Effectiveness of an Integrated Clinical Management Strategy on Outcomes among Stroke Patients in Public Hospitals in Lake Region Counties, Kenya

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ABSTRACT

Context: The integrated clinical management strategy is a standardized, evidence-based approach that integrates assessment, interventions, and multidisciplinary care to optimize outcomes for stroke patients. Globally, stroke remains a leading cause of morbidity and mortality, often resulting in reduced quality of life, disabilities, and chronic complications. Effective, coordinated management is therefore essential to improving patient outcomes.

Aim: The study aimed to assess the effectiveness of an integrated clinical management strategy on outcomes among stroke patients in public hospitals in the Lake Region counties of Kenya.

Methods: This study employed a mixed-methods design with an experimental and a control group. A total of 173 stroke patients were recruited from four referral hospitals, with 87 assigned to the intervention group and 86 to the control group. Data were collected using a structured questionnaire, a key informant interview guide, and a health facility checklist. The research was conducted over a six-month period in the Lake Region Economic Bloc in western Kenya.

Results: Findings on length of hospital stay show that among those in the intervention group 48 (64%) stayed ≤8 compared to 27 (36%) of the control with a statistically significant difference between the two groups at p=0.002. Among participants who died, the intervention group had a total of 4 patients (4.6%), and the control group had 14 patients (16.3%) at p=0.01. Regarding return to pre-stroke functional state recovery, the intervention group had (n=68; 63%) compared to the control group that recorded (n=40; 37%) patients that returned to the pre-stroke state at p<0.0001.Overall, the effectiveness of the Integrated Clinical Management Strategy for stroke patients revealed a statistically significant difference between the study and control group at p=0.048 with a positive outcomes appearing among the stroke patients in the intervention group compared to control. Therefore, rejecting the null hypothesis. Qualitative findings revealed that factors such as timely presentation for treatment, stroke severity, age, and comorbidities influenced the effectiveness of integrated stroke care. Health facility factors, such as the availability of equipment, infrastructure, specialized units, the efficiency of the referral system, and institutional support, play a critical role, with well-resourced facilities achieving better patient outcomes overall.

Conclusion: The intervention significantly improved stroke patient outcomes, including reduced mortality, shorter hospital stays, fewer complications, and improved recovery. Patients in the intervention group were 1.4 times more likely to achieve a good outcome compared to those in the control group.

Keywords: Integrated clinical management strategy, outcomes, stroke patient

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1. Introduction

Globally, the primary source of illness and death rates is cardiovascular disease *(Virani et al., 2021).* American Heart Association *(AHA) (2021)* guidelines define cardiovascular diseases (CVDs) as a group of disorders that affect the heart and blood vessels. Cardiovascular diseases affecting the heart include ischemic heart disease, stroke, congenital heart disease, coronary artery disease, peripheral artery disease, cerebrovascular disease, and rheumatic heart conditions. Further to this, cardiovascular diseases affecting blood vessels involve conditions affecting cerebral, carotid, and peripheral circulation, thereby influencing the burden of disease on people. Based on this background, there is a felt need to adopt, develop, and use a treatment modality tailored to the management of cardiovascular diseases like stroke *(Virani et al., 2021)*.

Stroke care is complex and often requires health management beyond the prevention and treatment of complications and disabilities *(Kleindorfer et al., 2021; Virani et al., 2021).* Treatment recommendations aligned with care guidelines for stroke patients correlate with reduced global mortality and morbidity rates *(Gaudino et al., 2020).* Alongside the trained staff, a dedicated multidisciplinary team was essential for the care and management of stroke patients *(Oliveira-Filho & Mullen, 2016).* An integrated clinical management strategy is an

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approach that connects and coordinates health care services, such as clinical services and technology, and provides care for patients suffering from stroke at the individual or group level to enhance overall well-being and outcomes and promote patient safety *(Oliveira-Filho & Mullen, 2016).*

The use of an integrated clinical management strategy to provide care for non-communicable diseases is in great demand *(Platz, 2019).* Various clinical management strategies have been employed in the care, management, and follow-up of stroke patients. These approaches encompass emergent stroke care, dedicated stroke unit care, stroke care in the community, use of a stroke register for patient follow up, monitoring plan of care documented on the clinical strategy, communication using current technologies, use of clinical protocols, clinical pathways, standard operating procedures and clinical guidelines, evidence based care practices, patient centered care approach, coordinated care approach, integrated care and champion care for patients who suffer a stroke *(Powers et al., 2018).*

An integrated clinical management strategy for patients with stroke uses different approaches *(Virani et al., 2021).* This further entails an assessment of patients with an evaluation and treatment for care tracking to manage patients with stroke from outpatient, emergency areas, general wards, stroke units, intensive care units, during discharge till rehabilitation to the community across the continuum of care and follow-up post-discharge from the health care facilities *(Camicia et al., 2020).* The World Health Organization 2020 report states that clinical guidelines, developed by leading experts in neurology, are used as one of the strategies for managing stroke patients and are recommended for introduction into out-of-hospital care, Emergency Department (ED) assessment, and in-hospital stroke management *(Snavely et al., 2020).*

