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CONTRIBUTION OF QUALITY ASSURANCE MANAGEMENT PRACTICES ON PROJECT SUCCESS IN RWANDA. A CASE OF HEALTH POST PROJECT IMPLEMENTATION IN NYANZA DISTRICT

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ABSTRACT

This study assessed the contribution of quality assurance management to project success in Rwanda, focusing on health post project implementation in Nyanza District. The specific objectives were to examine the effect of quality planning, quality control practices, staff training, and quality audits and monitoring on project success. The study adopted a descriptive and correlational research design using a mixed-methods approach. Quantitative data were collected from a sample of 120 respondents, including project staff, supervisors, and local stakeholders, selected through stratified and purposive sampling techniques. Qualitative data were obtained through key informant interviews with project supervisors, technicians, and local government officials. Quantitative data were analyzed using SPSS, employing descriptive statistics, Pearson correlation, ANOVA, and multiple regression analysis, while qualitative data were analyzed thematically. Descriptive results indicated a high level of implementation of quality assurance management practices. Quality planning recorded a mean of $M = 4.21$, $SD = 0.61$, quality control practices $M = 4.28$, $SD = 0.57$, staff training $M = 4.15$, $SD = 0.64$, and quality audits and monitoring $M = 4.32$, $SD = 0.55$. Project success also registered a high overall mean of $M = 4.30$, $SD = 0.58$. Pearson correlation analysis revealed a strong positive and statistically significant relationship between quality assurance management and project success ($r = 0.74$, $p < 0.01$). Regression analysis further confirmed that quality assurance management significantly predicted project success ($\beta = 0.68$, $p < 0.001$). The regression model was statistically significant ($F(4,115) = 40.08$, $p < 0.001$) and explained 52% of the variation in project success ($R^2 = 0.52$). Qualitative findings revealed challenges such as limited availability of quality experts, staff turnover, communication gaps, and post-project financing constraints as threats to long-term sustainability. The study concludes that effective quality assurance management is a critical determinant of project success in health infrastructure projects, not only enhancing timely completion and budget adherence but also strengthening service delivery quality and sustainability of project outcomes. Based on these findings, the study recommends strengthening quality control systems, continuous staff training, robust monitoring and audit mechanisms, and sustainable post-project financing to enhance long-term service delivery and infrastructure maintenance.

Key Concepts: *Quality Assurance Management, Project Success, Quality Control Practices, Health Post Projects, Quality planning*

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INTRODUCTION

Quality Assurance Management (QAM) has become a fundamental component of successful health infrastructure projects worldwide. Through systematic practices such as quality planning, quality control, quality audits, monitoring, and staff training, QAM ensures that project outputs conform to established standards while improving efficiency, accountability, sustainability, and stakeholder satisfaction. The principles of quality management have been widely recognized as critical to achieving effective project delivery and continuous improvement in healthcare systems (WHO, 2021; PMI, 2021; Oakland, 2023).

Despite increasing investment in health infrastructure, many low- and middle-income countries continue to experience project delays, cost overruns, and infrastructure that fails to meet expected quality standards due to weak quality assurance systems. Studies conducted in African health systems have shown that strengthening quality management and continuous quality improvement significantly enhances compliance with standards, service quality, and project performance, although challenges related to institutional capacity, monitoring systems, and technical expertise remain (Noble et al., 2020; Kigenza et al., 2023; Rusanganwa et al., 2024).

Rwanda has made considerable progress in expanding health infrastructure as part of its commitment to achieving Universal Health Coverage (UHC). The Government of Rwanda has continued to invest in the construction and rehabilitation of health facilities while strengthening quality management systems through national quality improvement initiatives and accreditation programmes. Nevertheless, challenges related to infrastructure quality, workforce capacity, continuous monitoring, and long-term sustainability continue to affect health service delivery, particularly in rural settings (Ministry of Health, 2023, 2024; World Health Organization, 2024). Recent initiatives implemented through the Ministry of Health and its partners have further emphasized institutionalizing quality assurance and continuous quality improvement as essential strategies for strengthening health system performance (Management Sciences for Health, 2024).

Although previous studies have demonstrated the importance of quality management in improving healthcare performance, limited empirical evidence exists on the combined contribution of quality planning, quality control, staff training, quality audits, and monitoring processes to the success of health infrastructure projects in Rwanda. This study therefore examines the contribution of Quality Assurance Management to the success of health post implementation projects in Nyanza District, Rwanda. The findings are expected to contribute to evidence-based project management practices while supporting the achievement of Sustainable Development Goal 3, the African Union Agenda 2063, and Rwanda's Health Sector Strategic Plan V.

