Effect of Strategy Formulation Action on Community-Level HIV Data Utilization in Kiambu County, Kenya

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ABSTRACT

This study investigated the effect of strategy formulation actions on the utilization of community-level HIV data in Kiambu County, Kenya. Employing a mixed-methods design, data was collected from 273 Community Health Promoters (CHPs) using structured questionnaires and eight Sub-County Community Strategy Coordinators (SCCSCs) via interviews. Descriptive analyses revealed that 58.6% of respondents agreed or strongly agreed on stakeholder engagement, while 61.5% affirmed data integration. Inferential results showed a strong positive correlation between strategy formulation and data utilization ($r = 0.86$, $p < 0.001$), with strategy formulation explaining 74% of the variance ($\beta = 0.80$, $p < 0.001$). Qualitative findings highlighted barriers, such as symbolic participation and misaligned planning cycles. The study recommends localized planning tools and inclusive stakeholder engagement to enhance data-driven HIV interventions. These findings underscore the critical role of strategy formulation in optimizing HIV data use in decentralized health systems.

Keywords: Strategy Formulation, HIV Data Utilization, Community Health, Kiambu County, Strategic Management, Evidence-Based Decision-Making

INTRODUCTION

The effective utilization of community-level HIV data is pivotal for evidence-based public health interventions, particularly in sub-Saharan Africa, where HIV remains a significant challenge (UNAIDS, 2023). In Kenya, advancements in data collection through systems like the District Health Information System 2 (DHIS2) have not fully translated into programmatic integration, limiting the impact of HIV interventions (Karuri et al., 2022). Kiambu County, with a population of approximately 1.8 million and a HIV prevalence below the national average of 4.9%, generates extensive community-level data through Com-munity Health Promoters (CHPs) (NSDCC, 2023). However, gaps in strategic management, particularly in strategy formulation, hinder the effective use of this data for planning, re-source allocation, and monitoring (Mbau et al., 2020). Strategy formulation, encompassing stakeholder engagement, clear and measurable objectives, effective communication, data integration, and aligned implementation, is essential for translating data into actionable interventions (Muthee et al., 2018). This study examines the effect of strategy formulation actions on community-level HIV data utilization in Kiambu County, addressing a critical challenge in Kenya's decentralized health system.

Kiambu County's devolved health structure emphasizes community-driven HIV interventions, with CHPs and Sub-County Community Strategy Coordinators (SCCSCs) playing central roles in data collection and application (NSDCC, 2023). Despite robust data systems, barriers such as limited stake-holder involvement, unclear objectives, and misaligned planning cycles impede effective data use (Odhiambo et al., 2019). This study hypothesizes that structured strategy formulation enhances the utilization of community-level HIV data, enabling improved decision-making in HIV programming. Using a mixed-methods approach, it analyzes quantitative data from 273 CHPs and qualitative insights from eight SCCSCs to pro-vide evidence-based recommendations for strengthening data utilization in Kiambu County.

LITERATURE REVIEW

Strategy formulation is the process of defining an organization's long-term direction, setting specific objectives, and developing plans to achieve them (Mintzberg, 1994). In public health, it ensures that community-level data informs evidence-based interventions, enhancing program effectiveness (Wagenaar et al., 2013). The Resource-Based View (RBV) theory posits that internal capabilities, such as strategic planning, optimize resources like data to achieve competitive advantages in health outcomes (Barney, 2013). Realist Review Theory complements this by emphasizing context-mechanism-outcome configurations, suggesting that strategy formulation's success depends on local adaptation and stakeholder dynamics (Pawson et al., 2005).

Empirical studies highlight the role of strategy formulation in HIV data utilization. Mwangi and Nzengya (Mwangi & Nzengya, 2023) found that inclusive stakeholder engagement in Kenyan community health programs improved responsiveness to local needs. Nguyen et al. (Nguyen et al., 2020) reported that participatory strategies in Vietnam increased community acceptance of HIV interventions. However, barriers such as power imbalances, limited resources, and top-down planning often undermine stakeholder involvement (Odhiambo et al., 2020). Clear and measurable objectives are also critical. Waweru et al. (2021) demonstrated that well-defined objectives in Kenyan HIV programs improved outcomes like testing uptake and link-age to care. Muthee et al. (Muthee et al., 2018) emphasized the SMART (Specific, Measurable, Achievable, Relevant, Time-bound) framework for setting effective goals. Despite these in-sights, gaps remain in localizing national HIV strategies and integrating community feedback, particularly in decentralized systems like Kiambu County (Odhiambo et al., 2019). This study addresses these gaps by examining how strategy formulation affects HIV data utilization at the community level.