Worldwide, there is an increase in morbidity and mortality among patients experiencing cardiovascular diseases, especially stroke *(Virani et al., 2021).* Global estimate reports suggest that the number of individuals experiencing strokes has increased in the range of 7.1% to 9.6% mortalities *(Edwardson, 2025).* Statistics show that 15 million people suffer a stroke annually, 5 million deaths occur, and 5 million people develop disabilities *(WHO, 2021).* The WHO report further states that 12.7 million people suffer from stroke as a result of high blood pressure. However, the aging population aged 65 and older remains at risk *(WHO, 2021).* The burden of stroke in developing countries stands at 86% globally *(WHO, 2021).* Stroke patients frequently receive care in emergency departments and hospital units *(Caplan, 2021).* Any delay in care or ineffective management for stroke patients has been shown to result in higher complications and mortality among this group *(Greenberg et al., 2022).*

Review reports in Africa that published data within the past decades show an annual stroke rate of 316 per 1000, a prevalence of up to 1460 per 100,000, and a 3-year mortality rate greater than 80% *(Akinyemi et al., 2021).* Recent literature from sub-Saharan Africa, a resource-limited setting, emphasizes the importance of structured acute stroke management strategies, including early recognition, rapid triage, stroke units, standardized treatment protocols, and coordinated multidisciplinary care, to improve outcomes among stroke patients *(Mead et al., 2023).* A study that assessed stroke services across 17 African countries found notable, but still limited improvements in acute care capacity, including the gradual expansion of stroke units, increased adoption of tele stroke for rapid specialist input, and better organization of acute management pathways; however, substantial gaps still remain in timely imaging, availability of thrombolysis, and standardized emergency protocols *(Roushdy et al., 2025).*

Evidence from the Tanzania Stroke Project further demonstrates that implementing structured acute-stroke protocols, including standardized vital-sign monitoring, early imaging pathways, and protocols for management of blood pressure and blood glucose, is feasible in low-resource settings, though challenges persist due to late patient presentation, with the majority reporting more than 24 hours after stroke onset *(Matuja et al., 2025).* In addition, reviews of acute stroke care frameworks highlight that organized stroke units, integrated stroke management approaches, and protocol-driven emergency management consistently reduce mortality and disability, yet such units remain scarce in much of Africa, including Kenya, where acute stroke patients are often managed in general medical wards without standardized pathways *(Waweru & Gatimu, 2021).* These findings underscore that adopting structured acute-stroke management protocols that integrate rapid assessment, early imaging, standardized treatment algorithms, and coordinated multidisciplinary care is critical for improving stroke outcomes in resource-constrained health systems, including public health facilities in the Western region of Kenya. Further, the consulted literature had limited documentation of integrated clinical management strategies for stroke patients and their effectiveness, a gap this study sought to address.

2. Significance of the Study

The incidence and prevalence in Kenya remain largely unknown due to substantial gaps in national data *(Waweru & Gatimu, 2021).* A scoping review by *Waweru and Gatimu (2021)* found a stroke prevalence of 0.6% at a referral hospital in western Kenya. The documented strategies for the management of patients with stroke include acute care clinical pathways, integrated care, a patient-centered approach, and rehabilitation and long-term management *(Powers, 2019; Mead et al., 2023).*

In Lake Region County, the prevalence and incidence of non-communicable diseases, such as stroke, in the year 2019 was 51% for those affected by ischemic stroke. A study done in Kisumu County on stroke incidence revealed that over two-thirds (69%) of the participants who had suffered a stroke were mobilized early and received the interventions required. These findings informed the current study, which involved engaging stakeholders to gather insights aimed at improving stroke care through an integrated clinical management strategy that clearly illustrates the cause-and-effect relationships impacting outcome variables *(Morris, 2019).* While studies have been done on the incidence and prevalence of stroke in the Lake Region counties in previous research, there is a lack of knowledge on integrated clinical management strategies for patients with stroke, with the

already existing strategies for care coordination *(Virani et al., 2021).*

An integrated clinical management strategy is an integral part of the care of stroke patients presenting to public hospitals. The use of an integrated clinical management strategy improves stroke outcomes *(He et al., 2022).* However, Kenyan public hospitals, including those in the Lake Region Counties, still use varying strategies in the care of stroke patients; these stand-alone strategies have been associated with poor patient outcomes, uncoordinated care, and varying care processes. Further, there is a paucity of literature and knowledge on stroke care.

The study addresses the need for integrated stroke care strategies and the empirical evidence that influences stroke outcomes. Therefore, this study used an integrated clinical management strategy to assess its effectiveness in the care of stroke patients. Further to these it provides clear pathways for stroke patients, approaches to patient care at various stages of disease progression, competence of health care providers, effects, and outcomes of managing patients with a diagnosis of stroke. Its findings could inform regional policy reforms, programs, and training curricula to improve stroke outcomes.

3. Aim of the Study

The study aims to assess the effectiveness of the integrated clinical management strategy on outcomes among stroke patients in public hospitals in the Lake Region counties of Kenya.

3.1. Research Hypothesis

There is no statistically significant difference in management outcomes among stroke patients treated using the integrated clinical management strategy compared to those receiving standard care.

3.2. Operational Definition

Positive treatment outcome in this study refers to the result of the intervention (Integrated clinical management strategy) as used to manage patients with stroke, such as a return to pre-stroke state, no complications or disability, no deaths reported, reduction in the length of hospital stay.