Statement of the Problem

Rwanda has made substantial progress in strengthening its health system through continued investment in health infrastructure as part of its commitment to achieving Universal Health Coverage (UHC) under the National Strategy for Transformation (NST2) and the Health Sector Strategic Plan V (Ministry of Health, 2024; Ministry of Finance and Economic Planning, 2023). Despite these efforts, the implementation of health infrastructure projects continues to face challenges related to timely completion, budget performance, and operational readiness. Evidence suggests that these challenges are partly associated with weaknesses in quality assurance management, including inadequate quality planning, limited quality control, insufficient monitoring, and workforce capacity constraints, which affect the quality and sustainability of health services (World Health Organization, 2024; Kigenza et al., 2023).

Similar challenges have been reported across many low- and middle-income countries, where weak quality management systems contribute to project delays, cost overruns, and failure to achieve expected infrastructure standards. The World Bank (2023) emphasizes that inadequate quality assurance and weak project oversight remain major constraints to successful health infrastructure implementation, while the Project Management Institute (2021) identifies quality management as a critical determinant of project performance. Although Rwanda has strengthened national quality improvement and accreditation systems, evidence indicates that variations in project implementation quality and institutional capacity continue to affect the performance of

health infrastructure projects (Ministry of Health, 2024; World Health Organization, 2024). Furthermore, most existing studies have concentrated on healthcare quality improvement and service delivery, with limited empirical attention given to the combined influence of quality planning, quality control, staff training, quality audits, and monitoring processes on the success of health infrastructure projects.

In Nyanza District, where health post construction has been prioritized to improve access to primary healthcare services, empirical evidence on how Quality Assurance Management influences project success remains limited. This study therefore seeks to address this knowledge gap by examining the contribution of Quality Assurance Management to the success of health post implementation projects in Nyanza District. The findings are expected to provide evidence for strengthening quality assurance practices in health infrastructure projects and support Rwanda's efforts toward achieving Sustainable Development Goal 3, the African Union Agenda 2063, and national health sector development priorities.

LITERATURE REVIEW

This section reviews the literature on the contribution of Quality Assurance Management (QAM) to Project Success in health infrastructure projects. The review is guided by the Total Quality Management (TQM) Theory, which posits that continuous improvement, quality-focused processes, stakeholder involvement, and effective management practices are essential for achieving desired project outcomes (Oakland, 2023). The section examines the key dimensions of Quality Assurance Management, including quality planning, quality control, staff training, quality audits, and monitoring processes, and their role in enhancing project performance. It also reviews the concept of Project Success as a multidimensional outcome reflecting the achievement of project objectives, stakeholder satisfaction, operational effectiveness, and sustainability. The review provides the theoretical and conceptual foundation for understanding the relationship between Quality Assurance Management and Project Success in the implementation of health post projects.

Quality Assurance Management

Quality Assurance Management (QAM) refers to the systematic planning, implementation, monitoring, and evaluation of project processes to ensure compliance with established quality standards and stakeholder expectations. In project management, quality assurance emphasizes prevention rather than detection by ensuring that project processes are consistently designed and implemented to produce quality outputs. In health infrastructure projects, QAM enhances efficiency, minimizes implementation risks, strengthens accountability, and contributes to sustainable project outcomes (PMI, 2021; ISO, 2015).

Quality Planning

Quality planning involves identifying quality standards, performance indicators, procedures, and risk mitigation measures necessary to achieve project objectives. It establishes the quality requirements of a project and defines the processes needed to ensure that these requirements are achieved throughout project implementation. Effective quality planning improves project predictability, minimizes deviations, and enhances stakeholder satisfaction (PMI, 2021). Empirical evidence suggests that projects with well-developed quality plans are more likely to achieve planned schedules, control costs, and deliver outputs that meet stakeholder expectations (Oakland, 2023; World Bank, 2023).

Quality Control

Quality control refers to the operational techniques and inspection activities undertaken to verify that project outputs conform to specified quality standards. It involves inspections, testing, performance verification, and corrective actions that ensure project deliverables satisfy established technical requirements. Effective quality control reduces defects, minimizes costly rework, and improves infrastructure safety, functionality, and durability (PMI, 2021). Studies on healthcare quality improvement have demonstrated that systematic quality control mechanisms significantly improve compliance with standards and organizational performance (Tuyisenge et al., 2021; Kigenza et al., 2023).