METHODOLOGY

The study adopted a mixed-methods design, combining quantitative and qualitative approaches to assess the effect of strategy formulation on community-level HIV data utilization in Kiambu County. The target population included 2,586 CHPs across 12 sub-counties and eight SCCSCs responsible for com-munity health strategy coordination. A sample of 273 CHPs was selected using stratified random sampling, with strata based on sub-counties to ensure proportional representation. All eight SCCSCs were purposively sampled for interviews due to their strategic roles. The sample size was calculated using Cochran's formula, ensuring a 95% confidence level and 5% margin of error (Kothari et al., 2018).

Quantitative data were collected using structured questionnaires with 5-point Likert-scale items (1 = Strongly Disagree, 5 = Strongly Agree) assessing strategy formulation actions (stake-holder engagement, objective clarity, communication, data integration, implementation alignment) and data utilization (planning, resource allocation, monitoring). The questionnaire was pilot-tested with 30 CHPs in a neighboring county, yielding a Cronbach's alpha of 0.89, indicating high reliability. Qualitative data were gathered through in-depth interviews with SCCSCs, using open-ended questions to explore enablers and barriers to strategy formulation. Data collection occurred between January and February 2025, with ethical approval from Africa Nazarene University and a research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). Informed consent was obtained from all participants.

Descriptive statistics (frequencies, percentages, means, standard deviations) were used to summarize strategy formulation practices and data utilization patterns. Inferential statis-tics included Pearson's product-moment correlation to assess the relationship between strategy formulation and data utilization, and simple linear regression to determine the effect size, specified as:

$$Y = \beta 0 + \beta 1 X 1 + \epsilon$$

Where Y is data utilization, $X1$ is strategy formulation, $\beta 0$ is the intercept, $\beta 1$ is the coefficient, and ϵ is the error term. Qualitative data were analyzed thematically, with codes derived inductively from interview transcripts. Data were processed using SPSS version 25, with statistical significance set at p ¡ 0.05.

RESULTS

This section provides a detailed presentation of the descriptive and inferential findings on the effect of strategy formulation action on community-level HIV data utilization, based on data from 273 CHPs and eight SCCSCs in Kiambu County. The response rate was 81.3% (273 out of 336 targeted CHPs), sufficient for robust analysis (Kothari, 2004).

A. Descriptive Results

Descriptive analyses focused on five strategy formulation actions: stakeholder engagement, clarity of objectives, communication of plans, data integration, and implementation alignment. The frequency and proportions of responses, measured on a 5-point Likert scale (SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree), are summarized in Table I.

Table I: Frequency and Proportions of Strategy Formulation Action

Measures	SD	D	N	A	SA
Stakeholders, including health workers, policymakers, and community representatives, are engaged in discussions and decision-making processes during the formulation of HIV strategies.	1 (0.4%)	16 (5.9%)	96 (35.2%)	113 (41.4%)	47 (17.2%)
The objectives outlined in HIV strategic plans are clearly defined, measurable, and provide specific guidance for program implementation and decision-making.	2 (0.7%)	23 (8.4%)	91 (33.3%)	109 (39.9%)	48 (17.6%)
HIV strategic plans are effectively communicated to all relevant stakeholders, including national, county, and community-level health practitioners, to ensure awareness and alignment.	4 (1.5%)	18 (6.6%)	89 (32.6%)	111 (40.7%)	51 (18.7%)
Community-level HIV data is systematically considered in the development of policies and strategic plans to inform decisions on interventions, resource allocation, and program priorities.	3 (1.1%)	23 (8.4%)	79 (28.9%)	127 (46.5%)	41 (15.0%)
The implementation of HIV strategic plans at different levels of the health system is aligned with the goals and priorities established in the planning process and reflects evidence-based approaches.	5 (1.8%)	20 (7.3%)	84 (30.8%)	113 (41.4%)	51 (18.7%)

