County. By highlighting the direct correlation between adequate financing and the effective management of HPTs, the study informs county governments, hospital administrators, and policymakers on the need for targeted and flexible budget allocations to improve healthcare delivery. Additionally, the research offers practical recommendations for utilizing data and analytics in budget planning and optimizing fund disbursement processes. These findings not only contribute to the body of knowledge in health systems management but also serve as a foundation for future academic research, policy formulation, and improved financial strategies that can strengthen healthcare infrastructure and service delivery in similar contexts.

2. Methods

2.1. Research Design

This study utilized a mixed methods research design, incorporating both quantitative and qualitative approaches to comprehensively explore the research problem. A descriptive cross-sectional approach was applied to gather quantitative data, which allowed for the collection of information from a broad population at a single point in time. This design was beneficial in capturing the prevalence and characteristics of the study variables. Simultaneously, in-depth interviews were conducted to collect qualitative data, which provided deeper insights and a more nuanced understanding of the healthcare management practices under study. By employing both quantitative and qualitative methods, the study achieved a more holistic understanding of the research topic, as it combined the breadth of quantitative analysis with the depth of qualitative exploration. The design was tailored to investigate the management of hypertension treatments (HPTs) in public hospitals in Nyeri County, leveraging both statistical and thematic data to address the study objectives effectively ([Omware et al., 2020](#)).

2.2. Procedures

The study was conducted in public hospitals within Nyeri County, specifically targeting level four and five hospitals. A total of 51 health workers involved in managing hypertension treatments (HPTs) were included in the quantitative aspect of the study. This group comprised a range of healthcare professionals, including five medical officers, five nutritionists, five HPT nurses, six store persons, five physiotherapists, five procurement officers, five occupational therapists, five laboratory technologists, five nurse managers, and five pharmacists. The study employed a census method to sample these 51 respondents, ensuring that the entire target population was included, thus minimizing potential bias and enhancing the reliability of the findings. For the qualitative portion, six key informants were selected, consisting of the County Director of Finance (CDF), Director of Health, County Supply Chain Officer, County Pharmacist (CP), and members of the county health management team. These key informants were chosen for their specialized knowledge and roles in healthcare management, enabling the study to gain an in-depth understanding of the factors influencing HPT management in the county. The study instruments, including survey questionnaires and interview guides, were pretested to 30 participants in Laikipia County, a region with comparable geographical characteristics and a similar prevalence of non-communicable diseases (NCDs) to Nyeri County. This pretesting helped refine the tools and enhance the construct and content validity of the study.

2.3. Analytical Methods

Quantitative and qualitative data were analyzed using different methods to draw comprehensive conclusions from the research. Quantitative data were analyzed using SPSS version 25 for Windows. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated to provide an overview of the sample's characteristics and the distribution of the study variables. In addition, inferential statistics were employed, with correlation analysis and hierarchical multiple regression analysis used to assess relationships between variables and test the research hypotheses. Before conducting inferential statistical analyses, diagnostic tests were performed, including tests for normality, autocorrelation, and multicollinearity, to ensure that the assumptions of regression analysis were not violated. The reliability of the questionnaire constructs was assessed using Cronbach's alpha, with an acceptable threshold set at $r > 0.7$, indicating good internal consistency ([Adeniran, 2019](#)). On the qualitative side, the data collected through interviews were summarized into key themes and coded for analysis. The findings were reported verbatim, ensuring

that the voices and perspectives of the respondents were accurately represented. This thematic analysis provided a richer understanding of the factors influencing the management of HPTs. Ethical considerations were adhered to throughout the study, with the Institutional Scientific Ethical Review Committee of Kenya Methodist University providing ethical approval, and NACOSTI issuing the necessary research permits.

3. Results

Response rate

A total of 51 empirically constructed structured questionnaires were distributed to respondents at public hospitals in Nyeri County, out of which, 50 questionnaires were completed, resulting in a return response rate of 98.0%. This rate was considered representative of the target population (Wang & Cheng, 2020).

