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Operationalizing Health Systems Strengthening in Decentralized Settings: A Leadership- and Management-Centred Approach from Kenya

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Research Article

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Posted Date: August 31st, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10636799/v1

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Additional Declarations: No competing interests reported.

RESEARCH ARTICLE

Operationalizing Health Systems Strengthening in Decentralized Settings: A Leadership- and Management-Centred Approach from Kenya

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Abstract

Background

Health systems strengthening (HSS) is widely recognized as essential for achieving Universal Health Coverage. Yet translating HSS into practice remains challenging because the WHO Health System Framework identifies key system components but provides limited guidance on who should operationalize HSS and how. This challenge is compounded by the context-specific nature of health systems, making universal best practices difficult to apply across settings. Responding to the need for empirical research on operationalizing HSS, this study developed and examined an operational approach grounded in the view that health managers develop two core competencies—servant leadership and systems thinking—through health systems management (HSM) training and apply them within an enabling external environment.

Methods: The approach was developed from the WHO Leadership and Management Strengthening Framework, comprising four components: an adequate number of managers, appropriate competencies, an enabling working environment, and functioning support systems. A mixed-methods case study was conducted in Kenya. Quantitative data were collected through an online survey and analysed using multiple linear regression to identify factors associated with the development and sustained application of the two core competencies. Independent-samples *t*-tests and the Jonckheere–Terpstra test were used to determine which training types most effectively developed these competencies. Qualitative data were collected through in-depth interviews and analysed thematically. Findings from both analyses were integrated to generate a comprehensive interpretation.

Results: Servant leadership and systems thinking emerged as essential and trainable competencies for effective HSM. These competencies were most effectively developed through comprehensive, leadership-inclusive HSM training. Two enabling conditions were critical for their sustained application: (i) organizational commitment to team-oriented work environments through clearly defined roles, effective digital communication for coordination, and comprehensive HSM training across managerial cadres, rather than primarily increasing manager numbers to meet staffing norms; and (ii)

national policy frameworks institutionalizing community health as an integral component of the health system.

Conclusions: The findings support the proposed approach to operationalizing HSS, suggesting a practical and context-sensitive pathway for strengthening decentralized health systems in low- and middle-income settings.

Keywords: Health systems strengthening, Health systems management, Systems thinking, Servant leadership, Mixed-methods research, Kenya

Main Manuscript Text

Background

Health systems strengthening (HSS) has been widely recognized as essential for achieving Universal Health Coverage. However, its implementation remains challenging partly because of the abstract nature of the Health System Framework[1] developed by the World Health Organization (WHO). The framework defines six essential system components (leadership and governance; health workforce; health information; health financing; medical products, vaccines and technologies; and service delivery), but offers limited operational guidance on how these components interact and underrepresents the roles of community and informal systems. To address these issues, development partners and scholars have proposed a number of re-oriented frameworks,[2-5] but several shortcomings remain. These include limited attention to leadership dimensions, particularly how leadership practices influence system performance, weak articulation of interactions among components, and insufficient integration of community within the system.

To address these gaps, this study proposes an operationally relevant approach, referred to as a leadership- and management-centred approach to HSS. The approach is ground in the view that HSS is fundamentally a matter of management and it is operational-level health managers who are the main actors. The approach conceptualizes HSS as the application of core competencies developed through leadership-inclusive health system management (HSM) training within enabling conditions to coordinate resources and improve service delivery. Building on prior literature[6-14], this study focuses on servant leadership and systems thinking as complementary core competencies for HSS. Servant leadership emphasizes people-centred leadership, stewardship, collaboration, and empowerment, while systems thinking focuses on understanding complex interactions within health systems. Together, these competencies provide a framework for strengthening leadership and management in decentralized health systems.

This approach was examined through a case study in Kenya. Kenya was selected as the study context because its devolved health governance structure, sustained investments by development partners in strengthening health systems management, and formal institutionalization of community health through the national community health strategy[15] and policy[16] provided a particularly suitable setting to examine how operational-level managers integrate facility- and community-based system components to influence overall system performance.

Methods

Study Design

The study employed a mixed-methods convergent parallel design, in which quantitative and qualitative data were collected concurrently, analysed separately, and subsequently integrated to generate meta-inferences. This design enabled the identification of determinants of the core competencies for HSS and the exploration of conditions that support their sustainable application in health systems management

through the routine operations of annual health plans, which constitute core tasks of health managers at county and sub-county levels.

Quantitative analyses were used to assess factors associated with these competencies, especially the effectiveness of training, while qualitative inquiry provided in-depth insights into how managers apply these competencies in practice and the conditions that enable their sustained conditions application in health systems management through the routine operations of annual health plans. Integration of findings from both strands facilitated the development of comprehensive meta-inferences.

Conceptual Frameworks and Study Objectives

This study was guided by two conceptual frameworks of WHO. The Health Systems Framework provided the conceptual basis for the study. The Leadership and Management Strengthening Framework was applied in the case study to examine four essential conditions for effective health systems management. These conditions were derived from a WHO-supported study in three African countries[6]: adequate numbers of health managers, appropriate competencies, an enabling working environment, and functioning support systems.

The case study pursued two objectives. First, it explored factors associated with whether managers possessed or demonstrated servant leadership and systems thinking, focusing on the remaining three conditions identified in the Leadership and Management Strengthening Framework. Second, it examined how health plan management practices carried out by managers with these competencies contributed to service delivery under Kenya's decentralized health system.

Finally, the empirical findings were used to refine and adapt the original Leadership and Management Strengthening Framework. Insights derived from the case study were also used to re-orient the WHO Health Systems Framework to better reflect operational interactions among system components and the integration of community-level systems.

Study Sites and Target Population

The study was conducted in Siaya County in western Kenya, where substantial investments in health systems management strengthening had been implemented by the Japan International Cooperation Agency[17]and the United States Agency for International Development[18-19] prior to Kenya's adoption of devolution in 2013, which established a central government and 47 semi-autonomous county governments. These donor-supported programmes provided training in team-oriented health systems management before and during Kenya's transition to decentralization. A number of health managers who had participated in these trainings remained in Siaya County at the time of data collection. In addition, Siaya County demonstrated relatively strong performance in selected health service indicators under the decentralized health system.[20] These characteristics made Siaya County a suitable setting for examining the sustained application of the core competencies within a decentralized health system.

Prior to decentralization, Siaya County belonged to a larger administrative province together with five other counties. Siaya County formally agreed to participate in the study, and an official approval

letter was issued by the County Governor to the County Department of Health and Sanitation.

Siaya County comprises six sub-counties: Alego Usonga, Gem, Ugenya, Ugunja, Bondo, and Rarieda. The quantitative survey targeted all 88 health managers (33 at the county level and 55 at the sub-county level) identified by the County Health and Sanitation Department as members of the county and sub-county health management teams. From this group, 33 managers whose scores were above the overall mean in both servant leadership and systems thinking were purposively selected and invited to participate in qualitative interviews.

