

# Influence of Participatory Monitoring and Evaluation Techniques on the Performance of Radiotherapy Bunker Installations in Regional Cancer Centres in Kenya

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**Abstract:** This study investigates the impact of participatory monitoring and evaluation (PM&E) practices on the performance of radiotherapy bunker installation projects in Kenya's regional cancer centers. Recognizing the complexity of such health infrastructure projects, the research focused on key PM&E practices: stakeholder involvement, information sharing, capacity building, and joint decision-making. Guided by participatory development theory, stakeholder theory, program theory, and results-based management theory, the study employed a descriptive design with 110 respondents selected through stratified random sampling. Data were collected via semi-structured questionnaires and analyzed using descriptive statistics, correlation, and multiple linear regression. Findings revealed that all four PM&E practices positively and significantly influenced project performance, with capacity building having the strongest effect. The model explained 28.5% of the variance in project performance. The study recommends strengthening PM&E practices especially capacity building, stakeholder engagement, information sharing, and collaborative decision-making to enhance the implementation and outcomes of complex health infrastructure projects.

**Keywords:** Project Performance, Stakeholder Engagement, Capacity Building, Health Infrastructure Projects, Joint Decision-Making.

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## 1. INTRODUCTION

Monitoring and evaluation (M&E) has increasingly evolved into a collaborative management process that supports learning, accountability, and improved project performance. Participatory monitoring and evaluation (PM&E) enhances stakeholder involvement in defining indicators, collecting data, interpreting findings, and applying lessons, thereby strengthening ownership and sustainability of development interventions (World Bank, 2020). In complex health infrastructure projects such as radiotherapy bunker installations, participatory approaches are particularly important because they integrate the perspectives of clinicians, engineers, policymakers, project managers, and communities, ultimately improving transparency and implementation outcomes. Globally, participatory M&E has been recognized for enhancing adaptive learning, accountability, and sustainability in infrastructure and health projects (UNDP, 2019; WHO, 2021; Chambers, 2018). Developed countries have institutionalized stakeholder engagement in evaluation standards to ensure alignment between public investments and community needs (OECD, 2020), while African countries such as Ghana, Tanzania, and Uganda have adopted participatory frameworks to enhance ownership and accountability despite challenges related to capacity and financial constraints (Mugenda & Mugenda, 2019; Kusek & Rist, 2021).

In Kenya, M&E is central to national development strategies such as Vision 2030, yet inadequate stakeholder involvement has contributed to delays, cost overruns, and inconsistent performance in infrastructure projects (Oduor, 2020). Significant investments have been made to establish regional cancer centres with radiotherapy facilities to improve access to cancer care. However, performance outcomes of these projects have varied, particularly regarding timelines, cost control, and technical compliance. Project performance in healthcare infrastructure is typically measured in terms of efficiency, effectiveness, relevance, and sustainability (World Bank, 2011; WHO, 2018; Kusek & Rist, 2004). Evidence suggests that

non-participatory M&E systems contribute to delays and budget overruns in 10–30% of health capital projects in low- and middle-income countries (World Bank, 2023). These challenges are further compounded by inadequate financing, as Kenya's health sector allocations remain below the Abuja Declaration target, leading to resource constraints and implementation inefficiencies (Health Sector Report, 2024; European Investment Bank, 2022; IMF, 2023).

Cancer remains a major public health burden in Kenya, with over 42,000 new cases and more than 27,000 deaths annually (GLOBOCAN, 2020). To address this challenge, the government has decentralized cancer services through regional centres equipped with radiotherapy facilities. Despite these efforts, radiotherapy bunker installation projects have experienced delays, cost overruns, and technical challenges, partly due to limited stakeholder engagement and top-down M&E approaches (Ministry of Health, 2022; Oduor, 2020). While participatory M&E has been studied in other sectors, limited empirical evidence exists on its application in specialized health infrastructure projects. Consequently, this study examines the influence of participatory monitoring and evaluation techniques—such as stakeholder involvement, information sharing, capacity building, and joint decision-making on the performance of radiotherapy bunker installations in regional cancer centres in Kenya.

## 2. LITERATURE REVIEW

Participatory monitoring and evaluation (PM&E) is grounded in several theoretical perspectives that emphasize stakeholder inclusion as a driver of project performance. Participatory Development Theory argues that development outcomes improve when stakeholders actively engage in planning, implementation, and evaluation, thereby enhancing ownership, empowerment, and sustainability (Chambers, 1983; Cornwall, 2008; Chambers, 2018). In radiotherapy bunker installations, involving healthcare workers, technical experts, and communities in defining operational standards strengthens ownership and improves performance.