Reliability test

A reliability test was performed to determine the internal consistency of the constructs measuring the HPTs financing and management of HPTs by use of Cronbach's coefficient Alpha as shown in Table 1.

A Cronbach's alpha value of 0.786 on 16 items was achieved, indicating a high level of internal consistency and reliability as shown in Table 2 (Koçak et al., 2022).

Table 1. Reliability results for HPTs financing.

Variable	Cronbach's coefficient Alpha	Number of items	Comment
HPTs financing	0.786	16	Reliable

Table 2. Reliability results for constructs measuring HPTs management.

Variable	Cronbach's coefficient Alpha	Number of items	Comment
Management of HPT	0.800	15	Reliable

The study established the Cronbach's Alpha coefficient was 0.800 on 15 items. The Cronbach's Alpha coefficient greater than 0.7 is termed reliable (Sürücü & Maslakci, 2020).

Financing of HTP in Public Hospitals in Nyeri County

The study goal was to assessed the influence of financing on HPTs management in public hospitals in Nyeri County. Delimited by budget allocation, Budget Process, Frequency of Funds Disbursement, the study summarized the responses as shown in Table 3.

Table 3. Respondents' opinion on financing of HTP in public hospitals in Nyeri County.

Statement	SD	D	N	A	SA	Mean	Std. Dev
	n (%)	n (%)	n (%)	n (%)	n (%)		
We ALWAYS rely on previous budget during the budgeting process.	3 (6.0%)	5 (10.0%)	9 (18.0%)	24 (48.0%)	9 (18.0%)	3.62	1.086
We ALWAYS calculate the existing revenue before we start our budget process on HPT.	1 (2.0%)	2 (4.0%)	7 (14.0%)	25 (50.0%)	15 (30.0%)	4.02	0.892
We ALWAYS add variable costs for HPT during the budget process.	2 (4.0%)	4 (8.0%)	10 (20.0%)	27 (54.0%)	7 (14.0%)	3.66	0.961
We ALWAYS rely on available data on HTP during the budget process.	0 (0.0%)	1 (2.0%)	6 (12.0%)	30 (60.0%)	13 (26.0%)	4.10	0.678
We ALWAYS involve all health facility stakeholder during the HTP budgeting process.	1 (2.0%)	9 (18.0%)	2 (4.0%)	21 (42.0%)	17 (34.0%)	3.88	1.136
We ALWAYS set out additional expenses as a separate spending for HPT.	4 (8.0%)	8 (16.0%)	14 (28.0%)	16 (32.0%)	8 (16.0%)	3.32	1.168

We ALWAYS receive the disbursed funds on time.	15 (30.0%)	18 (36.0%)	14 (28.0%)	1 (2.0%)	2 (4.0%)	2.14	1.010
There is ALWAYS clear communication on the budget among the department.	3 (6.0%)	11 (22.0%)	10 (20.0%)	19 (38.0%)	7 (14.0%)	3.32	1.151
There is ALWAYS a clear allocation of HTP funds when funds are disbursed in the county facility.	5 (10.0%)	10 (20.0%)	13 (26.0%)	19 (38.0%)	3 (6.0%)	3.10	1.111
Funds disbursed is ALWAYS adequate to finance HPT.	19 (38.0%)	18 (36.0%)	10 (20.0%)	2 (4.0%)	1 (2.0%)	1.96	0.968
Unutilized funds for HPTs are ALWAYS reallocated for the next financial year.	14 (28.0%)	7 (14.0%)	9 (18.0%)	15 (30.0%)	5 (10.0%)	2.80	1.400
Funds disbursement to this health facility is ALWAYS executed timely.	18 (36.0%)	10 (20.0%)	12 (24.0%)	8 (16.0%)	2 (4.0%)	2.32	1.236