The survey findings demonstrate robust stakeholder confidence in HIV strategic planning processes across five evaluated domains (n=273). Stakeholder engagement achieved the highest endorsement, with 58.6% of respondents affirming meaningful participation of health workers, policymakers, and community representatives in strategy formulation, while only 6.3% expressed disagreement. Community data integration emerged as the strongest performing area (61.5% agreement), indicating effective incorporation of local evidence into policy development. This finding aligns with high ratings for implementation alignment (60.1% agreement), suggesting coherent translation of strategic priorities into practice through evidence-based approaches. Strategic communication presented the greatest variability, with 59.4% agreement but the highest neutral response rate (32.6%), potentially reflecting inconsistent information dissemination across organizational hierarchies. Objective clarity received comparable endorsement (57.5% agreement), indicating that strategic plans generally contain well-defined, measurable goals. Notably, disagreement rates remained consistently low across all domains (6.3-9.1%), with minimal strong disagreement (0.4-1.8%), suggesting broad consensus regarding current practices. However, substantial neutral responses (28.9-35.2%) across all measures indicate opportunities for strengthening stakeholder

experiences rather than addressing fundamental deficiencies. These findings suggest that while HIV strategic planning frameworks are functioning adequately, targeted improvements in communication strategies and stakeholder engagement processes could enhance overall effectiveness and alignment across implementation levels.

Measures of central tendency and dispersion for strategy formulation actions, based on Likert-scale responses (1–5), are summarized in Table II.

Table II: Measures of Central Tendency and Dispersion Strategy Formulation Action

Measures	**Mean**	**Std Dev**
Stakeholders, including health workers, policymakers, and community representatives, are engaged in discussions and decision-making processes during the formulation of HIV strategies.	3.69	0.84
The objectives outlined in HIV strategic plans are clearly defined, measurable, and provide specific guidance for program implementation and decision-making.	3.65	0.89
HIV strategic plans are effectively communicated to all relevant stakeholders, including national, county, and community-level health practitioners, to ensure awareness and alignment.	3.68	0.9
Community-level HIV data is systematically considered in the development of policies and strategic plans to inform decisions on interventions, resource allocation, and program priorities.	3.66	0.87
The implementation of HIV strategic plans at different levels of the health system is aligned with the goals and priorities established in the planning process and reflects evidence-based approaches.	3.68	0.92
Overall Strategy Formulation Action	**3.67**	**0.81**

The descriptive statistics reveal consistent performance across HIV strategic planning domains, with an overall mean score of 3.67 (SD=0.81) indicating favorable stakeholder perceptions above the midpoint on the 5-point scale. Stakeholder engagement achieved the highest mean score (M=3.69, SD=0.84), reinforcing its prominence as the strongest strategic planning component. This finding, coupled with relatively low variability, suggests consistent positive experiences in participatory planning processes across respondents. Strategic communication and implementation alignment demonstrated identical performance (M=3.68, SD=0.90 and 0.92 respectively), though implementation alignment exhibited the highest standard deviation (0.92), indicating greater variability in stakeholder experiences regarding evidence-based practice translation. Objective clarity recorded the lowest mean (M=3.65, SD=0.89), though the difference remains minimal, suggesting comparable performance across domains. Community data integration (M=3.66, SD=0.87) maintained moderate positioning with acceptable variability. The narrow range of mean scores (3.65-3.69) demonstrates remarkable consistency in stakeholder perceptions across strategy formulation actions. However, standard deviations ranging from 0.84 to 0.92 indicate moderate dispersion, suggesting heterogeneous experiences within each domain. The overall low standard deviation (0.81) for the composite measure indicates that while individual experiences vary, the strategic planning system performs consistently across different functional areas, reflecting a stable and reasonably well-functioning framework.

B. Inferential Results

Inferential analyses examined the association between strategy formulation action and community-level HIV data utilization. The Pearson correlation results are summarized in Table III.