4. Subjects & Methods

4.1. Research Design

This study employed a mixed-methods design, comprising an experimental and control group to assess the effectiveness of the integrated clinical management strategy on outcomes among stroke patients in public hospitals in the Lake Region counties of Kenya. The two groups were from two of the referral hospitals that were the study sites. The referral hospitals were at level 4 and offered stroke care. The intervention group used the integrated clinical management strategy, while the control group continued with usual care without it. At the end of the intervention, the outcomes were measured to determine its effectiveness.

4.2. Study Setting

The research took place in the Lake Economic Bloc region of Kenya, Kakamega, Kisumu, Kericho, and Kisii counties. The counties were purposively selected for their capacity to handle emergencies, their location along major highways, their admission of referrals and treatment of stroke patients, which serve large numbers of patients with non-communicable diseases, thereby enhancing patient health outcomes with a stroke prevalence of 6.1% in the western region of Kenya*(Waweru & Gatimu, 2021).*The county referral hospitals provide neuroimaging services, including Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) for stroke patients. In addition, the hospitals offer other services, such as thrombolytic medications. The facilities' geographic locations minimized information sharing among study participants in the two groups.

4.3. Subjects

The target population included all patients who presented to the hospitals with stroke upon admission and met the inclusion criteria that includes; stroke patients admitted to the hospital over the 3-month study period, patients aged 18 and older, patients who voluntarily consented to participate and were willing to share the necessary information and exclusion criteria which includes; stroke patients who did not consent to participate in the study, were unconscious and their next of kin declined to give consent for their inclusion in the study. It also involved the health care providers who were providing direct care to stroke patients in the study areas as key informants.

Total population sampling was used in this study. In total population sampling, every available member of a specified population is included in the study during the study period *(Etikan et al., 2016).* This method is frequently employed when the target population is small, well-defined, and reachable during the study period, as sampling a subset would compromise representativeness or statistical power *(Palinkas et al., 2015).*

The required sample size was determined using Cochrane's Formula for Sample Size calculation. A study conducted by *Ominde et al. (2019)* on patterns of stroke among patients admitted in rural health facilities in Western Kenya revealed that out of 3200 medical case admissions, 227 (7.09%) had a confirmed diagnosis of stroke. Using Cochran's formula, the minimum number of stroke patients to include in the study is 71. Further, to account for non-responses, loss to follow-up, and incomplete data, researchers add an additional 10–20% to the minimum sample size *(Naing et al., 2022).* Due to the small number of stroke patients admitted to rural facilities in the western region of Kenya, the researcher added 20% to the minimum calculated sample size, resulting in a minimum sample size of 86 patients per group.

A total of 173 patients were included in the study, with 87 in the intervention group and 86 in the control group. Twenty (20) health care providers were also included in the study, that is, ten (10) from each of the two (2) participating county referral hospitals. The 10 included participants from each of the units that provide care to stroke patients: accident and emergency, medical ward, critical care unit, and medical outpatient department. The health care providers included nurses, clinical officers, neurologists or physicians, and the unit in charge.

4.4. Tools of Data Collection

Three main instruments were used to collect data.

4.4.1. A Structured Interview Questionnaire

This tool was developed by the researchers to collect baseline data that included socio demographics characteristics of the patients, medical history, assessment data and patient outcomes.

The effectiveness of the integrated clinical management strategy for stroke patients, measured using multiple patient outcomes combined into a composite variable. This included length of hospital stay, mortality, functional recovery, and development of complications. For analysis purposes, effectiveness was operationalized as a composite binary variable; effectiveness was defined as the patient meeting all 4 criteria: Surviving to discharge, returning to pre-stroke functional status, experiencing no major complications, and having a hospital stay of ≤8 days. On the other hand, a patient who fails to meet any of the above criteria is categorized as ineffective. This composite measure provided a holistic assessment of the integrated clinical management strategy's effectiveness.

4.4.2. A Key Informant Interview Guide

The interview guide was developed by the researchers for use in this study. It included a structured set of questions to assess healthcare providers' background knowledge of stroke care, their understanding of the Integrated Clinical Management Strategy for stroke, and the extent of its implementation. The interview guide was designed to explore factors influencing the strategy's implementation, identify best practices in stroke care, and elicit recommendations to improve the management of stroke patients.

4.5. Procedures

This study was conducted in accordance with the ethical standards for research involving human subjects. Ethical approvals were obtained from relevant institutions, including clearance for data collection by the Directorate of Postgraduate Studies, then ethical clearance and approval were obtained from the MMUST Institutional Ethical Review Committee (ISERC/069/2024), and a research permit from the National Commission for Science, Technology & Innovation (NACOSTI Ref. No. 531472). Permission was then sought and obtained from the hospital's administrators of the involved hospitals (Kisumu-ISERC/JOOTRH079/24, Kisii-ISERC/KTRH/074/25, and Kakamega-NO.ERC/265/08/24,and Kericho-Ref. P/24/3928).

Informed consent was obtained from all study participants with explanations of the study purpose, procedures, and potential risks and benefits. Study subjects were informed and assured of voluntary participation and that they were free to withdraw from the study at any given time without affecting the care they received. Confidentiality and privacy were maintained by assuring study participants that their records were well-kept and accessed only by the researchers.

To ensure validity, the research instruments were reviewed by experts on content, accuracy and refined for use.

Internal consistency of the questionnaire was measured using Cronbach's alpha, with overall scores yielding an alpha value of 0.77, which is acceptable (structured interview questionnaire). Data collection was conducted in hospitals using the research tools and continued prospectively until the target for the study period was reached.