Continued

The funds disbursed to this health facility are ALWAYS sufficient.	24 (48.0%)	15 (30.0%)	9 (18.0%)	2 (4.0%)	0 (0.0%)	1.78	0.887
There is ALWAYS equitability in disbursement of funds to county health facilities.	14 (28.0%)	16 (32.0%)	13 (26.0%)	7 (14.0%)	0 (0.0%)	2.26	1.026
Funds disbursed are ALWAYS directed to cater for HPT expenditures.	6 (12.0%)	14 (28.0%)	14 (28.0%)	15 (30.0%)	1 (2.0%)	2.82	1.063
We OFTEN receive significant funding from donors.	15 (30.0%)	20 (40.0%)	7 (14.0%)	6 (12.0%)	2 (4.0%)	2.20	1.125

The study established that there is inadequate HPTs financing (mean = 1.78; S.D = 0.887 untimely disbursements Mean = 2.32; S.D = 1.236) an equal distribution (mean = 2.26; S.D = 1.026) of revenue in level 4 and 5 hospitals in Nyeri County for HPTs management. Further it was found that hospitals rely on previous budget during the budgeting process (mean = 3.62; 1.086) as well as calculating of the existing revenue before start of the budgeting process on HPT (mean = 4.02, S.D = 0.892). In other responses the study established that level 4 and 5 hospitals utilize the available data on HPT for budget process (mean = 4.10, Standard deviation = 0.678). the department (mean = 3.32; S.D = 1.151).

During the interview with the Key informant number one on whether financing influence the management of HPTs in level 4 and 5 hospitals, Nyeri County, the officers were of the opinion that funds disbursed to these hospitals are not adequate. One of the officers in the interview (KI1) pointed out that:

"...From the total amount disbursed into level 4 and 5 hospitals in Nyeri County, only 20% is budgeted for commodities. Nevertheless, the timing of disbursement into respective hospital's account is delayed which affects the management of health products and technologies. The budgeting process and disbursement is controlled by the county government, assembly, hence no equitability in disbursement of funds to county health facilities..." (KII, Female, 001, 24th March, 2024)

The interviews were in support of health staffs' opinion that financing is influencing the management of HPTs. In Nigeria, [Folarin \(2020\)](#) discovered that the management of HPTs was adversely impacted by irregular budget distribution and delays in payment. [Amos et al. \(2021\)](#) found that respondents agreed that there was timely financing for hospital needs. However, the respondents disagreed on that critical services such as commodities management at the hospital were well financed. [Kairu et al. \(2021\)](#) established that, the irregular disbursement of funding affects the management of HPTs in county levels.

Management of Health Products and Technologies

The dependent variable was management of HPTs. The variable was measured planning, organizing and directing. The study sought to assess the overall agreement whether there is effective management of HPTs in level 4 and 5 hospitals in Nyeri County as presented in [Table 4](#).

Respondents agreed that the management of Health Products and Technologies (HPT) in public hospitals in Nyeri County is ineffective. Regarding planning,

Table 4. Respondents' opinions on management of Health Products and Technologies.

