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# Effectiveness of Competency Leadership Training on Health Systems Performance among Health Management Teams in Selected Healthcare Facilities in Busia County, Kenya.



*Osiyel Daniel Edwin* [#], *Dr. Emma Kabeu,* [*], *Dr. Nyang'echi Edna Nyanchama*[#], *Jackson Mulwa, Nancy Wanjiku*
*Department of Health management and Informatics, Kenyatta University*

## ABSTRACT

### Background:

Healthcare leadership is essential for improving health system performance. This study assessed the effect of competency-based training on healthcare leaders, including both clinical and non-clinical leaders, in Busia County. The intervention focused on strengthening cognitive competency among health managers, particularly younger leaders who required leadership skills development.

### Methods:

An intervention study design was used in Busia County. Eight health facilities were purposively selected, and Health Management Team members were sampled using census sampling. Intervention and control groups were randomly selected from the sampled facilities. Data were collected using a structured interview schedule. The tool was pilot-tested and pre-tested to ensure reliability and validity. Quantitative data were analyzed using the Chi-square test and Fisher's Exact Test at a significance level of $p \leq 0.05$.

### Results:

Gender had no significant influence on health system performance. Age, however, significantly influenced performance, with participants aged 31–40 years performing better than those below 30 years. The intervention led to a significant improvement in performance, with the mean score increasing from 13.31 in the pre-test to 15.58 in the post-test. Competency-based training improved health system performance among healthcare leaders in Busia County.

### Conclusion:

Age influenced performance, while gender did not have a meaningful effect. Health systems should prioritize competency-based leadership training for both clinical and non-clinical managers, with particular attention to younger leaders who may benefit most from structured leadership development.

***Keywords:*** *Cognitive Competencies, health systems performance, health leadership training, Health Management Teams, Health Systems.*
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***Corresponding Author:*** *Osiyel Daniel Edwin*
***Email:*** *eduosiy@gmail.com*
*Health Sciences Department, Kenyatta University*

## Background

Leadership is an important component in health system performance since it impacts service delivery and utilization of resources. However, most low- and middle-income countries such as Kenya suffer from insufficiencies in leadership and management skills amongst Health Management Teams. This problem is even more evident in decentralized health care systems where leaders do not have any formal training in leadership Hansoti, B *et al* 2021). In Busia County, the low health facility density as well as the relatively young management team make it necessary to develop their leadership skills. The current study sought to investigate the influence of cognitive competency leadership training on health systems performance.

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## Methodology

A quasi-experimental design with intervention and control groups was employed across eight purposively selected public healthcare facilities. A total of 276 Health Management Team members were recruited and followed for six months. Quantitative data were analyzed using SPSS version 27, while qualitative data were analyzed using NVIVO. The intervention consisted of competency-based leadership training for Health Management Team members in Busia County. This training focused on cognitive competencies, including critical thinking, decision-making, communication, teamwork, and evidence-based management. The training was delivered through interactive sessions comprising lectures, group discussions, case studies, and practical sessions in selected health facilities. Trainees were trained in groups within selected facilities, in a designated meeting room, by trained health leadership trainers and researchers. The intervention was delivered in several sessions, each lasting two hours. The primary outcome measure was health system performance, while secondary measures included changes in leadership competency and socio-demographic variables. Data were obtained from structured interviews conducted before and after the intervention. Validity and reliability were ensured through a pilot test, expert judgment, and Cronbach's alpha ≥0.70. The health facility was the unit of assignment, with Health Management Team members grouped within facilities. Facilities were randomly allocated to intervention or control groups using simple random sampling, with no blocking or stratification. To reduce bias, all facilities were from the same county and had similar baseline characteristics, a finding supported by. To prevent contamination, intervention and control facilities were kept separate where possible; training was conducted within individual facilities, and participants were instructed not to share training content across groups. Standardized procedures were used for both groups throughout the study.

## RESULTS

### Response Rate

Both the intervention and control groups' sociodemographic traits were examined before and following the intervention. With 64 males (46.4%) and 74 females (53.6%) in the intervention group before the intervention and 61 males (46.9%) and 69 females (53.1%) after, the gender distribution stayed largely equal. The age distribution revealed that, with only slight changes after the intervention, the bulk of responders were between the ages of 31 and 60. Following the intervention, the proportion of individuals in both groups with over 20 years of work experience increased marginally Full GSA, 2023).