Variables	Pearson Correlation (r)	p-value	Interpretation
Strategy Formulation Action vs Data Utilization	0.86	<0.001	Strong Positive

A strong positive correlation was found (r = 0.86, p ¡ 0.001), indicating that higher levels of strategy formulation are strongly associated with increased utilization of community-level HIV data for decision-making. The correlation coefficient (r = 0.86) reflects a robust linear relationship, and the p-value (<0.001) confirms statistical significance at the 0.05 level, rejecting the null hypothesis of no association. This suggests that improvements in stakeholder engagement, objective clarity, communication, data integration, and implementation alignment are closely linked to enhanced data use.

Simple linear regression was conducted to assess the predictive effect of strategy formulation on data utilization. The regression results are presented in Tables IV to VI.

Table III: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.86	0.74	0.74	0.38

Table IV:Analysis of Variance (ANOVA)

Source	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Strategy Formulation Action	1	112.50035	112.50035	785.1604	<0.001
Residuals	271	38.82976	0.1432833		

Table V: Regression Coefficients

Parameter	Estimate	Std. Error	Beta	t value	p-value
Intercept	0.78	0.11	0.97	7.29	<0.001
Strategy Formulation Action	0.8	0.03	0.99	28.02	<0.001

The regression model showed a strong fit, with R = 0.86 and R^2 = 0.74, indicating that 74% of the variance in data utilization is explained by strategy formulation actions. The adjusted R^2 (0.74) confirms the model's robustness, accounting for degrees of freedom. The 26% unexplained variance implies that other factors, such as data quality, leadership, or resource availability, may also affect data utilization, warranting further research. The ANOVA results confirmed the model's statistical significance ($F(1,271) = 785.16$, $p < 0.001$), rejecting the null hypothesis that strategy formulation has no effect on data utilization. The high F-value (785.16) indicates a strong relationship between the predictor (strategy formulation action) and outcome (data utilization).

The regression coefficient ($\beta = 0.80$, $p < 0.001$) indicates that a one-unit increase in strategy formulation is associated with a 0.80-unit increase in data utilization. The t-value (28.02) and p-value (<0.001) affirm the coefficient's significance. The constant (0.78, SE = 0.11, t = 7.29, $p < 0.001$) suggests a baseline level of data utilization when strategy formulation is minimal, though its practical relevance is limited given the model's focus on the predictor.

C. Qualitative Insights

Qualitative interviews with eight Sub-County Community Strategy Coordinators (SCCSCs) offered critical insights that enriched the quantitative understanding of strategy formulation processes within Kenya's HIV response. While descriptive statistics suggested generally favorable perceptions across all five assessed domains; stakeholder engagement, clarity of objectives, communication of plans, data integration, and implementation alignment, the qualitative narratives revealed persistent structural and operational limitations that complicate these perceptions.

Most notably, stakeholder engagement recorded the highest mean score (M=3.69, SD=0.84) and 58.6% agreement in the survey. However, interviewees characterized participation in strategic planning forums as largely symbolic, with SCCSCs, Community Health Promoters (CHPs), Community Health Extension Workers (CHEWs), and facility in-charges invited to consultative meetings but often excluded from final decision-making. One SCCSC noted, "We sit in those meetings and raise issues... but the final strategies rarely address those specifics," highlighting the disconnect between participation and effect. This finding corresponds with the 35.2% neutral survey responses for stakeholder engagement, suggesting ambivalence about the depth of inclusion in these processes.

Similarly, although community-level data integration was the highest-rated domain in terms of agreement (61.5%, M=3.66), SCCSCs voiced concern that strategic plans remained externally driven; shaped more by national and donor priorities than grounded in local HIV evidence. This sentiment reflects the 28.9% neutral responses in the survey, indicating uncertainty or perceived limitations in the actual use of local data during policy development. Participants cited a lack of responsiveness to community-specific epidemiological patterns, undermining the contextual relevance of the resulting strategies.

Challenges in temporal alignment between national planning cycles and local implementation timelines were also pronounced. One SCCSC described the national guidance as often "… coming late, forcing us to revise or ignore [local plans]." This issue disrupts alignment with strategic objectives, possibly contributing to the 30.8% neutral response rate for implementation alignment, despite its relatively high agreement rate (60.1%, M=3.68).

Additionally, the lack of operational guidance emerged as a recurrent theme. Respondents noted that strategic plans lacked sufficient detail on implementation procedures, with one stating, "They tell us to improve linkage rates, but there's no SOPs or operational support to guide the process." This gap between planning and execution reinforces the variability observed in responses regarding implementation alignment (SD=0.92), the highest among all five domains.