Data Collection

Data collection tools were the quantitative survey questionnaire (Supplementary File 1) and interview guide (Supplementary File 2). They were developed by the principal researcher (first author). These data collection tools were finalized after pre-testing with three health managers from non-study sites in a neighbouring county with a similar geographical and health system context. The pre-test assessed clarity, relevance, and cultural appropriateness.

The quantitative survey was administered using Google Forms between June and July 2022. The survey questionnaire comprised four sections (Table1): (1) self-assessment of core competencies (servant leadership and systems thinking); (2) biodemographic characteristics; (3) conditions influencing the development and application of the competencies, structured according to the WHO Leadership and Management Strengthening Framework and adapted to the local context using national health-sector policy documents; and (4) participation in leadership and management training, encompassing six training types identified in the 2015 Kenya National Assessment on Leadership, Management and Governance.[21]

To complement and triangulate the quantitative findings, semi-structured qualitative interviews were conducted remotely in English between August-September 2022 and March-April 2023 by the local researcher (second author). Each interview lasted approximately one hour, was conducted using the interview guide, and was audio-recorded and transcribed.

The interview guide covered three domains aligned with the study objectives. The first explored routine health plan management to assess whether reported perspectives and behaviours reflected characteristics of the core competencies, and to elicit examples of service delivery improvements attributed to managerial practices. The second examined conditions influencing managerial performance. The third explored differences in perspectives and behaviours between managers who had and had not participated in the training programmes identified in the quantitative analysis as most effective in developing the core competencies.

Table 1. Questionnaire Overview

Section	Content
1. Competencies	
Servant leadership competency	Maximum 100 points (20 questions × 5 points each)
Systems thinking competency	Maximum 100 points (20 questions × 5 points each)
2. Biodemographic characteristics	
Sex	Male / Female
Age group (8 groups)	20–25, 26–30, 31–35, 36–40, 41–45, 46–50, 51–55, 56–60
Highest educational qualification (3 levels)	Basic: Certificate, Ordinary Diploma Intermediate: Higher National Diploma, Bachelor's degree Advanced: Postgraduate Diploma, Master's degree, Doctoral degree
Years of management experience (6 groups)	<2 years, 2–5, 6–10, 11–15, 16–20, >20 years
Cadre (15 cadres categorized into 3 groups)	Facility-based: Clinical officer, Medical officer, Medical superintendent, Nursing officer, Laboratory officer, Pharmacist, Programme coordinator Community-based: Community health services focal person, Public health officer, Health promotion officer Office-based: Health administration officer, Health accounts officer, Health records officer, Information technology officer
3. External factors (9 factors - Yes: 1 / No: 0)	Allocation of adequate number of staff as per norms Availability of job description matched to background Regular and timely information sharing in management team Participation in decision-making process Availability of individual workspace Availability of own computer Availability of electric networking (internet or similar) Availability of transport resources for supervision Financial or non-financial support for training
4. Training History (6types categorized into 3 groups)	Leadership and management-related training (L&M-related training) Training specific to Health Systems (HSM Training) Comprehensive HSM training that includes all 14 areas

Note: The 14 areas include: 1) Introduction on health systems management, 2) Leadership, 3) Governance, 4) Planning and Monitoring & Evaluation, 5) Financial management, 6) Human resources management, 7) Information technology management, 8) Supply chain management, 9) Team management, 10) customer relationship management, 11) Change management, 12) Time management, 13) Health promotion, (14) Operational researches

Abbreviations: L&M, Leadership and Management; HSM, Health Systems Management

Quantitative Survey Instrument for Competency Assessment

Servant leadership and systems thinking were each assessed using 20 items. All items were rated on a six-point Likert-type scale ranging from 5 ("Almost always true") to 0 ("I do not know"). Total competency scores (maximum score: 100 each) represented the extent to which respondents demonstrated servant leadership and systems thinking behaviours.

Servant leadership was assessed using ten characteristics proposed by Larry C. Spears[14] and derived from the original ideas of Robert K. Greenleaf[11]: Listening, Empathy, Healing, Awareness, Persuasion, Foresight, Conceptualization, Stewardship, Commitment to the Growth of People, and Building Community. Because no universally standardized Greenleaf-specific self-assessment instrument exists, ten items were adapted from multiple validated assessment tools aligned with these characteristics.[22] Ten additional items were developed to contextualize these characteristics within routine health plan management, a core function of operational-level health managers in Kenya.

Systems thinking items were grounded in the seven systems thinking principles defined by WHO[3]: recognizing system structure, identifying underlying causes, focusing on

interrelationships, anticipating unintended consequences, recognizing system dynamics, using leverage points, and engaging multiple perspectives. In the absence of widely validated self-assessment instruments for systems thinking, items were formulated around these principles. The items were also aligned with the Leading and Managing Framework that was developed by Management Sciences for Health. The framework defines eight core competencies of Managers Who Lead[23]: four leading competencies (Scanning, Focusing, Aligning/Mobilizing, and Inspiring) and four managing competencies (Planning, Organizing, Implementing, and Monitoring & Evaluating). The questionnaire was designed to reflect the actual roles of health managers in managing annual health plans within Kenya's devolved health system.

Data Analysis

Quantitative analysis was conducted with two primary objectives. First, correlation analysis and simple linear regression were used to examine the association between servant leadership and systems thinking. Second, multiple linear regression analysis was performed to identify factors associated with each competency in relation to HSS. In addition, group comparisons were conducted to examine differences in competency scores across training types. The Jonckheere–Terpstra trend test was performed to assess ordered trends in competency scores across training categories.

All statistical analyses were conducted using R (version 4.3.2), with a two-sided significance level of $P < .05$. Continuous variables were summarized using means and standard deviations (SD) or medians and interquartile ranges (IQR), and categorical variables using frequencies and percentages. The chi-squared test or Fisher's exact test was used for categorical variables, and group comparisons for continuous variables were performed using the unpaired t-test or Wilcoxon rank-sum test, as appropriate. Prior to conducting parametric tests, normality of continuous variables was assessed using graphical methods and the Shapiro–Wilk test. For the Jonckheere–Terpstra trend test, assumptions were verified, including continuous dependent variables, independent ordinal groups, and a prespecified ordering of groups based on study hypotheses.

Qualitative data were analysed thematically following the six-step analytic framework developed by Braun and Clarke.[24] Thematic analysis was subsequently conducted across the dataset to identify cross-cutting patterns related to the application of servant leadership and systems thinking in health plan management and the conditions influencing their application.

Interview recordings were transcribed verbatim by the local researcher and subsequently anonymised. The principal researcher manually conducted the initial inductive coding of the interview data. To ensure conceptual coherence and alignment with the study objectives, iterative review and refinement of themes were undertaken collaboratively by the two

researchers. The essence of each theme was subsequently defined and named. Conceptual relationships among themes and sub-themes were then examined to identify broader cross-cutting themes. The final themes were synthesised into a coherent analytic narrative.