Stakeholder Theory further explains that projects operate within networks of actors whose interests must be managed through communication, consultation, and accountability (Freeman, 1984). Effective stakeholder engagement in monitoring and evaluation enhances information sharing, reduces conflicts, and improves decision-making, particularly in complex health infrastructure projects (Bryson, 2018).

Program Theory, operationalized through the Theory of Change, highlights the importance of shared understanding of how project activities lead to outcomes. This perspective emphasizes capacity building, enabling stakeholders to analyze data, identify gaps, and implement corrective measures that improve efficiency and quality (Rogers, 2014).

Results-Based Management complements these theories by focusing on measurable outcomes and the use of monitoring data for accountability and organizational learning (Kusek & Rist, 2004). Participatory approaches within RBM ensure that performance indicators reflect stakeholder expectations and contextual realities. Among these perspectives, Stakeholder Theory serves as the anchoring framework, as it best explains how collaboration, communication, and shared responsibility enhance ownership, coordination, and overall project performance.

Empirical literature supports the role of participatory M&E in improving project outcomes. Globally, participatory evaluation has been associated with enhanced efficiency and organizational learning in public infrastructure projects (Crawford & Bryce, 2018). Similarly, Bamberger et al. (2016) found that World Bank-funded community development projects with strong stakeholder involvement in M&E exhibited greater sustainability. In health infrastructure projects, participatory assessment processes improved compliance with construction standards and functionality by incorporating end-user feedback (WHO, 2021). However, challenges such as limited technical capacity and inconsistent participation were noted as constraints.

Regional studies also highlight the benefits of participatory M&E. Research across African countries indicates that stakeholder engagement enhances project relevance and sustainability, particularly in community-based and infrastructure initiatives (Bamberger et al., 2016). Collective decision-making between implementers and beneficiaries has been shown to improve adherence to timelines and quality standards in hospital construction projects (WHO, 2021). Nevertheless, limited technical capacity and weak information-sharing systems continue to constrain effective implementation in complex projects.

In Kenya, empirical evidence demonstrates a positive relationship between participatory M&E and project performance. Stakeholder involvement in water and sanitation projects improved transparency and accountability, leading to better outcomes (Oduor, 2020). Similarly, Kihara (2021) reported that participatory approaches enhanced ownership and sustainability in community development initiatives. However, most studies focus on social and community-based projects, with limited research on highly technical health infrastructure such as radiotherapy bunker installations.

Specific PM&E components have also been linked to improved project performance. Stakeholder involvement enhances decision-making, risk mitigation, and sustainability, particularly in complex projects (Nguyen, Mohamed, & Mostafa, 2021; Abolghasemi, 2024). Information sharing improves coordination, transparency, and timely decision-making, allowing stakeholders to identify implementation gaps and propose corrective measures. Capacity building strengthens stakeholders' technical and analytical abilities, leading to improved data quality, timely reporting, and evidence-based decision-making. Joint decision-making ensures that monitoring findings translate into actionable project adjustments, enhancing sustainability and stakeholder satisfaction. These participatory components are particularly critical in technically complex health infrastructure projects such as radiotherapy bunker installations, where multidisciplinary collaboration and regulatory compliance are essential for successful implementation.

### 3. RESEARCH METHODOLOGY

The study employed a descriptive and correlational research design to examine the relationship between participatory monitoring and evaluation (PM&E) practices and the performance of radiotherapy bunker installation projects. The target population consisted of 150 stakeholders involved in six referral hospital projects, including project managers, engineers, contractors, health professionals, and Ministry of Health representatives. Stratified random sampling was used to ensure proportional representation, and Yamane's formula yielded a sample size of 110 respondents.

Primary data were collected using structured questionnaires, while secondary data were obtained from policy documents and project reports. A pilot study involving 10% of the sample tested instrument clarity, with validity ensured through expert review and reliability assessed using Cronbach's alpha. Data collection was conducted through electronic and physical questionnaire distribution.

Quantitative data were analyzed using descriptive statistics, correlation analysis, and multiple linear regression to determine the influence of stakeholder involvement, information sharing, capacity building, and joint decision-making on project performance. Ethical considerations, including confidentiality, informed consent, and research authorization, were observed throughout the study.