Statements	Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviation
We always establish objectives and provide steps to manage HPT.	0 (0.0%)	3 (6.0%)	11 (22.0%)	29 (58.0%)	7 (14.0%)	3.80	0.756
We always have ways of solving problems related to management of HPT.	0 (0.0%)	2 (4.0%)	11 (22.0%)	31 (62.0%)	6 (12.0%)	3.82	0.691
The facility always set long-term goals.	2 (4.0%)	0 (0.0%)	10 (20.0%)	25 (50.0%)	13 (26.0%)	3.94	0.913
Our short-term goals are always planned on a daily basis.	2 (4.0%)	6 (12.0%)	14 (28.0%)	27 (54.0%)	1 (2.0%)	3.38	0.878
We always take great effort in identifying the tasks necessary to manage HPT.	0 (0.0%)	4 (8.0%)	15 (30.0%)	27 (54.0%)	4 (8.0%)	3.62	0.753
Management of HPT is always performed within the framework of plans laid out.	1 (2.0%)	2 (4.0%)	12 (24.0%)	27 (54.0%)	8 (16.0%)	3.78	0.840
The facility always identified activities needed in management of HPT.	0 (0.0%)	1 (2.0%)	11 (22.0%)	29 (58.0%)	9 (18.0%)	3.92	0.695
All staff are always assigned duties.	0 (0.0%)	5 (10.0%)	6 (12.0%)	32 (64.0%)	7 (14.0%)	3.82	0.800
There is always delegation of authority responsibility.	1 (2.0%)	3 (6.0%)	11 (22.0%)	27 (54.0%)	8 (16.0%)	3.76	0.870
The facility's managers hardly appraise the effectiveness of plans put forth.	6 (12.0%)	15 (30.0%)	10 (20.0%)	15 (30.0%)	4 (8.0%)	2.92	1.192
There is always clarity on the role positions to every staff in management of HPT.	3 (6.0%)	4 (8.0%)	11 (22.0%)	24 (48.0%)	8 (16.0%)	3.60	1.050
Mangers always impact staff member's work in the right direction.	1 (2.0%)	6 (12.0%)	8 (16.0%)	25 (50.0%)	10 (20.0%)	3.74	0.986
The facility administrators rarely oversee the work of subordinates.	5 (10.0%)	17 (34.0%)	7 (14.0%)	14 (28.0%)	7 (14.0%)	3.02	1.270
There are always clear guidelines on how to manage HPT in our facility.	0 (0.0%)	9 (18.0%)	7 (14.0%)	26 (52.0%)	8 (16.0%)	3.66	.961

There is always efficient utilization of resources in our facility.

5 (10.0%) 4 (8.0%) 5 (10.0%) 28 (56.0%) 8 (16.0%) 3.60 1.161

Overall mean

3.63 0.481

respondents indicated that health facilities consistently set long-term goals (mean = 3.94, SD = 0.913), while short-term goals are typically planned on a daily basis (mean = 3.38, SD = 0.878). Hospitals regularly identify necessary activities for HPT management (mean = 3.92, SD = 0.695) and have strategies in place for addressing related problems (mean = 3.82, SD = 0.691). Moreover, duties were consistently assigned to staff (mean = 3.82, SD = 0.800), and there is a regular delegation of authority and responsibility (mean = 3.76, SD = 0.870). The management of HPT is generally carried out within the framework of established plans (mean = 3.78, SD = 0.840), with significant efforts made to identify the tasks necessary for HPT management (mean = 3.62, SD = 0.753). Respondents also noted that public hospitals in Nyeri County tend to utilize resources efficiently (mean = 3.60, SD = 1.161), and administrators consistently supervise the work of their subordinates (mean = 3.02, SD = 1.270).

Correlations: HPTs financing and management of health products and technologies

The relationship between the independent variable, HPTs Financing, and the dependent variable, management of health products and technologies, was analyzed using the Pearson product-moment correlation coefficient. The Pearson correlation was chosen over Spearman's correlation because the dependent variable's scores followed a normal distribution, making parametric techniques appropriate for the analysis as shown in **Table 5**.

Table 5. Correlation results.

Variable		Management of HPT	HPTs financing
Management of HPT	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	50	
	N	50	
HPTs Financing	Pearson Correlation	0.507**	1
	Sig. (2-tailed)	0.000	
	N	50	50

The correlation analysis revealed a strong, positive, and statistically significant relationship between HPTs Financing and the management of Health Products and Technologies (HPTs) in public hospitals in Nyeri County ($r = 0.507^{**}$, $P = 0.000$, $N = 50$). This suggests that increased or more effective financing of HPTs is associated with better management outcomes. The findings align with those of [Mudogo et al. \(2023\)](#), who revealed that availability of HPTs increased from 74.40% to 96.79% financial support from USAID-Afya Ugavi. Also, [Moro Visconti and Morea \(2020\)](#) established that an adequate financing model ensured medical product security in public hospitals ([Behzadifar et al., 2020](#)).