To enhance credibility and dependability, the coding process and thematic structure were reviewed separately by the local researcher. In addition, the preliminary findings and thematic interpretations were presented remotely to five management team members of the Siaya Department of Health and Sanitation who had participated in the interviews. Their feedback was incorporated through discussion and verification of the interpretation of the findings.

The quantitative and qualitative findings were integrated through joint displays to generate meta-inferences. Three analytic patterns were examined: convergence (where findings aligned), complementarity (where qualitative findings elaborated or explained quantitative results), and discordance (where findings diverged).[25]

Development of Multiple Linear Regression Models

Multiple linear regression models were developed to examine factors associated with servant leadership and systems thinking scores as the dependent variables. Seventeen factors derived from the survey instrument were considered as candidate predictors, comprising five biodemographic characteristics, nine external factors, and three training types (Table 1). Given the study hypothesis that the core competencies for HSS can be developed through training, three training categories derived from the six reported training types were treated as the primary explanatory variables: (i) any leadership and management-related training; (ii) health systems management (HSM) training; and (iii) comprehensive HSM training. Comprehensive HSM training refers to leadership-inclusive HSM training covering fourteen competency areas. Each training category was analysed in a separate regression model to assess its independent association with competency scores in alignment with the study hypothesis. Regression coefficients represent the mean difference in competency scores associated with participation in each training category.

Acknowledging the risk of overfitting associated with a relatively large number of explanatory variables in relation to the sample size (N = 76), all seventeen candidate predictors were not entered into the regression models simultaneously. Instead, a staged modelling procedure was applied to derive parsimonious models. Pearson's correlation analysis was first conducted as a screening step to identify variables significantly associated ($P < .05$) with leadership and management scores. Variables identified through this process were subsequently assessed for key regression assumptions.

Linearity between dependent and independent variables was assessed using scatterplots and residual plots. Multicollinearity was examined using variance inflation factors (VIF), and

variables with VIF > 10 were excluded from model development. Model assumptions, including normality, homoscedasticity, and independence of residuals, were assessed using residual diagnostics.

Two modelling approaches were considered: a standard multiple regression model including selected variables and a forward stepwise regression procedure. Model comparison using Akaike Information Criterion (AIC) indicated that the forward stepwise regression approach produced more parsimonious models, and this approach was therefore adopted for the final analyses. Depending on the training model and whether competency score was used as the dependent variable, the final models included between six and eleven predictors. Model performance was evaluated using statistical significance ($P < .05$) and goodness-of-fit indicators (adjusted R^2). The primary explanatory variables representing training types were retained in all models to reflect the study hypothesis.

Results

Study Participants and Context

Of the 88 health managers invited at county and sub-county levels, 77 completed the quantitative survey (response rate: 86%). One questionnaire was excluded due to incomplete data, resulting in 76 valid responses included in the final analysis. Of the 33 managers who met the criteria for qualitative interviews, 25 participated in interviews, representing all sub-counties and cadres.

Participant characteristics are summarized in Table 2. The distribution of sex, age, and educational level was relatively balanced. Most respondents had fewer than 10 years of management experience and were facility-based managers. More than half of the managers had participated in training specific to health systems management, but only a small proportion had completed comprehensive programme.

Table 2. Participants' Characteristics and Competency Scores by subgroup (N-76)

Variable		Category	n (%)	Servant leadership scores (Max: 100)		*P* value	Systems thinking scores (Max: 100)		*P* value
				Mean	SD		Mean	SD	
Biodemographic Characteristics	**Sex**					.96			.20
		Male	41 (54%)	83.66	8.90		83.12	11.41	
		Female	35 (46%)	83.40	8.10		80.46	9.93	
	Age group					.56			.86
		26-40	37 (49%)	82.57	9.11		81.08	13.04	
		41–60	39 (51%)	84.46	7.86		82.67	8.14	
						.094[1]			.15[2]
	Educational level	Basic	23 (30%)	81.30	7.85		80.13	9.81	
		Intermediate	37 (49%)	83.89	9.43		82.30	11.08	
		Advanced	16 (21%)	85.94	6.51		83.50	11.66	

					.19			.12
Years of Management Experience	Less than 10 years	62 (82%)	82.85	8.38		81.00	11.12	
	11-20⁺ years	14 (18%)	86.57	8.58		85.86	8.24	
					.031[3]			.014[4]
Cadre group	Facility-based	47 (62%)	84.98	7.79		83.57	10.20	
	Community-based	17 (24%)	79.29	9.62		76.44	9.93	
	Office-based	12 (14%)	83.91	8.35		81.67	12.98	
					.026			.01
	Attended	40 (53%)	85.33	8.56		84.63	10.25	
Training History HSM training	Not attended	36 (47%)	81.56	8.00		78.86	10.50	

Abbreviations: HSM, Health Systems Management

[1] Basic-advanced: .094, Basic-Intermediate: .26, Intermediate-Advanced: .49
[2] Basic-advanced: .15, Basic-Intermediate: .39, Intermediate-Advanced: .58
[3] Facility-Community: .031, Facility-Office: .75, Community-Office: .16
[4] Facility-Community: .014, Facility-Office: .471, Community-Office: .62

Two external conditions were largely fulfilled: team-based information sharing (89%) and participation in decision-making (93%). However, substantial gaps were observed in staffing adequacy (36%) and logistical support for supervision, particularly the provision of vehicles and fuel (7%).

Quantitative Findings: Determinant Factors for Competency Development and Sustainable Application

Multiple linear regression analyses showed that all three training types were significantly positively associated with servant leadership scores (Table 3) and systems thinking scores (Table 4). Having a documented job description aligned with career development was consistently associated with higher competency scores across models. Management experience of more than 20 years was positively associated with servant leadership scores but was not significantly associated with systems thinking scores.

Cadre differences were observed, with community-based cadres demonstrating lower scores compared with facility-based cadres. Meeting staffing norms was negatively associated with servant leadership scores in the HSM model and the comprehensive HSM model.

Among the nine external factors examined, three variables remained statistically significant: routine involvement in decision-making; and established information-sharing structures were positively associated with the competency scores, whereas limited logistical support for supervision was negatively associated with performance outcomes.