Accordingly, while Kenya's HIV strategic planning framework demonstrates structural coherence and general stakeholder endorsement, the qualitative evidence suggests that deeper integration of local insights, improved timing of national directives, and stronger operational guidance are critical to translating strategic intent into effective action. Targeted improvements in these areas could shift neutral perceptions toward stronger agreement and enhance the responsiveness and utility of HIV strategies across implementation levels.

D. Summary of Findings

The descriptive results indicate moderate to high adoption of strategy formulation practices in Kiambu County's HIV programming. Data integration was the strongest area, with 61.5% agreement and a mean of 3.66, reflecting systematic use of community-level HIV data. Clarity of objectives was the weakest, with 57.5% agreement and a mean of 3.65, suggesting a need for more specific and measurable goals. The composite mean (3.67, SD = 0.81) indicates general agreement but with room for improvement. Inferential results confirm a strong positive effect of strategy formulation on data utilization, with a correlation of $r = 0.86$ and a regression coefficient of $\beta = 0.80$, ex-plaining 74% of the variance. Qualitative insights highlight operational barriers, including symbolic stakeholder

participation, externally driven strategies, temporal misalignment of planning cycles, and insufficient implementation guidance, which limit the effectiveness of strategic planning processes.

DISCUSSION

The findings assert that strategy formulation significantly informs the level of community-level HIV data utilization in Kiambu County, aligning with the Resource-Based View (RBV) theory's emphasis on internal capabilities like strategic planning to optimize resources. The strong correlation ($r = 0.86$, $p < 0.001$) and regression coefficient ($\beta = 0.80$, $p < 0.001$) support Mwangi and Nzengya (Mwangi Nzengya, 2023), who found that inclusive planning enhances programmatic responsiveness in Kenyan community health programs. The high agreement on data integration (61.5%, M = 3.66) reflects concerted efforts to incorporate community-level HIV data into policy and planning, consistent with Nguyen et al. (Nguyen et al., 2020), who reported improved outcomes with data-driven strategies in Vietnam. However, the lower agreement on clarity of objectives (57.5%, M = 3.65) and qualitative reports of symbolic participation echo Odhiambo et al. (Odhi-ambo et al., 2020), highlighting power imbalances and weak feedback loops that reduce the relevance of strategic plans. The regression model's high R^2 (0.74) indicates that strategy formulation is among the primary drivers of data utilization, but the 26% unexplained variance suggests other factors, such as data quality, leadership practices, or resource constraints, may also play a role (Mpofu et al., 2020). The qualitative finding of temporal misalignment, where national guidance arrives after sub-county planning, aligns with Waweru et al., (2021), who noted planning delays as a barrier in Kenyan HIV programs.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that strategy formulation significantly enhances community-level HIV data utilization in Kiambu County, with a one-unit increase in strategy formulation associated with a 0.80-unit increase in data utilization. The strong correlation ($r = 0.86$) and high explanatory power ($R^2 = 0.74$) highlight the pivotal role of stakeholder engagement, clear objectives, communication, data integration, and implementation alignment. However, barriers such as symbolic participation, externally driven strategies, temporal misalignment, and lack of implementation guidance limit the effectiveness of these processes. To strengthen data utilization, the following recommendations are proposed:

1. Develop localized planning tools that leverage community-level HIV data to tailor strategies to sub-county needs, enhancing relevance and responsiveness.

2. Establish formal mechanisms, such as stakeholder review panels, to integrate community and facility-level feedback into final strategic plans, ensuring meaningful participation.

3. Synchronize national and sub-county planning cycles to provide timely guidance, reducing delays and enabling data-driven adaptations.

4. Provide operational support, including standard operating procedures (SOPs) and training, to guide the implementation of strategic plans, bridging the gap between planning and action.

These interventions can optimize community-level HIV data utilization, improving health outcomes in Kiambu County's de-centralized health system. Future research should explore additional factors contributing to the 26% unexplained variance in data utilization, such as data collection practices, leadership effectiveness, or resource availability, to provide a more holistic understanding of HIV program performance.

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