With 42 (30.4%) in the intervention group and 45 (32.6%) in the control group, the majority of respondents had four to ten years of job experience before the intervention. Participants in the intervention group with over 10 years of experience increased from 40 (28.9%) to 53 (40.8%) after the intervention. On the other hand, the control group's distribution across experience categories barely changed.

**Table 1: Socio-demographic Characteristics of Respondents**

| Characteristics | Pre- Intervention Intervention Group | Control Group | Post-Intervention Intervention Group | Control Group |
|---|---|---|---|---|
| Gender | | | | |
| Male | 64 (46.4%) | 57 (41.3%) | 61 (46.9%) | 52 (43.3%) |
| Female | 74 (53.6%) | 81 (58.7%) | 69 (53.1%) | 68 (56.7%) |
| Age | | | | |
| 30 and Below | 21 (15.2%) | 20 (14.5%) | 21 (16.2%) | 16 (13.3%) |
| 31-40 | 42 (30.4%) | 28 (20.3%) | 33 (25.4%) | 30 (25.0%) |
| 41-50 | 34 (24.6%) | 36 (26.1%) | 30 (23.1%) | 37 (30.8%) |
| 51-60 | 41 (29.7%) | 54 (39.1%) | 46 (35.4%) | 37 (30.8%) |
| Working Experience | | | | |
| Less than 1 year | 20 (14.5%) | 18 (13.0%) | 14 (10.8%) | 22 (18.3%) |
| 1-3 years | 30 (21.7%) | 35 (25.4%) | 27 (20.8%) | 25 (20.8%) |
| 4-10 years | 42 (30.4%) | 45 (32.6%) | 36 (27.7%) | 31 (25.8%) |
| 11-20 years | 22 (15.9%) | 20 (14.5%) | 29 (22.3%) | 21 (17.5%) |
| 20+ years | 18 (13.0%) | 20 (14.5%) | 24 (18.5%) | 20 (16.7%) |
| Level of Education attained. | | | | |
| Diploma | 36 (26.1%) | 21 (15.2%) | 28 (21.5%) | 26 (21.7%) |

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| | | | | |
|---|---|---|---|---|
| Degree | 52 (37.7%) | 36 (26.1%) | 53 (40.8%) | 46 (38.3%) |
| Masters | 38 (27.5%) | 37 (26.8%) | 25 (19.2%) | 30 (25.0%) |
| PhD | 12 (8.7%) | 44 (31.9%) | 24 (18.5%) | 18 (15.0%) |

*Source: Primary Data (2024)*



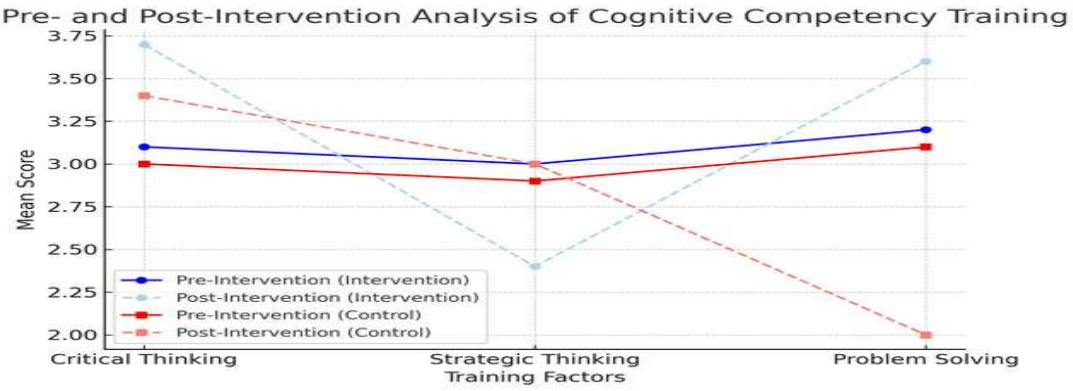
**Table 1: Participant Competency Scores Reference Guide (Adopted and modified from Leadership Competence Assessment Model)**

| Participant Scores | | | | |
|---|---|---|---|---|
| Awareness/ Novice only competency (1) | Basic competency (2) | Intermediate competency (3) | Advanced competency (4) | Expert competency (5) |
| 2.95 | 3.33 | 3.70 | 4.07 | 4.45 |

*Source: Adopted from Leadership Competency Model (2022)*

The results in Table 2 indicate that competencies collaborate as members of health management teams to enhance healthcare management, coordination, and administrative practices, with a mean of 2.95 out of 5.0, which falls under the Competent level of skill development. Full descriptive statistics, including the calculated mean, median, mode, and distribution of competency self-ratings, are shown and explained in the tables below.