Table 3. Significant Explanatory Variables for Servant Leadership Scores Across Training Models (Reference group: no L&M-related training, n = 19)

Model	Explanatory Valuable	Coef.	95% CI	*P* value
L&M Training	Participation in L&M Training (Yes:1-No:0)	5.23	1.19 to 9.27	.013
L&M training attended (n=57)	Years of management experience (20^{+})	8.48	11.53 to 15.43	.019
	Information sharing in the team (Yes:1-No:0)	6.04	0.38 to 11.69	.040
	Availability of job description (Yes:1-No:0)	3.60	0.02 to 7.18	.053
HSM Training	Participation in HSM Training (Yes:1-No:0)	6.80	2.67 to 10.92	.002
HSM training attended (n=40)	Years of management experience (20^{+})	12.31	4.74 to 19.89	.002
	Adequate number of staff deployment (Yes:1-No:0)	-5.27	-1.23 to -9.31	.013
	Availability of job description (Yes:1-No:0)	4.52	0.81 to 8.23	.020
Comprehensive HSM Training	Participation in Comprehensive HSM Training (Yes:1-No:0)	11.75	4.77 to 18.73	.004
	Years of management experience (20^{+})	17.84	4.82 to 30.86	.016
Comprehensive HSM training attended (n=11)	Adequate number of staff deployment (Yes:1-No:0)	-8.49	-15.56 to -1.42	.032
	Availability of job description (Yes:1-No:0)	14.20	2.22 to 26.17	.034

Abbreviations: L&M, Leadership and Management; HSM, Health Systems Management; Coef., regression coefficient; CI, confidence interval

Table 4. Significant Explanatory Variables for Systems Thinking Scores Across Training Models (Reference group: no L&M-related training, n = 19)

Model	Explanatory Valuable	Coef.	95% CI	*P* value
L&M Training	Participation in L&M Training (Yes:1-No:0)	7.85	2.99 to 12.71	.002
L&M training attended (n=57)	Availability of job description (Yes:1-No:0)	5.17	0.72 to 9.62	.025
	Sex (Female)	-4.90	-9.16 to -0.65	.027
	Information sharing in the team (Yes:1-No:0)	7.49	0.31to 14.68	.044
HSM Training	Availability of job description (Yes:1-No:0)	8.68	3.14 to 14.22	.003
HSM training attended (n=40)	Cadre (Office-based)	-11.83	-19.95 to -3.71	.006
	Participation in HSM Training (Yes:1-No:)	7.42	2.06 to 12.78	.009
	Availability of Personal Computer (Yes:1-No:0)	8.16	1.67 to 14.66	.017
	Cadre (Community-based)	-6.79	-13.03 to -0.55	.037
	Information sharing in the team (Yes:1-No:0)	8.63	0.50 to 16.76	.042
Comprehensive HSM Training	Education level (Advanced)	-20.92	-31.69 to -10.15	.001
Comprehensive HSM training attended (n=11)	Cadre (Community-based)	-20.52	-31.81 to -9.23	.002
	Availability of electronic networks (Yes:1-No:0)	15.62	6.71 to 24.52	.003
	Availability of Personal Computer (Yes:1-No:0)	12.29	4.62 to 19.97	.005
	Cadre (Office-based)	-12.48	-20.69 to -4.27	.008
	Participation in Comprehensive HSM Training (Yes:1-No:0)	10.41	3.02 to 17.81	.013
	Availability of job description (Yes:1-No:0)	7.96	1.40 to 14.52	.029
	Adequate number of staff deployment (Yes:1-No:0)	-10.88	-19.94 to -1.82	.030

Abbreviations: L&M, Leadership and Management; HSM, Health Systems Management; Coef., regression coefficient; CI, confidence interval

Quantitative Findings: Training Most Effective for Developing Competencies Essential for HSS

Independent *t*-tests compared managers without leadership and management training with those who had participated in each training type. For servant leadership scores, managers who completed HSM training had significantly higher scores than those without training (mean difference = 5.48 points; 95% CI: 1.10–9.87; $P = .015$). Similarly, managers who completed comprehensive HSM training scored significantly higher (mean difference = 7.16 points; 95% CI: 0.74–13.57; $P = .030$). In contrast, participation in training on leadership and management was not associated with a statistically significant difference in leadership scores ($P = .130$).

For systems thinking scores, participation in each training type was associated with significantly higher scores compared with no training. Managers who completed training on leadership and management had higher scores (mean difference = 7.02 points; 95% CI: 1.17–12.87; P = .020), as did those who completed HSM training (mean difference = 9.57 points; 95% CI: 3.59–15.55; P = .002) and comprehensive HSM training (mean difference = 12.13 points; 95% CI: 4.03–20.23; P = .005). Effect sizes were larger for systems thinking scores than for servant leadership scores.

The Jonckheere–Terpstra trend test was conducted to assess whether these competency scores increased with more specialized and comprehensive training. A statistically significant increasing trend was observed for both leadership (P = .009) and management scores (P = .001).

Qualitative Analysis: Application of Servant Leadership and Systems Thinking in Health Plan Management and Influencing Conditions

1. How Servant Leadership and Systems Thinking Were Applied in Health Plan Management

Qualitative interviews were analysed thematically to examine how health managers' servant leadership and systems thinking competencies shaped health plan management. The major themes that emerged during the planning stage were participatory decision-making, coordination of competing demands, and systems interconnectedness, while engagement of community resources, and promotion of communication and networking among stakeholders emerged prominently during the implementation stage.

The finalized thematic map (Figure1) illustrates the hierarchical relationships among these themes and sub-themes in alignment with the research questions. The map indicates that managers did not apply individual competency elements independently, but rather integrated them to work toward a common goal. The themes formed an interconnected pattern that reflected two overarching characteristics of health plan management—integration and collective action —indicating that servant leadership and systems thinking were expressed collective action through interconnected management processes.

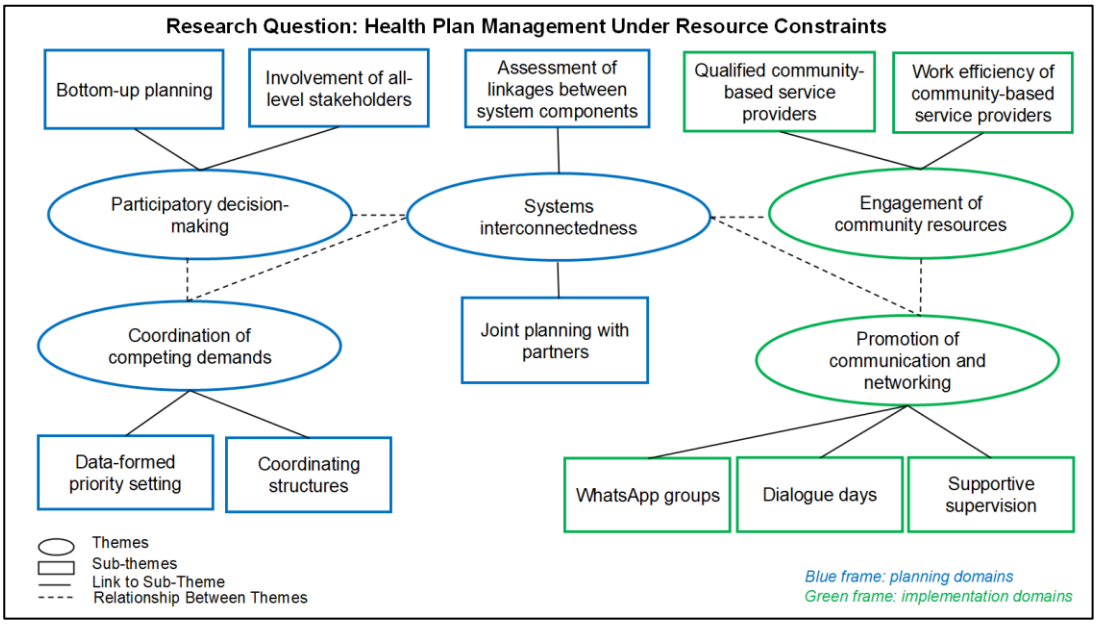


Figure 1: Finalized Thematic Map of Health Plan Management Through Servant Leadership and Systems Thinking

Table 5 demonstrates how the qualitative findings align with servant leadership characteristics and systems thinking principles. These findings were consistent with the literature and the quantitative results, illustrating that servant leadership and systems thinking are mutually reinforcing and central to effective health systems management.