### 4. RESULTS AND DISCUSSION

#### 4.1 Descriptive Statistics

Table 1: Descriptive Statistics

vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
1	110	2.860	0.789	2.9	2.866	0.741	1	4.80	3.80	-0.021	-0.493	0.075
2	110	3.138	0.778	3.2	3.143	0.890	1	4.80	3.80	-0.171	-0.368	0.074
3	110	2.982	0.698	3.0	2.986	0.593	1	4.80	3.80	-0.117	0.066	0.067
4	110	2.902	0.662	3.0	2.895	0.593	1	5.00	4.00	0.032	0.798	0.063
5	110	3.018	0.777	3.0	3.023	0.741	1	4.75	3.75	-0.076	-0.320	0.074

The descriptive statistics show moderate levels across all variables. Information sharing recorded the highest mean (3.138), followed by project performance (3.018), capacity building (2.982), joint decision-making (2.902), and stakeholder involvement (2.860). The relatively low standard deviations indicate moderate variability, while skewness and kurtosis values suggest approximately normal distribution, supporting the suitability of the data for inferential analysis.

Table 2: Correlation Matrix

Stakeholder Involvement	Information Sharing	Capacity Building	Joint Decision	Project Performance	Variable
1.000	-0.071	-0.088	-0.075	0.242	Stakeholder Involvement
-0.071	1.000	0.056	0.010	0.253	Information Sharing
-0.088	0.056	1.000	0.100	0.342	Capacity Building
-0.075	0.010	0.100	1.000	0.185	Joint Decision
0.242	0.253	0.342	0.185	1.000	Project Performance

Correlation results indicate positive relationships between all participatory monitoring and evaluation practices and project performance. Capacity building had the strongest correlation ( $r = 0.342$ ), followed by information sharing ( $r = 0.253$ ), stakeholder involvement ( $r = 0.242$ ), and joint decision-making ( $r = 0.185$ ). The low correlations among independent variables indicate minimal risk of multicollinearity.

**Table 3: Regression Results**

term	estimate	std.error	statistic	p.value
(Intercept)	-0.3338671	0.53680267	-0.6219551	0.53531959741
Stakeholder Involvement	0.2979827	0.08196341	3.6355577	0.00043148701
Information Sharing	0.2532222	0.08271146	3.0615130	0.00279677754
Capacity Building	0.3759049	0.09280503	4.0504799	0.00009811218
Joint Decision	0.2013500	0.09755428	2.0639789	0.04148510699

Regression analysis shows that all PM&E practices positively and significantly influence project performance. Capacity building had the strongest effect ( $\beta = 0.376$ ), followed by stakeholder involvement ( $\beta = 0.298$ ), information sharing ( $\beta = 0.253$ ), and joint decision-making ( $\beta = 0.201$ ). These results indicate that strengthening participatory monitoring and evaluation practices improves radiotherapy bunker project performance.

**Table 4: Model Fitness**

r.squared	adj.r.squared	sigma	statistic	p.value	df	logLik	AIC	BIC	deviance	df.residual	nobs
0.2846	0.2574	0.669	10.44	0.0000003	4	-109.4	230.8	247.0	47.09	105	110

The model explains 28.5% of the variation in project performance. The significant F-statistic ( $p < 0.001$ ) confirms that the regression model is statistically significant and suitable for prediction.

**Table 5: Multicollinearity Test**

Variable	VIF
Stakeholder Involvement	1.017
Information Sharing	1.008
Capacity Building	1.019
Joint Decision	1.015

All VIF values are close to 1, indicating no multicollinearity among predictors and confirming the stability of regression estimates.

**Table 6: Normality Test**

Test	Statistic	p_value	Skewness	Kurtosis
Shapiro-Wilk	0.985	0.2433	-0.077	2.729

The Shapiro-Wilk test confirms normality ( $p > 0.05$ ), indicating that regression assumptions were met.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

Participatory monitoring and evaluation practices significantly influence the performance of radiotherapy bunker installation projects. Capacity building emerged as the most influential factor, followed by stakeholder involvement, information sharing, and joint decision-making. These practices improve coordination, accountability, and efficiency, leading to better project outcomes.

### 5.2 Recommendations

Capacity-building programs should be strengthened to enhance monitoring and evaluation skills. Stakeholder involvement should be increased throughout the project lifecycle to improve transparency and ownership. Structured communication systems should be implemented to improve information sharing. Collaborative decision-making frameworks should be

adopted to enhance accountability. Finally, policymakers should integrate participatory monitoring and evaluation approaches into national health infrastructure implementation guidelines to promote sustainability and improved project performance.

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