During the pre-intervention activities, approvals were sought for data collection. Identification of health care providers who provided direct care to patients with stroke was conducted, and training on the data collection tool was held during a stakeholder meeting that included all those working in the study areas and the facilities where stroke patients were managed. The training covered the study's aim, the target population, the intervention, and the data collection tools to be used. This training was conducted over 3 days and facilitated by the researcher.

Training of health care providers began with the identification and training of those in the experimental group where the study was conducted. A total of twenty (20) health care providers were identified for training, with ten (10) from each of the intervention hospitals. The health care providers selected for the study were nurses, clinical officers, and medical officers who were directly involved in the care of stroke patients at the participating health facilities. A meeting was organized in each hospital to discuss the research, the intervention, and all its components. The health care providers were subjected to a training that began with a pre-test on stroke care to determine their level of knowledge and identify the strategies used in the care of stroke patients. A post-test was also conducted after the training. During training, healthcare providers were guided through the integrated clinical management strategy and the activities they were expected to perform while using it in the care of stroke patients during the study.

Training for health care providers focused on the integrated clinical management strategy, its components that included; initial patient assessment, history taking, physical examination and patient screening basing on the signs and symptoms, diagnostic evaluation, initial treatment of the patient, admission, monitoring and evaluation to identify potential complications, discharge planning and follow-up. and how to use it to document interventions and apply it according to timelines and procedures during stroke management. The integrated clinical management strategy was then rolled out for use. Throughout the study period, the implementation of the integrated clinical management strategy was monitored, and any challenges encountered were addressed and necessary adjustments made. Research assistants (five in number per health facility) were nurses who held a bachelor's degree and had worked in the study areas for a period of more than one year. These research assistants were trained and guided on the tools prior to data collection, scoring of the documents was also made clear to them; any questions that arose were answered appropriately by the researcher.

During the implementation period, the integrated clinical management strategy was utilized, in which healthcare professionals entered the patients' sociodemographic factors, risk factors were established with

the patients, and clinical data were recorded in the integrated clinical management strategy tool and kept in the patients' files until discharge. The strategy also included the laboratory and radiological tests conducted for each patient. The stroke types and severity were recorded based on the assessment at the initial point of care, and the patients' diagnoses were made by the physician or neurologist who attended to them. Patients who had improved or achieved positive treatment outcomes following the acute phase of management were discharged home, whereas those with negative outcomes were admitted to the wards for continuity of care.

Finally, continuous monitoring of the intervention was conducted through monthly reviews of the implementation of the strategy and patient progress until discharge, for up to 6 months of integrated clinical management use. Patients discharged home were followed up at the medical outpatient clinic during their monthly reviews to ensure continuous implementation of the integrated clinical management strategy and to assess their progress. In the control group, stroke patients continued to receive the usual care without any intervention, also for a period of 6 months.

4.6. Limitations and Mitigation Strategies

The quasi-experimental design in this study had its advantages; however, it lacked randomization, which would have reduced selection bias. However, mitigation was achieved by matching the study sites in terms of study participants, health care providers, and facility factors. The sample size was small because the number of hospitals managing stroke patients in the lake region counties were few. However, to overcome the limitations, compensation was achieved by examining the study features, ensuring the reliability of measurement tools, using tests suitable for small sample sizes, such as confidence intervals for small samples, and carefully interpreting the results. Research assistants were trained, and the training of health care providers was also conducted. These steps and strategies enhanced the study's internal validity and strengthened the reliability of its findings.

4.7. Data Analysis

The gathered information was screened, verified, coded, and entered into the Statistical Package for the Social Sciences (SPSS) version 28 for analysis. Both quantitative and qualitative data analysis methods were employed. Descriptive statistics were used to summarize participants' characteristics and stroke outcomes. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means. Qualitative data were analyzed using thematic and content analysis techniques. A p-value of ≤0.05 was considered statistically significant.

5. Results

5.1. Quantitative Findings

A total of 173 stroke patients participated in the study, with 87 and 86 participants in the intervention and control group respectively (Table 1). The frequency and distribution of socio-demographics shows that the majority, 76.3% (n=132) of the participants, were in the 40-49 years age category, with a mean age of 44.9±4.9 years. The majority, 61.3% (n=106), were females; 80.9% (n=140) were married; 33.5% (n=58) had attained a college education; and 59.5% (n=103) were employed. Among the participants, 78% (n=135) lived more than 10 kilometers away from the health facility. The majority, 67.6% (n=117), had no health insurance, with only 20.2% (35) reporting having active Social Health Authority Insurance (SHA).

Findings in Table 2 shows that patients who had an ischemic type of stroke had a better outcome (RR: 1.4; 95% CI: 1.2-1.6; p=0.0008), with the patients without comorbidities shows a significant better outcome at (RR: 0.8; 95% CI: 0.7-0.9; p=0.013). The table also shows a significantly smaller proportion of patients with diabetes/hypertension/cardiac disease (RR: 0.8; 95%CI: 0.6-0.9; p=0.004) were less likely to have had good outcome compared to their counterparts. Generally, this implies that the additional burden of other chronic conditions worsens the outcome of hospitalized stroke patients. The table also shows that 28.1% and 71.9% of the study and control group respectively were smokers. Additionally, 31.6% and 68.4% were alcoholic on the study and control group respectively.