The application of these competencies in health plan management was associated with notable improvements in service delivery indicators. Participants reported reductions in mother-to-child HIV transmission across the county (from approximately 25% in 2014/15 to below 5% in 2021/22) and increases in facility deliveries (from 56% to 88%). At sub-county level, phone-based defaulter tracing in Bondo increased ANC4+ coverage from 48% to 78%, while a pre-calling system in Gem improved PMTCT retention from 70% to 96%. These examples illustrate how collaborative planning, community engagement, stakeholder coordination, and adaptive communication mechanisms were operationalized across health system levels to improve service delivery.

Table 5. Alignment of Theme and Subtheme with Servant Leadership and Systems Thinking

	Theme	Subtheme	Illustrative Quote	Relevance to Servant Leadership Characteristics	Relevance to Systems Thinking Principles
Planning	I. Participatory decision-making	1. Involving key stakeholders at all levels 2. Bottom-up planning starting from the community.	*I involve the community in the planning process with the support of Community Health Volunteers. We hold meetings or dialogues where community members voice their concerns. I incorporate these issues into the health plan to ensure no one is left out (Sub-county Clinical Officer).*	Listening; Empathy; Commitment to the Growth of People	Focus on relationship between system components; Engage multiple perspectives for learning and adaptation
	II. Coordination of competing demands with transparency and accountability	1. Coordination structures 2. Data-formed priority-setting	*The planning process includes a stakeholder forum where we regularly meet with all stakeholders to share and critique the plans. At the sub-county level, there is a formation of a technical working group. Additionally, we encourage community participation through Community Dialogue Days, where members have the opportunity to voice their concerns and contribute to the planning process (County Nursing Director).*	Awareness; Stewardship; Foresight	Identify underlying causes rather than symptoms; Recognize that systems are dynamic and constantly changing; Use leverage points for effective intervention
	III. Systems interconnectedness	1. Assessing linkages between health system components 2. Joint planning with partners	*When planning health plans, we consider the inter-linkages between health system components. We look at the aspects of six pillars of health systems and assess these six pillars to determine what will work best (Sub-county Clinical Officer).*	Building Community; Persuasion	Recognize that systems are dynamic and constantly changing; Focus on relationship between system component; Anticipate unintended consequences
Implementation	I. Engagement of community resources to expand service coverage	1. Increasing the number of qualified community-based service providers 2. Increasing work efficiency of community-based service providers	*We have been supported by development partners to implement bottleneck analysis, which has been extended to the community level. This has improved referrals within the community. Initially, partners targeted the wrong groups, but now they've shifted their focus to the communities, which are now the right target (County Public Health Officer).*	Empowerment; Building Community; Commitment to the Growth of People	Anticipate unintended consequences; Engage multiple perspectives for learning and adaptation
	II. Promotion of communication and networking among stakeholders	1. WhatsApp groups 2. Dialogue Days 3. Supportive supervision	*WhatsApp group has enabled us to work as a team…We discuss and share a lot as a team to make decisions (Sub-county AIDS&STD Coordinator). We ensure quarterly Community Dialogue Days where specific challenges/grievances are discussed and specific solutions arrived at. This has led to good community and facility relations enhancing quality service delivery to the catchment population (Sub-county Clinical Officer).*	Listening; Empathy; Persuasion	Focus on relationship between system component; Engage multiple perspectives for learning and adaptation

2. Contributing and Constraining Conditions for the Application of *Servant Leadership and Systems Thinking*

The thematic analysis further explored conditions influencing the sustainable application of the core competencies in health plan management (Figure 2). The analysis identified three major contributing conditions: team-oriented coordination and communication across health system levels; functional governance and policy alignment; and comprehensive health systems management capacity-building. Three major constraining conditions were also identified: uneven management capacity across health system levels; resource constraints at facility and community levels; and low county government initiatives for evidence-based planning and decision-making. These themes and their corresponding sub-themes are presented in the finalized thematic structure.

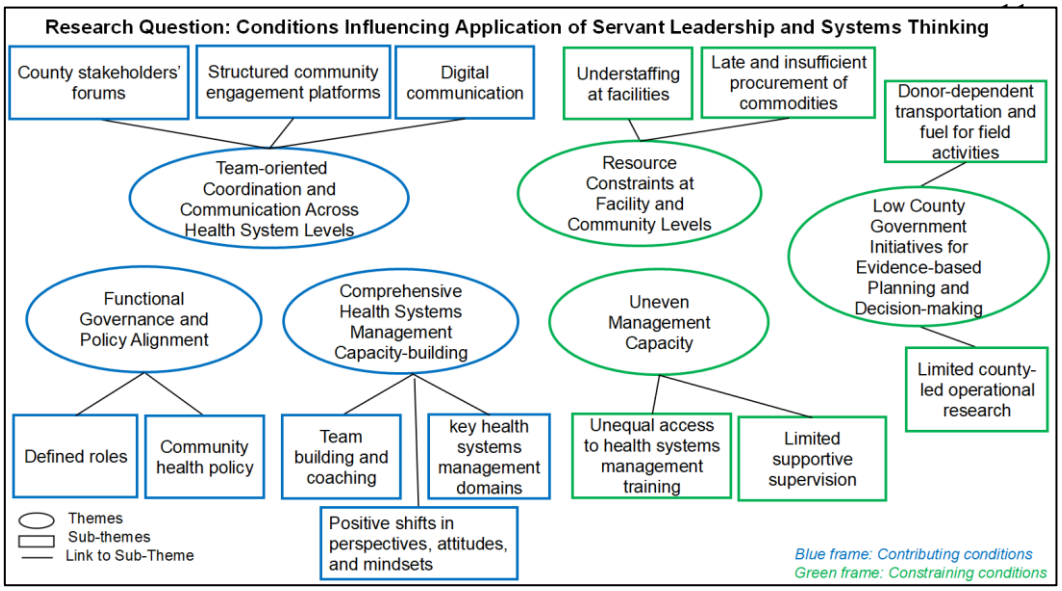


Figure 2. Finalized Thematic Framework of Conditions Influencing the Application of Servant Leadership and Systems Thinking in Health Plan Management

The themes reflected the roles of different actors within the decentralized health system, indicating that organizational ownership and government commitment are essential for sustaining health systems strengthening efforts. This was reflected at multiple levels of the decentralized health system. At the national government level, responsibility included developing relevant policies, guidelines, and norms. At the county government level, responsibility focused on allocating financial and human resources to support implementation by the county department of health and sanitation. At the organizational level, creating a team-oriented working environment was essential for enabling management teams to strengthen team performance across health system levels, thereby improving service delivery. The findings further support the quantitative evidence that HSM training contributes to the development and sustainable application of the core competencies.