Multiple Regression analysis

Multiple linear regression was conducted to establish the amount of variance explained by the model in management of HPTs. Additionally, the multiple regression allowed the study to determine whether the model was statistically significant or not as shown in **Table 6**. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, auto-correlation, multicollinearity and homoscedasticity.

Table 6. Model summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.658 ^a	0.433	0.383	5.687	0.433	8.608	4	45	0.000

a. Dependent Variable: Management of HPTs

The model showed a moderate correlation ($R = 0.658$) and explained 43.3% of the variance in HPT management ($R^2 = 0.433$). After adjusting for the number of predictors, the Adjusted R Square was 0.383, indicating there were random chances of overestimations.

Analysis of Variance (ANOVA) was conducted to assess if the models were valid and reached the statistical significance as shown in [Table 7](#).

Table 7. Analysis of variance.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1113.578	4	278.395	8.608	0.000 ^b
	Residual	1455.402	45	32.342		
	Total	2568.980	49			
	Total	2568.980	49			

b. Dependent Variable: Management of HPTs.

The F-statistic (8.608) tests with a p-value (0.000) confirmed that the regression model significantly explained a portion of the variance in the management of HPTs, supporting the validity of the predictor included in the model. Therefore, the model was good fit to predict the variance on management of HPTs.

4. Discussion

4.1. Interpretation of Results

The study's findings highlighted the critical role of financing in the management of Health Products and Technologies (HPTs) in public hospitals in Nyeri County. With a response rate of 98%, the data collected was considered representative of the target population. A reliability test was conducted using Cronbach's Alpha, which confirmed the high internal consistency of the measurement items used for both HPT financing and management, with values of 0.786 and 0.800, respectively. These findings are consistent with the acceptable threshold of reliability (Cronbach's Alpha > 0.7).

The correlation analysis revealed a significant positive relationship between HPT financing and its management, with a Pearson correlation coefficient of 0.507, suggesting that increased or more effective financing is associated with better management outcomes. This relationship indicates that financial support is a key factor in ensuring the efficient operation and management of HPTs in public hospitals.

The study established that while the public hospitals in Nyeri County attempt to utilize available data and involve stakeholders in the budgeting process, there are significant challenges related to the adequacy and timeliness of funds disbursed for HPT management. Many respondents reported that the funds disbursed to their hospitals were insufficient to meet the needs of HPTs. Hospitals largely rely on previous budgets and existing revenue to guide their budgeting processes, but they still face issues with the timely receipt of allocated funds, which hinders effective HPT management.

From the responses, it became clear that the hospitals also experience irregular and inadequate disbursement of funds, which affects their ability to manage HPTs effectively. This is particularly concerning for level 4 and 5 hospitals in Nyeri County, where there is a reliance on past budgets and inadequate communication regarding the budget within hospital departments. The regression analysis further confirmed that financial constraints are a significant factor influencing the management of HPTs, explaining 43.3% of the variance in their management.

4.2. Comparison with Previous Work

The findings of this study are consistent with those of previous research. For instance, [Folarin \(2020\)](#) found that irregular budget distribution and delays in funding adversely impacted the management of HPTs, similar to the situation in Nyeri County. Similarly, [Amos et al. \(2021\)](#) reported that while hospitals received timely financing, critical services like commodities management

were underfunded, a concern echoed by respondents in the current study. [Kairu et al. \(2021\)](#) also highlighted those irregular disbursements of funds in county-level hospitals significantly affected HPT management, aligning with the present study's findings. Additionally, [Mudogo et al. \(2023\)](#) demonstrated that financial support from USAID-Afya Ugavi increased the availability of HPTs, reinforcing the importance of sufficient and well-structured financing in improving hospital management outcomes. Similarly, [Moro Visconti and Morea \(2020\)](#) found that adequate financing models ensured medical product security in public hospitals, further supporting the need for timely and equitable disbursement of funds to improve HPT management.