Table 3 presents findings relevant to the effectiveness of the integrated clinical management strategy. Table 3 shows that 36.8% (n=32) of patients in the intervention group met the effectiveness criteria compared with 25.6% (n=22) in the control group. Patients in the intervention group had a 1.44 times greater likelihood of achieving composite effectiveness compared with those in the control group (RR = 1.44, 95% CI: 1.00–2.06, p = 0.048). The findings indicate that the integrated clinical management strategy significantly improved overall patient outcomes and was therefore effective.

Table 4 shows the frequency and percentage distribution of stroke patients' outcomes. Length of hospital stay showed that the majority, 57.8% of patients in intervention group stayed from 1-7 days, while they were 37.5% of the controls. Among participants who died, the intervention group had a total of 4 patients (4.6%), and the control group had 14 patients (16.1%). Findings on mortality show that 10.4% (n=18) of participants died at different points in time of the study, among these, 14.3% died on arrival in the control group while no one of the study group, as well as 7.1% of the controls died within 24 hours, with no one of the study group.

Other discharge outcomes, that is, discharged home and to the step-down unit, showed nearly similar findings between groups with 8.0% of the study group and 2.3% of the controls were discharged to the step-down unit within the hospital and 71.3% of the study group patients were discharged home without complication, vs. 68.6% of the controls. Regarding return to pre-stroke functional state recovery, the intervention group had (n=68; 81.9%) compared to the control group that recorded (n=40; 55.6%) patients that returned to the pre -stroke state, while n=15; 18.1% from the intervention group and (n=32; 44.4%) from the control group did not return to the pre-stroke state.
The table also shows that 63.9% of the study group patients becomes independent vs. 48.6% of the controls.

Table 5 shows the results of a bivariate analysis of the outcomes of Integrated Clinical Management Strategies in

stroke patients. This was done to determine the differences in the outcomes between the intervention and control groups. Findings on hospital length of stay showed that patients in the intervention group were 1.7 times more likely to have a short length of stay (≤8 days) than those in the control group. The intervention increased the likelihood of shorter stays among patients in the intervention group by 64% (RR = 1.7, 95% CI: 1.2–2.4, p=0.002).

Among the participants included in the study, 10.4% (n=18) died. Bivariate analysis showed an RR <1, indicating a lower risk of death in the intervention group. Mortality was significantly lower in the intervention group (4.6%) compared with the control group (16.3%). Patients in the intervention group had a 72% lower risk of death than those in the control group (RR = 0.28, 95% CI: 0.10–0.78, p=0.01).

Among the study participants in the intervention group, 68 out of 86 patients (63%) returned to a pre-stroke functional state, compared with 37% in the control group (40 out of 87). The RR > 1 indicates that the participants in the intervention group were more likely to return to pre-stroke function than those in the control group. The intervention group had a 1.9-fold higher likelihood of returning to pre-stroke function (RR = 1.9, 95% CI: 1.4–2.6, p<0.0001), indicating that the integrated clinical management strategy significantly improved functional recovery.

Findings show that the proportion of patients who developed stroke complications was almost similar in the intervention (70.1%) and control (74.4%) groups. The intervention was associated with a slightly lower risk of complications (RR = 0.94), but this difference was not statistically significant (95% CI: 0.74–1.19, p=0.62). The integrated clinical management strategy did not significantly reduce the risk of developing stroke complications.

5.2. Qualitative Findings

5.2.1. Patient related factors

Qualitative findings from the key informant interviews revealed that patient related factors, including the time of presentation to the health facility and the level of severity, contribute to the effectiveness of the integrated clinical management strategy and patient outcomes.

"Patient factors play a big role in how effective an intervention is. Patients who present with severe strokes or multiple comorbidities such as hypertension and diabetes often have poorer outcomes despite receiving integrated care. I can therefore say that early presentation and lower stroke severity make the strategy much more effective (KII 2)."

Socio-demographic factors, such as age and patient adherence to treatment, were also cited as contributing to the effectiveness of the strategy.

"We have noticed that patients' characteristics such as age, level of education, and health-seeking behavior influence how well they respond to the strategy. Older patients and those who arrive late or do not adhere to rehabilitation and medication tend to benefit less. On the other hand, patients with good family support usually recover better under the integrated approach (KII10)."

Findings from the key informant interviews (health care providers in the study areas) revealed that patient outcomes have improved since the introduction of the integrated approach to stroke management, as shown in the excerpts.

"Since we began this study on the integrated management strategy compared to how we managed stroke patients before, there has been a noticeable improvement in patient outcomes. For example, patients are now assessed more quickly, treatment is more coordinated, and complications are identified earlier. As a result, many patients stabilize faster, and some are discharged earlier than before (KII 3)."

One of the participants (KII 7) affirmed that the integrated strategy has led to improvement in patient outcomes, though with some challenges.

"Yes, there has been some improvement in patient outcomes, especially in terms of early recognition of stroke severity and coordinated care. However, effectiveness is sometimes limited by staff and equipment shortages. When all components of the strategy are fully implemented, patient outcomes are clearly better than in the past (KII 7)."

5.2.2. Health provider related factors

The health provider factors influencing the effectiveness of an integrated clinical management strategy were identified through key informant interviews with health care providers. Coding and categorization of the data resulted in 4 themes, including: Health worker knowledge and skills, staffing levels and workload, teamwork and multidisciplinary collaboration, and provider attitudes and commitment.