Joint Interpretation of Findings

This integrative analysis identified convergent and complementary relationships between the quantitative and qualitative findings, while no substantive discordance was observed (Table 6).

Table 6. Joint Display Integrating Quantitative and Qualitative Findings on Factors Influencing the Development and Sustainable Application of Servant Leadership and Systems Thinking

Quantitative findings	Qualitative findings	Meta-inference
Biodemographic characteristics **20⁺yrs. of experience:** Significantly positive association with servant leadership scores across all training models. **Community-based (vs. Facility-based):** Significantly negative association with systems thinking scores in the HSM Training Model and the Comprehensive HSM Training Model. **External condition** **Perceived adequacy of number of managers:** Significantly negative association with servant leadership scores in the HSM Training Model and the Comprehensive HSM Training Model; and with systems thinking scores in the Comprehensive HSM Training Model. **Having a documented job description aligned with career development:** Significantly positive association with servant leadership and systems thinking scores in all training models (62% had a documented job description aligned with career development). **Information-sharing structures:** Significantly positive association with servant leadership and systems thinking scores in the L&M Model, and with management scores: in the HSM Training Model (89% answered that the information-sharing structures were available). **Routine involvement in decision-making and limited logistics support for supervision:** Common for almost all managers (93% each), indicating no statistically significant association with either competency. **L&M training** **All three types (L&M, HSM, Comprehensive HSM):** Significantly positive association with servant leadership and systems thinking scores. **Comprehensive HSM:** Largest positive associations with servant leadership and systems thinking scores (only 14% completed comprehensive training, of whom nearly half were at the county level).	**Contributing Conditions** **Team-oriented Coordination and Communication:** County stakeholders' forums engage diverse stakeholders across health system levels in the joint management of health plans; Structured community engagement platforms (Dialogue Days and Action Days) promote community participation and ownership in improving service delivery; Digital communication tools (e.g., WhatsApp) promote information sharing and facilitate joint planning, monitoring, follow-up, and reporting for health plan management among management teams and service providers at facility and community levels. **Functional Governance and Policy Alignment:** Clearly defined and documented managerial roles and responsibilities within management teams promote teamwork; National community health policies support health managers in engaging community resources to improve service delivery. **Comprehensive Health systems management Capacity-building:** Comprehensive HSM training promotes systems-oriented problem solving, team-building, coaching, supportive supervision, and positive shifts in perspectives and mindsets. **Constraining Conditions** **Uneven Management Capacity Across Health System Levels:** Unequal access to HSM training creates competency gaps among management team members and service providers at facility and community levels; Limited supervision of service providers reduces opportunities for mentorship and implementation follow-up at facility and community levels. **Resource Constraints at Facility and Community Levels:** Resource constraints, including understaffing linked to delays in staff recruitment processes by the County Public Service Board, and delays in procurement of commodities through the national Medical Supplies Authority, affect implementation capacity at facility and community levels. **Low County Government Initiatives for Evidence-based Planning and Decision-making:** Dependence on donor support for transportation and fuel constrains routine field activities by health management teams; Limited county-led operational research reduces the use of evidence in planning and decision-making processes.	**Convergence** **Training:** Quantitative evidence showing stronger effects from comprehensive HSM training converged with qualitative accounts of mindset change, systems-oriented problem solving, team-building, and coaching, indicating that comprehensive HSM training supports not only competency development but also the sustained application of servant leadership and systems thinking across health system levels. **Information flow:** Quantitative associations between information-sharing structures and competency scores converged with qualitative findings on digital and forum-based coordination, suggesting that communication and stakeholder engagement mechanisms reinforce collaborative leadership and collective management practices in health plan management. **Complementarity** **Number vs. competency:** While quantitative findings showed that perceived adequacy in the number of managers was not associated with higher competency scores, qualitative findings revealed that uneven competency distribution within teams can constrain collective performance, suggesting that competency mix and collaborative functioning may be more important than staffing numbers alone. **Sustained application:** Quantitative findings showing strong effects from comprehensive HSM training was complemented by qualitative insights indicating that such training promotes sustained application of competencies through cognitive reframing and enhanced systems awareness. **Supervision support**: Quantitative findings indicating limitations in logistics support for supervision were complemented by qualitative accounts describing dependence on donor support for transportation and fuel, highlighting structural resource constraints affecting routine implementation and follow-up activities. **Discordance** No substantive discordance was identified between quantitative and qualitative findings.

Abbreviations: L&M, Leadership and Management; HSM, Health Systems Management

Convergent findings were observed regarding the association between comprehensive HSM training and higher competency scores, which aligned with qualitative findings of mindset change and systems-oriented perspectives. Convergent findings further clarified how team-oriented working environment, including information sharing and collaborative decision-making processes, influenced the sustained demonstration of the core competencies in managing diverse stakeholders and resources within complex health systems.

Complementarity findings were also observed in relation to the mechanisms influencing collective performance and sustained competency application. While quantitative findings showed that an adequate number of managers alone did not predict higher competency scores, qualitative findings suggested that uneven competency distribution within teams may constrain collective performance. In addition, qualitative insights complemented the quantitative findings on the strong effects of comprehensive HSM training by indicating that such training may promote sustained application of competencies through cognitive reframing and enhanced systems awareness.

The integrative analysis also demonstrated a relationship between servant leadership and systems thinking competencies. Simple linear regression analysis showed a positive association between the two scores (correlation coefficient 0.62; $P < .001$). A one-unit increase in systems thinking score was associated with a 0.49-point increase in servant leadership score (95% CI: 0.35 to 0.63; $P < .001$). This relationship aligned with qualitative accounts describing how servant leadership-oriented behaviours supported systems-oriented practices, including attention to linkages, feedback, and collective problem-solving within health systems. This finding indicates that both competencies are essential for effective health systems management, providing empirical support for Robert K. Greenleaf's proposition: systems thinking constitutes a core dimension of servant leadership and further demonstrate that managers with stronger servant leadership tendencies are more likely to apply systems-thinking approaches in their routine management tasks.

Discussion

Key Findings and Implications

The integrated finings support a leadership- and management-centred approach proposed by this study. The approach comprises: (i) development of servant leadership and systems thinking of operational-level managers through the comprehensive HSM trainings; and (ii) sustained application of these competencies for mobilizing and coordinating resources for strengthening health systems within enabling organizational and policy environments. The approach is in line with WHO Leadership and Management Strengthening Framework by demonstrating that competencies and contextual conditions operate as mutually reinforcing determinants of performance rather than independent influences.