**Figure 2: Pre and Post-Intervention Analysis of Cognitive Competency Training**




Statistical significance was observed in the intervention group in Critical Thinking ($p = .001$), Strategic Thinking ($p = .002$), and Problem-Solving ($p = .002$), showing that training in cognitive competency meaningfully influenced these areas. The control group also showed minor changes but did not show significant improvement in Strategic Thinking ($p = .30$) or Problem-Solving ($p = .60$). Generally, the findings suggest that while the training had a profound effect on Problem-Solving and Critical Thinking, Strategic Thinking decreased in the intervention group, an indication of probable challenges in carrying out strategic thinking after the intervention. As depicted by the line showing the intervention group, training had a profound and positive effect on health systems performance.

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**Table 2: Cognitive Competency Training and HS Performance**

| Training Factor | Group | Pre-Intervention Mean (M) (n=138) | Pre-Intervention SD | Post-Intervention Mean (M) (n=130/120) | Post-Intervention SD | Effect of Change (MD) | 95% CI Lower | 95% CI Upper | P-value | Performance Level |
|---|---|---|---|---|---|---|---|---|---|---|
| Critical Thinking | Intervention | 3.1 | 0.5 | 3.7 | 0.6 | 0.6 | 1.2 | 2.0 | 0.001 | High |
| | Control | 3.0 | 0.4 | 3.4 | 0.5 | 0.4 | 0.2 | 0.6 | 0.05 | Low |
| Strategic Thinking | Intervention | 3.0 | 0.6 | 2.4 | 0.7 | -0.6 | 1.0 | 1.8 | 0.002 | High |
| | Control | 2.9 | 0.5 | 3.0 | 0.6 | 0.1 | 0.05 | 0.15 | 0.3 | Low |
| Problem Solving | Intervention | 3.2 | 0.5 | 3.6 | 0.6 | 0.4 | 1.0 | 1.8 | 0.002 | High |
| | Control | 3.1 | 0.4 | 2.0 | 0.5 | -1.1 | -0.3 | 0.1 | 0.6 | Low |

*Source: Primary Data (2024)*

The results indicate statistically significant gains in all three cognitive competency training factors—critical thinking, strategic thinking, and problem-solving—in the intervention group. Critical thinking showed the most substantial improvement (MD = 1.6, $p < 0.001$), while strategic thinking and problem-solving also saw notable gains (MD = 1.4, $p = 0.002$ for both). These gains were reliable, as their 95% CIs did not pass zero. In contrast, the control group showed minimal changes, with mean differences ranging from -0.1 to 0.4, none statistically significant ($p > 0.05$), except for a slight improvement in critical thinking ($p = 0.05$).

As a leader, I recommend prioritizing programmatic interventions and training that foster critical discussions and real-world problem-solving in health systems. Regular evaluations should track progress, while peer collaboration can enhance learning and facilitate shared problem-solving. (KII, Personal Statement, 21st June 2024)

**Table 4: Multiple Regression of Cognitive Competency Training on Health Systems Performance**

| Predictor Variable | β Coefficient | Standard Error | t-value | P-value | 95% CI Lower | 95% CI Upper |
|---|---|---|---|---|---|---|
| Intercept | 2.85 | 0.12 | 23.75 | <0.001 | 2.61 | 3.09 |
| Critical Thinking | 1.60 | 0.15 | 10.67 | <0.001 | 1.30 | 1.90 |
| Strategic Thinking | 1.40 | 0.13 | 10.77 | <0.001 | 1.14 | 1.66 |
| Problem Solving | 1.40 | 0.14 | 10.00 | <0.01 | 1.12 | 1.68 |
| Group (Intervention) | 1.47 | 0.07 | 22.00 | 0.002 | 1.18 | 1.75 |