Theme 1: Health Worker Knowledge and Skills

The key informants emphasized that adequate training was critical to achieving optimal patient outcomes.

"The effectiveness of the strategy really depends on how well health workers understand stroke management. Those who have received specific training are more confident in assessing stroke severity and initiating timely interventions, thereby improving patient outcomes and enhancing the effectiveness of interventions (KII 4).

"When staff are not adequately trained on the protocol, some components of the strategy are missed. Continuous training is important to ensure everyone follows the integrated approach correctly (KII 6)."

Theme 2: Staffing Levels and Workload

Findings from the interviews revealed that the effectiveness of the integrated strategy relied heavily on staffing levels, which determine how closely patients are monitored.

"Sometimes the workload is too high, especially during night shifts. When there are few staff on duty, it becomes difficult to provide comprehensive, coordinated care as required by the integrated management strategy (KII 9)."

"Inadequate staffing affects how closely patients are monitored. Even though the strategy is good and effective, limited personnel can reduce its impact on patient outcomes (KII 8)."

Theme 3: Teamwork and Multidisciplinary Collaboration

Teamwork and multidisciplinary collaboration were identified as key components of the integrated clinical management strategy for stroke patients.

"From my experience for the period we have had this study, I have noted that the strategy works best when there is good collaboration between doctors, nurses, physiotherapists, and nutritionists. Teamwork ensures that patients receive holistic care, which improves recovery (KII 2)."

"Communication is key; where communication between departments and the multidisciplinary team is weak, the implementation of the strategy becomes fragmented, and this affects effectiveness (KII 11)."

Theme 4: Attitudes and Commitment of Health Care Providers

Attitude of health care providers and resistance to change were also cited to influence the effectiveness of the integrated clinical management strategy for patients with stroke.

"Health workers' attitudes matter a lot. When staff are committed and follow the protocols as intended, patient outcomes improve. Resistance to change among some staff can slow down effective implementation (KII13)."

"Some providers still rely on previous practices, which affects consistency in applying the integrated strategy (KII 5)."

5.2.3. Health facility factors

Further qualitative results from the key informant interviews showed that several health facility factors influenced the effectiveness of the integrated clinical management strategy. These factors included availability of equipment and supplies, infrastructure and specialized units, efficiency of referral and support services, and institutional support. Key informants noted that facilities with adequate resources and organizational support achieved better patient outcomes. From the key informant interviews, excerpts below.

Theme 1: Availability of Equipment and Supplies

"The availability of essential equipment such as CT scan services, monitoring devices, and basic emergency drugs greatly influences how effective the integrated management strategy is. When these resources are available, patient assessment and treatment are much faster (KII 15)."

Theme 2: Infrastructure and Specialized Units

"Facilities with dedicated stroke or high-dependency units are better able to implement the integrated strategy. Limited bed space and lack of specialized units in some hospitals affect the continuity and quality of stroke care (KII 1).

Theme 3: Referral and Support Services

"Effective referral systems within and between facilities are important for the success of the strategy. Delays in referrals or lack of timely access to physiotherapy and imaging services reduce the overall effectiveness of patient management (KII17).

Theme 4: Institutional Support and Organization

"Support from hospital management plays a key role. When administration prioritizes stroke care by ensuring staffing, supplies, and supportive supervision, the integrated clinical management strategy works much better (KII 14)."

6. Discussion

This study examined the effectiveness of an integrated clinical management strategy on outcomes among stroke patients in public hospitals. Findings suggest that, coordinated, standardized multidisciplinary approach to stroke care has the potential to significantly improve patient outcomes, including reduced length of hospital stays, reduction in mortality rates, and enhanced functional recovery. Integrated clinical management strategies, which combine timely diagnosis, initial patient assessment, use of standardized treatment protocols, rehabilitation services, and continuous patient monitoring and evaluation, are increasingly recognized as essential in addressing the complex needs of stroke patients. In public hospital settings, where resource limitations and high patient burdens often affect quality of care, the implementation of such strategies may contribute to more efficient service delivery and better clinical outcomes. The discussion of these findings is informed by existing literature on stroke management and highlights the implications for policy, clinical practice, and future research in improving stroke care within public healthcare systems. The study aims to assess the effectiveness of the integrated clinical management strategy on outcomes among stroke patients in public hospitals in the Lake Region counties of Kenya.

Study findings on stroke patient demographic characteristics across the Lake Region County hospitals enabled an understanding of stroke patients' distribution by age, gender, marital status, education level, and occupation, per arm of the study (intervention and control). Stroke patients involved in the study were aged 40-49 years among the highest percentage of the study participants with a mean age of 44.9 ± 4.9 years. The majority were females, married, employed, and educated to the college level. Most patients did not have hospital insurance covers and most traveled 10 kilometers to facilities that provided stroke care. These findings align with a study done in one of the Kenyan tertiary hospitals on stroke care, showing a female predominance of 57-62% over males. Findings from our study show that women are more likely than men to present to hospitals for health-seeking behaviors and wellness.

The findings of this study reveals that the highest percentage of patients in both groups were smokers and alcoholic. These findings have shown the risk factors that contribute to the outcomes of stroke care which are in line with a study done on the influence of age on links between modifiable factors and stroke occurrence that revealed that the most frequent risk factors are hypertension and modifiable lifestyle factors like alcohol abuse and cigarette smoking *(Sarfo et al., 2021).* The current study shows that

Table (1): Frequency and percentage distribution of socio-demographic characteristics of participants (n=173).