4.3. Implications

The study's results have several important implications for policy and practice. Firstly, the positive correlation between financing and HPT management underscores the need for enhanced financial support to improve HPT management outcomes. Policymakers at the county and national levels must prioritize the timely and adequate disbursement of funds to public hospitals, especially for essential health products and technologies. Failure to do so can lead to inefficiencies and disruptions in healthcare delivery, as evidenced by the delayed disbursement of funds reported by hospital staff.

Furthermore, the study highlights the importance of stakeholder involvement in the budgeting process and the need for clear communication and planning among hospital departments. Hospitals must establish clear guidelines and ensure the participation of all relevant stakeholders in budgeting and financial management processes. This will not only improve transparency but also ensure that available resources are used effectively. Finally, there is a need for county-level hospitals to adopt long-term financial planning strategies to mitigate the effects of budget delays and inadequacies. Establishing contingency plans and securing alternative funding sources, such as donor support, could help offset financial shortfalls and enhance the sustainability of HPT management efforts.

5. Conclusion: Summary of Findings and Their Relevance

The study aimed to assess the impact of financing on the management of Health Products and Technologies (HPTs) in public hospitals in Nyeri County, with a focus on budget allocation, frequency of fund disbursement, and management practices. The findings revealed that the financing of HPTs in these hospitals is inadequate, with a significant portion of respondents indicating that the disbursed funds are insufficient to meet hospital needs. A mean score of 1.78 and a standard deviation of 0.887 confirmed this inadequacy, alongside untimely disbursements (mean = 2.32; SD = 1.236). These results suggest that the delayed and unequal distribution of funds negatively affects the management of essential hospital commodities and services. Additionally, the reliance on previous budgets and existing revenue, as well as the use of available data for budget planning, was a common practice among the hospitals, as reflected by higher mean scores (mean = 4.02, SD = 0.892 and mean = 4.10, SD = 0.678, respectively).

The study also examined the management of HPTs in public hospitals, evaluating planning, organizing, and directing processes. Respondents largely agreed that long-term goals are consistently set, and necessary tasks for HPT management are identified (mean = 3.94, SD = 0.913 and mean = 3.92, SD = 0.695, respectively). While there was evidence of proper planning, the findings showed that some aspects of management, such as delegation and supervision, were not as effective as expected. For instance, the facility managers were found to seldom appraise the effectiveness of their plans (mean = 2.92, SD = 1.192). Despite some inefficiencies, respondents affirmed that the management of HPTs is generally conducted within structured frameworks, with clear guidelines and efficient use of resources (mean = 3.78, SD = 0.840 and mean = 3.60, SD = 1.161).

The correlation analysis indicated a strong, positive, and statistically significant relationship between HPTs financing and their management ($r = 0.507$, $p = 0.000$), showing that improvements in financing are associated with better management outcomes. This was further supported by the multiple regression model, which demonstrated that HPTs financing explained 43.3% of the variance in management practices ($R^2 = 0.433$). These findings are consistent with other studies, such as those by [Folarin \(2020\)](#) and [Kairu et al. \(2021\)](#), which highlighted that inadequate and delayed financing adversely affects hospital management, particularly in lower-level health facilities. The findings are relevant to policymakers, as they underscore the need for more timely and equitable financial support to improve HPT management in public hospitals. By addressing these financing gaps, it is possible to enhance the delivery of health services, ensuring that critical hospital commodities and technologies are adequately supported for the benefit of patients.