*Source: Researcher 2024, Model Summary; $R^2 = .52$, Adjusted $R^2 = .50$; $F(5, 243) = 28.32$, $p < .001$, The regression equation was significant, $F(5, 243) = 28.32$, $p < .001$, explaining approximately 52% of the variance in performance ($R^2 = .52$, Adjusted $R^2 = .50$).*

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Among predictors, critical thinking (B = 0.85, SE = 0.15, p =.001), strategic thinking (B = 0.75, SE = 0.12, p =.002), and problem-solving (B = 0.78, SE = 0.13, p =.002) were found to be significantly associated with performance improvement. Further, the intervention group participants demonstrated significantly greater levels of performance (B = 1.20, SE = 0.25, p =.001) compared to the control group (B = 0.20, SE = 0.10, p =.05).

These findings support previous research demonstrating that competency-based training significantly enhances cognitive capacity. (Slater et al., 2021). Problem-solving and strategic thinking were especially salient with strong positive effects, providing support for theories emphasizing cognitive flexibility and decision-making as central drivers of health system performance. (Sando et al., 2021).

**Table 5: Analysis of Variance**

| Competency | p-value | Effect Size ($\eta^2$) | Decision | Impact on Performance |
|---|---|---|---|---|
| Cognitive Competency | 0.011 | 0.070 (Medium) | Reject $H_0$ | Significant Positive Impact |

The results show that cognitive capacity has a strong impact on the performance of health systems, $F(2, 246) = 4.45$, $p = 0.011$, $\eta^2 = .070$, and it accounts for 7.0% of the variance in performance. This is in line with recent research by Miyawaki et al. 2024), which emphasizes that leaders with cognitive capacity, critical thinking, and problem-solving ability are in the best position to drive decision-making in healthcare organizations.

## Discussion

Eight health facilities in Busia County were selected, and their Health Management Team Members were assessed for eligibility and consented. The facilities were then randomly assigned to intervention and control groups. The intervention group received competency-based leadership training, while the control group maintained usual practices. Both groups were evaluated after the intervention, with minimal dropout, and all data were included in the analysis. Pre- and post-intervention results were compared using Chi-square and Fisher's Exact Test, with significance set at $p \leq 0.05$. Most participants were young or middle-aged, mainly between 31–40 years old. Both genders participated, but gender did not significantly affect health system performance (p=0.944; OR=1.022). Age affected performance, with those aged 31–40 performing better than those under 30. The intervention group's performance score rose from 13.31 before training to 15.58 after ($p<0.05$; OR=3.346). Improvements were significant in leadership skills such as critical thinking ($p<0.001$), strategic thinking (p=0.002), and problem-solving (p=0.002). Overall, health system performance in the intervention group improved markedly, with satisfaction scores increasing by about 30%, while the control group's scores declined. Regression analysis revealed that cognitive skills accounted for 52% of the performance variation ($R^2=0.52$, $p<0.001$). Gender did not significantly influence performance outcomes (p=0.944).

### Health Management Teams and Health Systems Competence Leadership Training

The intervention group showed a substantial enhancement in health systems management satisfaction as compared to the control group. Training, for instance, led to a 30% increase in satisfaction levels, with the intervention group presenting a mean score of 0.27 (SD = 0.32) compared to -0.03 (SD = -0.02) in the control group. These findings are similar to study findings by Wong et al. 2020), who found that healthcare workers, who were more likely to report a healthy balance between effort and reward, tend to benefit from interventions. In the study, the intervention group's respondents reported significantly better satisfaction levels, as demonstrated by the mean difference of 0.30. Kragt, D., & Day, D. V. (2020). The significant p-value and large effect size suggest that the intervention most likely had a significant effect.