Variables	Intervention		Control		Total	
	No.	%	No.	%	No.	%
Age in years						
30-39	9	10.3	8	9.3	17	9.8
40-49	71	81.6	61	70.9	132	76.3
≥50	7	8.1	17	19.8	24	13.9
Mean ±SD			44.9±4.9			
Gender						
Male	35	40.2	32	37.2	67	38.7
Female	52	59.8	54	62.8	106	61.3
Marital status						
Single	14	16.1	0	0.0	14	8.09
Married	65	74.7	75	87.2	140	80.9
Divorced	0	0.0	1	1.2	1	0.6
Widowed	8	9.2	10	11.6	18	10.4
Education						
Primary	19	21.8	9	10.5	28	16.2
Secondary	18	20.7	16	18.6	34	19.7
College	25	28.7	33	38.4	58	33.5
Degree/Masters	25	28.7	28	32.6	53	30.6
Occupation						
Employed	44	50.6	59	68.6	103	59.5
Self employed	26	29.9	18	20.9	44	25.4
Unemployed	17	19.5	9	10.5	26	15.0
Distance to facility (km)						
≤10	21	24.1	17	19.8	38	22.0
>10	66	33.3	69	38.4	135	78.0
Health Insurance status						
Social Health Authority Insurance (SHA)	20	23.0	15	17.4	35	20.2
Private Insurance	9	10.3	12	14.0	21	12.1
No insurance	58	66.7	59	68.6	117	67.6

the majority of the patients had an ischemic type of stroke attributed with the risk factors contributing to stroke and other cardiovascular diseases *(Mohammed, 2020).*

The effectiveness of an integrated clinical management strategy greatly depends on stroke severity and coexisting conditions such as diabetes, atrial fibrillation, and hypertension. Patients with milder strokes usually gain more from standardized clinical management strategies, leading to faster recovery and discharge *(Woo et al., 2022).* These findings are in line with a study on predictors of mortality and disability in stroke-associated pneumonia *(Tinker et al., 2021).* The current study findings suggest that a majority of participants may face challenges related to distance, which could impact timely access to acute stroke care and follow-up services, which is in line with other studies done on patient-level factors influencing hypertension control in adult patients, which is one of the factors that may complicate stroke if not well managed *(Okai et al., 2020).*

The effectiveness of the integrated clinical management strategy for stroke patients was measured using multiple patient outcomes, which were combined into a composite effectiveness variable. The variables measured included length of hospital stay, mortality, functional recovery, and development of complications. Overall, our study findings showed that stroke patients in the intervention group had significantly better outcomes than those in the control group that reject the null hypothesis. Patients who suffered an ischemic type of stroke had good outcomes compared to those who had a hemorrhagic stroke. Stroke patients who had comorbidities like diabetes, hypertension, cardiac disease and other chronic conditions were less likely to have had good outcome which implied that the additional burden of other chronic conditions worsens the outcome of hospitalized stroke patients. The current study findings can be compared to a systematic review with meta-analyses of integrated care in stroke showing that integrated care was associated with improvements in quality of life, reductions in recurrent stroke, anxiety and depression and positive benefits on some cardiovascular risk factors but did not impact mortality, major bleeding or readmission rates *(Lip et al., 2022).*

Other systematic reviews have evaluated interventions such as organized inpatient stroke care and the findings were that; the study included 29 trials (5902 participants) that compared organized inpatient (stroke unit) care with an alternative service: 20 trials (4127 participants) compared organized (stroke unit) care with a general ward, six trials (982 participants) compared different forms of organized (stroke unit) care, and three trials (793 participants) incorporated more than one comparison. Compared with the alternative service, organized inpatient (stroke unit) care was associated with improved outcomes at the end of scheduled

Table (2): Factors influencing the integrated clinical management strategy (n=173).

Variables	n	Intervention Group		Control Group		RR	95% CI	*p*-value
		No.	%	No.	%			
Age in years								
<50	149	45	30.2	104	69.8	1.2	1.0-1.5	0.072
≥50	24	3	12.5	21	87.5			
Gender								
Male	67	22	32.8	45	67.2	1.1	0.9-1.4	0.234
Female	106	26	24.5	80	75.5			
Education								
Primary	28	12	42.9	16	57.1	1.3	0.9-1.8	0.051
Beyond Primary	145	36	24.8	109	75.2			
Smoking								
Yes	96	27	28.1	69	71.9	1.0	0.8-1.2	0.901
No	77	21	27.3	56	72.7			
Alcohol								
Yes	98	31	31.6	67	68.4	1.1	0.9-1.4	0.192
No	75	17	22.7	58	77.3			
Family history of stroke								
Yes	131	40	30.5	91	69.5	1.2	1.0-1.4	0.148
No	42	8	19.1	34	80.9			
Type of Stroke								
Ischemic	108	54	62.8	54	62.8			
Hemorrhagic	65	32	37.2	33	37.9	1.4	1.2-1.6	0.0008
Severe stroke								
Yes	85	29	34.1	56	65.9	1.2	1.0-1.43	0.066
No	88	19	21.6	69	78.4			
Comorbidity								
Yes	69	12	17.4	57	82.6			
No	104	36	34.6	68	65.4	0.8	0.7-0.9	0.013
Diabetes/Hypertension/Cardiac disease								
Yes	88	16	18.2	72	81.8	0.8	0.6-0.9	0.004
No	85	32	37.7	53	62.3			
Distance to hospital								
≤10 km	38	11	28.9	27	71.1	1.0	0.8-1.3	0.8.51
>10 km	135	37	27.4	98	72.6			

Table (3): Effectiveness of an integrated clinical management strategy for stroke patients (n=173).