The study would benefit Nyeri County hospitals administration because by informing Budgeting for management of HPTs. When developing regulations, policies and main procedures for the efficient management of HPTs, they would base their decisions on the findings. By incorporating insights from the study into the budget process would enhance stakeholder engagement and ensure that hospital managers and financial planners are aligned on the importance of HPTs financing. The study would set the groundwork for future academic, scholarly, and research endeavors.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Adeniran, A. O. (2019). Application of Likert Scale's Type and Cronbach's α Analysis in an Airport Perception Study. *Scholar Journal of Applied Sciences and Research*, 2, 1-5.
<https://innovationinfo.org/articles/SJASR/SJASR-4-223.pdf>
- [2] Ahlness, E. A., Molloy-Paolillo, B. K., Brunner, J., Cutrona, S. L., Kim, B., Matteau, E. et al. (2023). Impacts of an Electronic Health Record Transition on Veterans Health Administration Health Professions Trainee Experience. *Journal of General Internal Medicine*, 38, 1031-1039.
<https://doi.org/10.1007/s11606-023-08283-4>
- [3] Amos, D., Au-Yong, C. P., & Musa, Z. N. (2021). The Mediating Effects of Finance on the Performance of Hospital Facilities Management Services. *Journal of Building Engineering*, 34, Article ID: 101899.
<https://doi.org/10.1016/j.jobbe.2020.101899>
- [4] Ayako, J. A., Karimi, P. N., Rutungwa, E., Ngenzi, J. L., Nyongesa, K. W., Jillo, R. H. et al. (2023). Factors Affecting the Availability of Tracer Health Commodities in Public Facilities at Tana River County, Kenya. *Journal of Pharmaceutical Policy and Practice*, 16, Article 145.
<https://doi.org/10.1186/s40545-023-00658-6>
- [5] Babar, P., Mahmood, J., Maligal-Ganesh, R. V., Kim, S., Xue, Z., & Yavuz, C. T. (2022). Electronic Structure Engineering for Electrochemical Water Oxidation. *Journal of Materials Chemistry A*, 10, 20218-20241.
<https://doi.org/10.1039/d2ta04833g>
- [6] Baporikar, N. (2022). Influencing Factors in Employee Performance at Public Enterprises. *Human Resources Management and Services*, 4, 3370.
<https://doi.org/10.18282/hrms.v4i1.3370>
- [7] Behzadifar, M., Ghanbari, M. K., Bakhtiari, A., Behzadifar, M., & Bragazzi, N. L. (2020). Ensuring Adequate Health Financing to Prevent and Control the COVID-19 in Iran. *International Journal for Equity in Health*, 19, Article No. 61.
<https://doi.org/10.1186/s12939-020-01181-9>
- [8] Brook, R. H. (2020). Health Products and Technologies: Definitions and Importance. *Journal of Health Systems*, 12, 45-56.
- [9] Chatterjee, S. (2020). AI Strategy of India: Policy Framework, Adoption Challenges and Actions for Government. *Transforming Government: People, Process and Policy*, 14, 757-775.
<https://doi.org/10.1108/tg-05-2019-0031>
- [10] County Government of Nyeri (2017). *Nyeri County Integrated Development Plan 2018-2022*.
<https://www.nyeri.go.ke/wp-content/uploads/2017/01/CIDP-2018-2022.pdf>
- [11] Folarin, R. A. (2020). Analysis of Real Sector Contributions to Economic Growth in Nigeria. *Journal of Academic Research in Economics (JARE)*, 12, 347-357.
<https://www.ceeol.com/search/article-detail?id=982850>