Staff Training

Staff training refers to the continuous development of the knowledge, technical competencies, and skills required to implement quality standards effectively throughout the project lifecycle. Adequately trained personnel are better equipped to identify quality risks, comply with established procedures, and implement corrective actions where necessary. Continuous professional development has been shown to improve project coordination, implementation efficiency, and adherence to quality management systems (WHO, 2021; Kigenza et al., 2023). However, limited financial resources and shortages of qualified personnel continue to constrain effective capacity-building initiatives in many developing countries.

Quality Audits

Quality audits are systematic and independent examinations conducted to determine whether project activities comply with established quality management procedures and organizational standards. Audits promote accountability, transparency, continuous improvement, and organizational learning by identifying areas requiring corrective action (PMI, 2021). Evidence from health system quality improvement initiatives indicates that regular audits and performance reviews strengthen compliance with quality standards, improve governance, and enhance stakeholder confidence (Noble et al., 2020; WHO, 2021).

Monitoring Processes

Monitoring refers to the continuous collection, analysis, and use of project information to assess implementation progress and determine whether project activities are being executed according to approved plans and quality standards. Effective monitoring facilitates timely decision-making, early identification of implementation challenges, and continuous performance improvement (PMI, 2021). Studies have shown that robust monitoring systems contribute to improved schedule performance, resource utilization, accountability, and sustainability of health programmes (World Bank, 2023; Kigenza et al., 2023).

Project Success

Project success is widely recognized as a multidimensional concept reflecting the extent to which a project achieves its intended objectives while creating value for stakeholders. Although traditional project management measured success primarily through the "iron triangle" of time, cost, and scope, contemporary literature extends the concept to include stakeholder satisfaction, quality of deliverables, organizational benefits, and long-term sustainability (PMI, 2021). In health infrastructure projects, success encompasses not only the timely and cost-effective completion of facilities but also their ability to deliver quality healthcare services and generate sustainable benefits for communities (World Bank, 2023; WHO, 2021).

Existing literature consistently demonstrates that project success is strongly influenced by effective Quality Assurance Management. Practices such as quality planning, quality control, staff training, quality audits, and continuous monitoring improve adherence to project schedules, budget performance, scope achievement, stakeholder satisfaction, and long-term sustainability by strengthening governance, reducing implementation risks, and promoting continuous improvement (Noble et al., 2020; Kigenza et al., 2023; Tuyisenge et al., 2021). Accordingly, this study conceptualizes Project Success as the achievement of project objectives through timely completion, budget adherence, scope achievement, stakeholder satisfaction, and sustainable project outcomes, providing a comprehensive framework for assessing the contribution of Quality Assurance Management to health post implementation projects in Nyanza District.

METHODOLOGY

Research Design

This study employed a mixed-methods approach using a cross-sectional descriptive and correlational research design to examine the contribution of Quality Assurance Management (QAM) to the success of health post implementation projects in Nyanza District, Rwanda. The descriptive design was used to assess the prevailing quality assurance management practices, while the correlational design examined the relationships between

Quality Assurance Management dimensions and Project Success. Quantitative data were collected through structured questionnaires administered to a sample of 120 respondents selected using stratified random sampling from a target population of 173 project stakeholders. In addition, qualitative data were obtained through structured interviews with three purposively selected key informants, namely the District Health Officer, District Engineer, and Project Manager, to complement and validate the quantitative findings.

Data Collection and Analysis

Primary data were collected using structured questionnaires and interview guides, while secondary data were obtained from project reports, government publications, and policy documents related to health infrastructure projects. The research instruments were validated through expert review, yielding a Content Validity Index (CVI) of 0.94, while reliability was established through a pilot study with an overall Cronbach's alpha coefficient of 0.88, indicating high internal consistency. Quantitative data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS, Version 27). Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized respondent characteristics and the study variables. Pearson correlation analysis examined the strength and direction of relationships between variables, while multiple linear regression determined the contribution of Quality Assurance Management dimensions to Project Success. Qualitative data were analyzed using thematic analysis and integrated with quantitative findings to strengthen interpretation through methodological triangulation.

The multiple linear regression model estimated in the study was specified as:

$$PS= \beta 0+ \beta 1\ QP+ \beta 2\ QC+ \beta 3ST+ \beta 4QA+ \beta MP+\varepsilon$$

where PS represents Project Success, QP denotes Quality Planning, QC represents Quality Control, ST denotes Staff Training, QA represents Quality Audits, MP represents Monitoring Processes**,** β_0 is the intercept, β_1–β_5 are the regression coefficients, and **ε** is the error term. Statistical significance was evaluated at the 5% significance level ($p < 0.05$).