A central meta-inference concerns the conditions for effective team performance. The integrated findings suggest that role clarity and competency complementarity within management teams are more

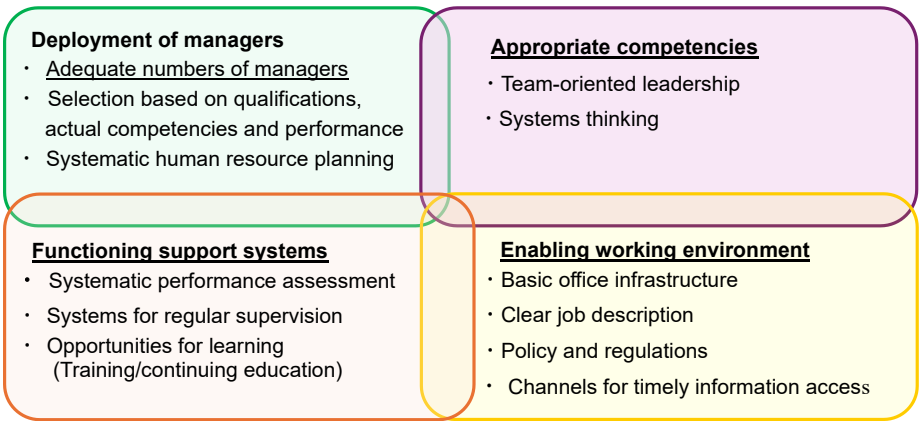
critical for effective system performance than staffing quantity alone. For the department of health and sanitation, this implies that addressing training gaps should extend beyond expanding training coverage across cadres to ensuring competency complementarity between county and sub-county levels. Such initiatives should be counted in the context of overall human resource strategies, including transparent recruitment criteria, clearly defined terms of reference, and structured performance appraisal systems linked to professional development pathways. When the core competencies were sufficiently developed across management teams and frontline health workers at facility and community levels, digital communication tools were perceived as effective enablers of coordination and teamwork.

A notable finding was the role of policy in sustaining competency application. Managers' accounts of service delivery improvements aligned closely with Kenya's national community health strategy, which institutionalizes community health and provides an enabling environment for operational-level managers to apply their competencies across facility and community levels.

Conceptual Implications of the Findings

The leadership- and management-centred approach provides an empirical basis for analysing HSS through the lens of operational-level leadership and management. Rather than prescribing a universal model, it demonstrates how contextually embedded these competencies interact with organizational and policy environments to shape system functioning. This approach aligns with the view of the WHO that health systems are inherently context-specific and that no single set of best practices guarantees improved performance.[1]

The study findings provide practical insights into three of the four conditions underlining the WHO Leadership and Management Strengthening Framework (appropriate competencies, enabling working environments, and functioning support systems) while suggesting that the remaining condition, an adequate number of managers, does not necessarily contribute to improving health system performance. The study findings suggest the need to refine the framework by specifying practical actions under its four conditions (Figure 3).



Underlined items are conditions identified in the original framework.

Figure 3. Reoriented Leadership and Management Strengthening Framework: Conditions for Effective Health Systems Management

In the proposed approach, Leadership and Governance is highlighted in the six components of WHO Health System Framework, with particular emphasis on the roles of operational-level managers. Accordingly, the study reconceptualizes the positioning of leadership and governance in the framework as the integrative force linking all system components, with particular emphasis on information systems and facility–community linkages (Figure 4).

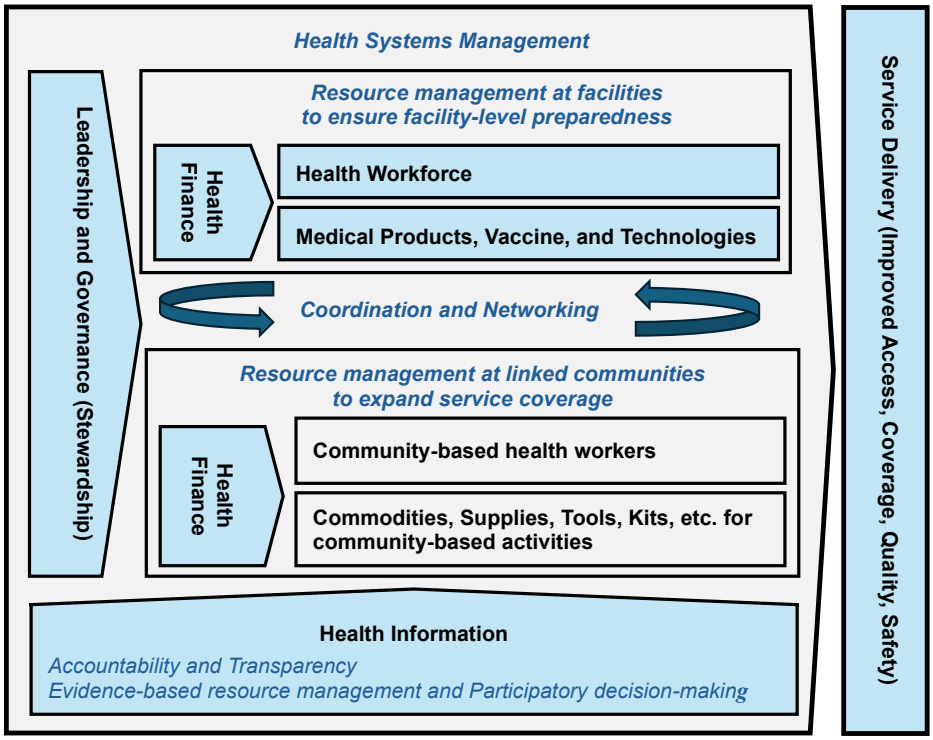


Figure 4. Reoriented WHO Health Systems Framework: A Leadership-and Management-Centred Approach to Health Systems Strengthening.

Contribution of This Study to Health Systems Research

This study responds to calls from the Alliance for Health Policy and Systems Research for multidisciplinary research on the nature, quality, and contributions of leadership in health systems in LMICs.[26] The study contributes to health systems research by identifying servant leadership and systems thinking as competencies essential for HSS through literature review and quantitative analysis. It further advances understanding of these competencies as context-dependent capabilities shaped by organizational and policy environments that enable their application in practice. The value of the case study lies in its in-depth examination of the relationships between individual competencies and system-level factors within a decentralized health system, thereby contributing to ongoing efforts to strengthen competency development and health system performance in devolved settings.

Limitations of This Study and Implications for Future Researches

Several limitations related to the regression modelling approach should be considered. Given the relatively small sample size and exploratory use of forward stepwise regression, the models may be subject to overfitting, model selection bias, and inflated Type I error due to multiple testing. Furthermore, the cross-sectional quantitative design limits causal inference regarding the observed associations due to the potential presence of residual confounding beyond the controlled factors. The quantitative assessment of competencies relied on self-reported measures. Triangulation with perspectives from frontline workers was not possible due to restrictions during the pandemic.

Future research should examine and refine the proposed leadership- and management-centred approach across diverse geographic and socio-economic contexts, including pastoral, agricultural, peri-urban, and urban settings within Kenya and in other LMICs, particularly in Africa. Comparative applications would enable assessment of contextual influences, strengthen the empirical basis of the approach, and contribute to the development of context-sensitive strategies for HSS.

Conclusions

This mixed-methods study supports the hypothesis grounded for the proposed approach.