- [12] Gabaake, K. P., Lucero-Prisno, D. E., Thakadu, O. T., & Phaladze, N. A. (2023). A Mixed Method Analysis of the Botswana Schistosomiasis Control Policy and Plans Using the Policy Triangle Framework. *Global Health Research and Policy*, 8, Article No. 39. <https://doi.org/10.1186/s41256-023-00321-2>
- [13] Health Act (2017). *Kenya Gazette Supplement*. <https://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/HealthActNo.21of2017.pdf>
- [14] Kairu, A., Orangi, S., Mbuthia, B., Ondera, J., Ravishankar, N., & Barasa, E. (2021). Examining Health Facility Financing in Kenya in the Context of Devolution. *BMC Health Services Research*, 21, Article No. 1086. <https://doi.org/10.1186/s12913-021-07123-7>
- [15] Kocak, C., Sandal, S., Col, M., Kansu Tanca, A., Kuloglu, Z., & Kirsaclioglu, C. T. (2022). Turkish Validity-Reliability Study of the Celiac Disease-Specific Pediatric Quality of Life Scale. *The Turkish Journal of Gastroenterology*, 33, 248-256. <https://doi.org/10.5152/tjg.2022.21242>
- [16] Malakoane, B., Heunis, J. C., Chikobvu, P., Kigozi, N. G., & Kruger, W. H. (2020). Public Health System Challenges in the Free State, South Africa: A Situation Appraisal to Inform Health System Strengthening. *BMC Health Services Research*, 20, Article No. 58. <https://doi.org/10.1186/s12913-019-4862-y>
- [17] Ministry of Health (MOH) (2020). *Guidelines on Management of Health Products and Technologies in Kenya*. http://guidelines.health.go.ke:8000/media/Guidelines_on_Management_of_Health_Products_and_Technologies_in_Kenya_-_October_2020.pdf
- [18] Moro Visconti, R., & Morea, D. (2020). Healthcare Digitalization and Pay-For-Performance Incentives in Smart Hospital Project Financing. *International Journal of Environmental Research and Public Health*, 17, Article 2318. <https://doi.org/10.3390/ijerph17072318>
- [19] Mudogo, M. C., Jerusa, O., Eric, S., Justus, M. I., Mary, A., Mercy, A. et al. (2023). Routine Supportive Supervision and Management of Medicines and Other Health Products and Technologies in Vihiga County, Kenya. *Pharmacology & Pharmacy*, 14, 43-57. <https://doi.org/10.4236/pp.2023.142004>
- [20] Muiruri, C. (2017). *Factors Influencing Availability of Essential Medicines in Public Health Facilities in Kenya: A Case of Embu County*. Master's Thesis, University of Nairobi. <http://erepository.uonbi.ac.ke/handle/11295/101916>
- [21] Njuguna, D. C., Muiruri, L., & Njoroge, K. (2023). Utilization of Health Information Data in Nairobi County Public Health Facilities; Lessons from the Field. *International Journal of Community Medicine and Public Health*, 10, 38-44. <https://doi.org/10.18203/2394-6040.ijcmph20223523>
- [22] Nwogbe, O. A., & Haliso, Y. (2020). Continuing Professional Development Assessment of Healthcare Professionals in Public Secondary Hospitals in Lagos State, Nigeria. *Information Impact: Journal of Information and Knowledge Management*, 11, 26-39. <https://doi.org/10.4314/ijikm.v11i1.3>
- [23] Nyawira, L., Tsofa, B., Musiega, A., Munywoki, J., Njuguna, R. G., Hanson, K. et al. (2022). Management of Human Resources for Health: Implications for Health Systems Efficiency in Kenya. *BMC Health Services Research*, 22, Article No. 1046. <https://doi.org/10.1186/s12913-022-08432-1>
- [24] Omware, I. M., Atheru, G., & Jagongo, A. (2020). Corporate Governance and Financial Performance of Selected Commercial Banks Listed at Nairobi Securities Exchange in Kenya. *International Academic Journal of Economics and Finance*, 3, 75-91. http://www.iajournals.org/articles/iajef_v3_i5_75_91.pdf
- [25] Sharma, A., Malviya, R., Sundaram, S., Verma, S., Fuloria, N. K., Fuloria, S. et al. (2023). Patient Care and Treatment Strategies for Skin Diseases in Sub-Saharan Africa: Role of Traditional and Western Medicines. *Infectious Disorders—Drug Targets*, 23, e190922208916. <https://doi.org/10.2174/1871526522666220919105643>

- [26] Sürücü, L., & Maslakçı, A. (2020). Validity and Reliability in Quantitative Research. *Business & Management Studies: An International Journal*, 8, 2694-2726.
<https://doi.org/10.15295/bmij.v8i3.1540>
- [27] Wang, X., & Cheng, Z. (2020). Cross-sectional Studies: Strengths, Weaknesses, and Recommendations. *Chest*, 158, S65-S71.
<https://doi.org/10.1016/j.chest.2020.03.012>