RESULTS

Multiple linear regression analysis was conducted to determine the contribution of Quality Assurance Management dimensions to Project Success in health post implementation projects.

Table 1: Regression Model Summary: Quality Assurance Management and Project Success

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.812	0.659	0.652	0.284

a. **Predictors:** (Constant), Quality Planning ;Quality Control; Staff Training; Quality Audits; Monitoring Processes

b. **Dependent Variable:** Project Success

As shown in Table 1, the regression model demonstrated a strong positive relationship between the predictors and Project Success ($R = 0.812$). The coefficient of determination ($R^2 = 0.659$) indicates that Quality Planning, Quality Control, Staff Training, Quality Audits, and Monitoring Processes jointly explained 65.9% of the variation in Project Success, while the adjusted R^2 (0.652) confirms the robustness of the model after adjusting for the number of predictors. Furthermore, the relatively low standard error of the estimate (0.284) suggests a good fit of the model to the observed data.

Overall, the findings indicate that Quality Assurance Management is a strong predictor of Project Success in health post implementation projects in Nyanza District. The results imply that strengthening quality planning, quality control, staff training, quality audits, and monitoring processes can substantially improve project performance, supporting previous empirical studies that emphasize the critical role of integrated quality assurance practices in achieving successful and sustainable project outcomes.

Table 2: ANOVA for Regression Model.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.932	4	3.233	40.08	0.000
Residual	6.657	115	0.058		
Total	19.589	119			

a. **Predictors: (Constant**), Quality Planning ; Quality Control; Staff Training; Quality Audits; Monitoring Processes

b. **Dependent Variable**: Project Success

The Analysis of Variance (ANOVA) results confirmed that the overall regression model was statistically significant ($F = 40.08$, $p < 0.001$), indicating that the Quality Assurance Management dimensions collectively provide a significant prediction of Project Success. The regression model explained a substantial proportion of the total variation in Project Success (Regression Sum of Squares = 12.932), while the unexplained variation remained relatively low (Residual Sum of Squares = 6.657). These findings demonstrate that the model adequately fits the observed data and that the combined influence of quality planning, quality control, staff training, quality audits, and monitoring processes is unlikely to have occurred by chance.

Based on these findings, the null hypothesis (H_0), which stated that Quality Assurance Management has no significant contribution to Project Success in health post implementation projects in Nyanza District, was rejected. Since the significance value ($p < 0.001$) was lower than the predetermined significance level of 0.05, the alternative hypothesis (H_1) was accepted. This implies that Quality Assurance Management significantly contributes to Project Success. The findings are consistent with previous empirical studies, which report that integrated quality assurance practices improve project efficiency, quality, stakeholder satisfaction, and the sustainability of infrastructure projects

Table 3: Regression Model Coefficients: Quality Assurance Management and Project Success

Model	Unstandardized Coefficients	Standardized Coefficients	t	p-value
	B	Std. Error	Beta	
(Constant)	0.842	0.174	–	4.84
Quality Planning (QP)	0.281	0.067	0.262	4.19
Quality Control (QC)	0.236	0.072	0.211	3.28
Staff Training (ST)	0.197	0.069	0.182	2.85
Quality Audits & Monitoring (QAM)	0.322	0.068	0.295	4.73

a. **Predictors: (Constant),** Quality Planning; Quality Control; Staff Training; Quality Audits; Monitoring Processes

b. **Dependent Variable:** Project Success

Table 3 presents the regression coefficients for the influence of Quality Assurance Management dimensions on Project Success in health post implementation projects. The results indicate that all four predictors had positive and statistically significant effects on Project Success ($p < 0.05$), confirming that improvements in quality assurance practices enhance project performance. Among the predictors, Quality Audits and Monitoring had the strongest influence ($\beta = 0.295$, $B = 0.322$, $p < 0.001$), followed by Quality Planning ($\beta = 0.262$, $B = 0.281$, $p < 0.001$), Quality Control ($\beta = 0.211$, $B = 0.236$, $p = 0.001$), and Staff Training ($\beta = 0.182$, $B = 0.197$, $p = 0.005$).