The leadership- and management-centred approach conceptualizes HSS as application of core competencies, particularly servant leadership and systems thinking, by the trained operational-level managers within enabling organizational and policy environments to improve service delivery. The findings demonstrate that competencies and contextual conditions operate as mutually reinforcing determinants of performance and should be considered in relation to how they enhance team functioning and collaboration across county, sub-county, facility, and community levels. These insights provide practical and conceptual contributions to strengthening decentralized health systems in Kenya and other LMICs.

Supplementary files

Supplementary File 1: Quantitative Survey Questionnaire

Supplementary File 2. Interview Guide

Acknowledgement

The authors would like to express our gratitude to Dr Felix Tindi, who was serving in the County Government of Siaya at the time of the study, for approving the research, and to County Health Director Kennedy Odhiambo Orunejo for his support throughout the implementation process. We also thank the management teams in the Department of Health and Sanitation, led by Dr Omondi Owin, Chief Officer of Health, for contributing their time to the quantitative surveys and interviews during the COVID-19 pandemic. Special appreciation is extended to Mr Henry Mathews Odiango, County Health Records Information Officer, for his support in ensuring the accuracy of the facility data collected.

Declarations

Abbreviations

ANC: Antenatal care; CI: confidence interval; Coef.: regression coefficient confidence; HIV: human immunodeficiency virus; HSM: health systems management; HSS: health systems strengthening; LMICs: low-and middle-income countries; PMTCT: Prevention of Mother-to-Child Transmission; WHO: World Health Organization

Ethics approval and consent to participate

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Teikyo University Ethical Review Board (Approval No. ERC/TEIKYO/20-214), the Institutional Ethics Review Committee of Jaramogi Oginga Odinga Teaching and Referral Hospital in Kisumu (Approval No. IERC/JOOTR/415/2021). A research license was granted by the National Commission for Science, Technology and Innovation (NACOSTI) of the Government of Kenya (License No. NACOSTI/P/21/10895).

Both the quantitative and qualitative components involved health managers who provided informed consent prior to participation. Each participant received a study information sheet, consent form, and withdrawal form via email and WhatsApp, which is widely used for official communication in the study setting.

Consent for publication

Not applicable

Availability of data and materials

All data generated or analysed during this study are included in this published article and its supplementary information files. The original dataset is available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This study received no funding from any organization. The authors retained full control over the study design, data collection, analysis, and interpretation.

Authors' Contributions

KK and KT conceptualized the study. KK was responsible for data curation, formal analysis, methodology, and visualization. KK and KO conducted the investigation and managed the project. KT supervised the study. KK, KO, and KT contributed to validation. KK wrote the original draft of the

manuscript. KK, KO, and KT reviewed and edited the manuscript. All authors approved the final version of the manuscript.

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References

1. World Health Organization. Everybody's business: strengthening health systems to improve health outcomes – WHO's framework for action. Geneva: World Health Organization; 2007.
2. United States Agency for International Development. *The health system assessment approach: a how-to manual*. Washington, DC: United States Agency for International Development; 2012.
3. World Health Organization. Systems thinking for health systems strengthening. Geneva: World Health Organization; 2009.
4. Mikkelsen-Lopez I, Wyss K, de Savigny D. An approach to addressing governance from a health system framework perspective. *Int Health Hum Rights*. 2011;11:13. doi:10.1186/1472-698X-11-13.
5. Sacks E, Morrow M, Story WT, Shelley KD, Shanklin D, Rahimtoola M, et al. Beyond the building blocks: integrating community roles into health systems frameworks to achieve health for all. *BMJ Glob Health*. 2019;3(Suppl 3):e001384. doi:10.1136/bmjgh-2018-001384.
6. World Health Organization. Making health systems work: working paper No. 8. Geneva: World Health Organization; 2007.
7. Richmond B. *An introduction to systems thinking*. Lebanon (NH): ISEE Systems Inc.; 2004.
8. Peters DH. The application of systems thinking in health: why use systems thinking? Health Res Policy Syst. 2014;12:51. doi:10.1186/1478-4505-12-51.
9. Frick DM. Robert K. Greenleaf: a life of servant leadership. San Francisco (CA): Berrett-Koehler Publishers; 2004.
10. Masango MJ. Leadership in the African context. Verbum Eccles. 2002;23(3):709–11.
11. Greenleaf RK. Servant leadership: a journey into the nature of legitimate power and greatness. New York: Paulist Press; 2002.
12. Metz T. An African theory of good leadership. Afr J Bus Ethics. 2018;12(2):42–55.
13. Sipe JW, Frick DM. Seven pillars of servant leadership: practicing the wisdom of leading by serving. Rev ed. New York: Paulist Press; 2015.
14. Spears LC. Character and servant leadership: ten characteristics of effective, caring leaders. J Virtues Leadersh. 2010;1:25–30.
15. Ministry of Health, Republic of Kenya. Kenya community health strategy 2020–2025. Nairobi: Ministry of Health; 2020.
16. Ministry of Health, Republic of Kenya. Kenya community health policy 2020–2030. Nairobi: Ministry of Health; 2020.
17. Kita K, Takio K. *Strengthening health systems management under decentralization in Kenya* [Internet]. Available from: https://www.effectivecooperation.org/system/files/2021-06/strengthening_health_systems_management_under_decentralization.pdf. Accessed 2026 May 23.
18. Chelagat T, Kokwaro G, Onyango J, Rice J. Effect of project-based experiential learning on health service delivery indicators: a quasi-experimental study. *BMC Health Serv Res* 2020;20:144. doi:10.1186/s12913-020-4949-5.
19. Seims KRL, Alegre JC, Murei L, Bragar J, Thatte N, Kibunga P, et al. Strengthening management and leadership practices to increase health-service delivery in Kenya: an evidence-based approach. *Hum Resour Health* 2012;10:25. doi:10.1186/1478-4491-10-25.

20. Kenya National Bureau of Statistics. *Kenya Demographic and Health Survey 2022: Key Indicators Report*. Nairobi, Kenya: Kenya National Bureau of Statistics; 2022.
21. Ministry of Health, Republic of Kenya. The second national capacity assessment report on leadership, management and governance in Kenya: national health sector review. Nairobi: Ministry of Health; 2015.
22. KnowledgeJump. *Servant leadership self-assessment questionnaire* [Internet]. Available from: http://www.nwlink.com/~donclark/leader/servant_leadership_survey.html#google_vignette. Accessed 2026 Jul 3.
23. Management Sciences for Health. Managers who lead: a handbook for improving health services. Cambridge (MA): MSH; 2005.
24. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101. doi:10.1191/1478088706qp063oa.
25. Guetterman TC, Fetters MD, Creswell JW. Integrating quantitative and qualitative results in health science mixed methods research through joint displays. *Ann Fam Med*. 2015;13(6):554–61. doi:10.1370/afm.1865.
26. Alliance for Health Policy and Systems Research. *Open mindsets: participatory leadership for health: flagship report 2016*. Geneva: World Health Organization; 2016.

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