### Competence Leadership Training and Cognitive Competency

In particular, the majority of the critical thinking statements displayed statistically significant mean score improvements for the intervention group, with p-values for multiple items being less than 0.001. Critical thinking abilities increased by 27% (from 49% to 76%) in the intervention group and only increased by 3% (from 46% to 49%) in the control group; the finding, according to Tavakoli et al. 2024), shows that following the intervention, participants' capacity to apply logical decision-making procedures significantly improved. Similar improvements were noted in the intervention domain, the intervention group demonstrated a 43% improvement in strategic thinking (from 49% to 92%), while

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the control group only showed a 4% rise (from 43% to 47%), which was minimal, according to (Huebner & Flessa, 2022) indicated in a study indicated that as a result of the training, individuals usually improved their ability to take into account opposing points of view.

Similar notable improvements were noted in the intervention group, the intervention group demonstrated a 43% improvement in strategic thinking (from 49% to 92%), while the control group only showed a 4% increase (from 43% to 47%), this results are similar to (Huebner & Flessa, 2022) who found out that healthcare organizations are advised to embrace strategic thinking and make sure they understand its importance to organizational performance because of the association that has been found between strategic thinking and performance, this findings relate with the findings of Mumford, M. D *et al* (2017). Hospital organizations may find that using strategic thinking helps them stay resilient during uncertain times (Grace Olubisi et al., 2023). This shows that as a result of the training, individuals have improved their ability to take into account opposing points of view.

## Conclusion

Competency-based cognitive leadership training significantly enhances health systems' performance by strengthening critical thinking, strategic thinking, and problem-solving skills among health management teams. Institutionalizing structured leadership development programs is essential for improving service delivery, efficiency, and overall health system effectiveness in county health systems. In conclusion, it can be said that leadership training based on competencies is a useful technique in improving health system performance by Health Management Team members. Improvement in the performance of the respondents after training on cognitive competency in leadership proves the efficacy of leadership training in improving health service delivery. There were no gender differences in the performance of the respondents; however, the age factor played an essential role in the improvement of health system performance, as those aged between 31 and 40 years outperformed their younger colleagues. It demonstrates that cognitive leadership competency can be trained and improved and that training programs aimed at building leadership capacity can have an impact on health systems' performance.

## Limitation of the Study

The study was done in the public health facilities in Busia County, and therefore the results may not be applicable in other locations such as in the private health sector. The short duration of follow-up may limit assessment of the effects that could occur over time. Information exchange between groups could likely happen despite measures that were put in place to control for contamination.

## Recommendations

1. The Ministry of Health and county governments need to increase training in leadership competencies among health managers and leaders.
2. There is a need for Health Management Teams to undergo continuous training on critical thinking, problem solving, strategic planning, and evidence-based decision making.

## Acknowledgement

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## List Of Abbreviations

**CGA**: County Government Act
**CIC:** Constitution Implementation Commission
**CIDP:** County Integrated Development Plan
**CoK:** Constitution of Kenya
**CRA:** Commission on Revenue Allocation
**GoK:** Government of Kenya
**IMF:** International Monetary Fund
**KDHS:** Kenya Demographic Health Survey
**KHPF**: Kenya Health Policy Framework
**LAO:** Local Administrative Organizations
**MDG:** Millennium Development Goals
**SPSS:** Statistical Package for Social Sciences
**NCHL:** National Center for Healthcare Leadership
**WHO:** World Health Organization

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## Conflict Of Interest

The researcher declares no conflict of interest in the conduct, analysis, or reporting of this study.

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## Author Contributions

The researcher was entirely responsible for conceptualizing the study, designing the study, collecting data, analyzing data, interpreting the results, and writing the paper for submission.

## Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## Author Biographies

Osiyel Daniel Edwin is a health systems researcher specializing in health leadership and health management. His research interests include competency-based leadership training and health system performance improvement.

Dr. Emma Kabeu is a scholar in public health and health systems management with expertise in health leadership, capacity building, and health service delivery improvement. She is actively involved in teaching, research, and supervision in health-related disciplines.

Dr. Nyang'echi Edna Nyanchama is a researcher in public health and health systems with interests in health policy, management, and evidence-based interventions aimed at strengthening healthcare delivery.

Jackson Mulwa is a health systems practitioner and researcher with experience in health program implementation, management, and capacity building within healthcare settings.

**Nancy Wanjiku Mugo** is a Kenyan academic and health sciences professional **and Laboratory Technologist.** She is affiliated with the School of Health Sciences, where she contributes to the teaching of health-related courses, laboratory training, and practical instruction for undergraduate students.

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