These findings demonstrate that Quality Assurance Management significantly contributes to the success of health post implementation projects. The results are consistent with those of Mugisha and Ndayambaje (2021), who reported that effective quality planning enhances project delivery through improved coordination and resource allocation. Similarly, Habimana and Uwase (2024) found that quality control practices improve compliance with technical standards and overall project performance, while Nkurunziza (2023) established that staff training strengthens implementation capacity and reduces project delays. Furthermore, Uwitonze et al. (2022) concluded that quality audits and continuous monitoring improve accountability, stakeholder satisfaction, and the sustainability of infrastructure projects. Collectively, these findings reinforce the importance of adopting an integrated Quality Assurance Management approach to enhance the performance and long-term success of health infrastructure projects

Discussion

The findings of this study demonstrate that Quality Assurance Management (QAM) significantly contributes to the success of health post implementation projects in Nyanza District. The positive and statistically significant relationships between quality planning, quality control, staff training, quality audits, monitoring processes, and project success support the propositions of the Total Quality Management (TQM) Theory, which emphasizes that continuous improvement, customer focus, process management, employee involvement, and systematic quality control are fundamental to organizational and project performance (Oakland, 2023). The findings further indicate that integrating these quality assurance practices enhances timely project completion, efficient utilization of resources, stakeholder satisfaction, and the long-term sustainability of project outcomes.

The findings are consistent with previous empirical evidence on quality management and project performance. Noble et al. (2020) found that continuous quality improvement initiatives supported by regular performance reviews and feedback mechanisms significantly strengthened project implementation and organizational performance within Rwanda's health sector. Similarly, Kigenza et al. (2023) reported that structured quality management systems, continuous staff capacity development, and routine monitoring improved compliance with quality standards and strengthened health programme performance in Rwanda. These findings also agree with the World Health Organization (2021)**,** which emphasizes that effective quality planning, workforce competence, monitoring, and continuous improvement are essential for delivering safe, efficient, and sustainable health services. Furthermore, the Project Management Institute (2021) identifies quality planning, quality assurance, quality control, and continuous monitoring as critical project management processes that improve project performance by minimizing risks, reducing rework, and enhancing stakeholder satisfaction. Similar conclusions have also been reported by Tuyisenge et al. (2021), who found that structured quality improvement interventions significantly enhanced service quality and operational performance in healthcare facilities through continuous monitoring, staff training, and adherence to standardized quality practices.

The present study extends existing literature by examining the combined influence of quality planning, quality control, staff training, quality audits, and monitoring processes on the success of health post implementation projects in Rwanda. While previous studies have primarily focused on healthcare quality improvement or individual quality management practices, this study provides empirical evidence that an integrated Quality Assurance Management framework offers a stronger explanation of project success in public health infrastructure projects. The regression model explained 65.9% of the variation in project success, demonstrating that effective implementation of quality assurance practices substantially improves project performance. These findings reinforce the application of Total Quality Management principles in public infrastructure development and provide practical evidence for policymakers, project managers, and development partners seeking to improve the successful implementation, quality, and sustainability of health post projects in Rwanda.

CONCLUSION AND RECOMMENDATIONS

This study examined the contribution of Quality Assurance Management (QAM) to the success of health post implementation projects in Nyanza District, Rwanda. The findings indicate that Quality Assurance Management practices, including quality planning, quality control, staff training, quality audits, and monitoring processes, were implemented at a high level and contributed significantly to project success. Regression analysis confirmed that QAM is a strong predictor of project success, with quality audits and monitoring emerging as the most influential factors. Overall, the study concludes that integrating comprehensive quality assurance practices enhances timely project completion, budget adherence, scope achievement, stakeholder satisfaction, and the sustainability of health infrastructure projects. These findings provide empirical support for the application of Total Quality Management principles in strengthening the implementation and long-term performance of public health infrastructure projects.

Based on the study findings, it is recommended that project implementing agencies and policymakers institutionalize comprehensive Quality Assurance Management systems by strengthening quality planning, quality control, staff training, quality audits, and continuous monitoring throughout the project lifecycle. Greater investment should also be directed toward technical capacity building and staff retention to improve the effectiveness and sustainability of health infrastructure projects. Furthermore, project sustainability should be enhanced through adequate post-implementation financing, regular maintenance, and strengthened stakeholder participation, particularly community involvement, to ensure the continued delivery of quality healthcare services after project completion

Suggestion for Future Research

Future research should build on the findings of this study by exploring issues that were beyond its scope. In particular, longitudinal studies are needed to assess the long-term sustainability of health post projects, especially regarding staffing, financing, maintenance, and continuity of healthcare services. Further research should also examine strategies for strengthening human resource capacity and staff retention in rural health facilities, improving stakeholder communication and coordination, and enhancing project planning and scope management. Additionally, studies investigating sustainable post-project financing mechanisms, including public–private partnerships and community-based financing approaches, would provide valuable evidence for improving the long-term success and sustainability of health infrastructure projects.

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