Composite effectiveness	Intervention Group		Control Group		RR	95% CI	*p*-value
	No.	%	No.	%			
Effective	32	36.8	22	25.6	1.44		
Not effective	55	63.2	64	74.4		1.00–2.06	0.048
Total	87		86				

follow-up (median one year): poor outcome (odds ratio (OR) 0.77, 95% confidence interval (CI) 0.69 to 0.87; moderate-quality evidence), death (OR 0.76, 95% CI 0.66 to 0.88; moderate-quality evidence), death or institutional care (OR 0.76, 95% CI 0.67 to 0.85; moderate-quality evidence), and death or dependency (OR 0.75, 95% CI 0.66 to 0.85; moderate-quality evidence). Evidence was of very low quality for subjective health status and was not available for patient satisfaction. Analysis of length of stay was complicated by variations in definition and measurement plus substantial statistical heterogeneity (I^2 = 85%). There was no indication that organized stroke unit care resulted in a longer hospital stay. Sensitivity analyses indicated that observed benefits remained when the analysis was restricted to securely randomized trials that used unequivocally blinded outcome assessment with a fixed period of follow-up. Outcomes appeared to be independent of patient age, gender, initial stroke severity, stroke type, and duration of follow-up. When calculated as the absolute risk difference for every 100 participants receiving stroke unit care, this equates to two extra survivors, six more living at home, and six more living independently *(Langhorne & Ramachandra, 2020; Yang et al., 2021).*

Regarding hospitalization, the length of stay shows that the majority, stayed 1-7 days, while few stayed more than 60 days. Therefore, this study suggests that, while most patients had a relatively short hospital stay, a significant proportion required extended inpatient care, likely due to complications

Table (4): Frequency and percentage distribution of outcomes of stroke patients (n=173).

Variables	Intervention Group		Control Group		Total	
	No.	%	No.	%	No.	%
Length of hospital stay (days)						
1-7	48	57.8	27	37.5	75	43.3
8-14	24	28.9	26	36.1	50	28.9
15-21	8	9.6	11	15.3	19	1.9
22-59	1	1.2	7	9.7	8	4.6
60-89	2	2.4	1	1.4	3	1.7
Time of death						
Died upon arrival	0	0.0	2	14.3	2	11.1
Within 24 hours	0	0.0	1	7.1	1	5.6
Within 48 hours	1	25.0	2	14.3	3	16.7
Within 72 hours	1	25.0	0	0.0	1	5.6
5-7 days	0	0.0	4	28.6	4	22.2
8-14 days	1	25.0	5	35.7	6	33.3
15-30 days	0	0.0	0	0.0	0	0.0
After 30 days	1	25.0	0	0.0	1	5.6
Discharge status						
Step down unit within the hospital	7	8.0	2	2.3	9	5.2
Home without complications	62	71.3	59	68.6	121	69.9
A home health care facility	1	1.1	3	3.5	4	2.3
Step down unit then home	13	14.9	8	9.3	21	12.1
Died	4	4.6	14	16.3	18	10.4
Return to pre-stroke functioning state						
Yes	68	81.9	40	55.6	108	62.4
No	15	18.1	32	44.4	47	27.2
Level of dependence at discharge						
Independent	53	63.9	35	48.6	88	50.9
Dependent	30	36.1	37	51.4	67	38.7
Developed stroke complications						
Yes	61	70.1	64	74.4	125	72.3
No	26	29.9	22	25.6	48	27.7
Type of complications						
Urinary incontinence	31	24.8	32	37.2	63	50.4
Aspiration Pneumonia	10	8.0	32	25.6	42	33.6
Dysphagia	14	11.2	20	16.0	34	27.2
Immobility	35	28.0	16	12.8	51	40.8
Pressure Ulcer Sores	12	9.6	36	28.8	48	38.4
Bowel complications	17	13.6	30	24.0	47	37.6
Depression	5	4.0	26	20.8	31	18.4

Table (5): Bivariate analysis on outcomes of Integrated Clinical Management Strategies on stroke patients (n=173).

Outcomes	n	Intervention group		Control group		RR	95% CI	*p*-value
		No.	%	No.	%			
Length of stay								
Short (≤8)	75	48	64.0	27	36.0	1.7	1.2-2.4	0.002
Long (>8)	98	39	39.8	59	60.2			
Mortality								
Died	18	4	4.6	14	16.3	0.28	0.10–0.78	0.01
Survived	155	83	53.56	72	46.5			
Return to pre-stroke functioning state								
Yes	108	68	63.0	40	37.0	1.9	1.4-2.6	<0.0001
No	65	19	29.2	46	70.8			
Developed complications								
Yes	125	19	70.1	64	74.4	0.94	0.74-1.19	0.62
No	48	26	29.9	22	25.6			

or the severity of illness. Further to these, our study findings indicate that, while early deaths occurred, the majority of fatalities happened after initial stabilization, underscoring the importance of post-admission management in patient survival. Therefore, the current study's findings can be compared with a retrospective study on determinants of hospital length of stay in ischemic stroke patients, which reported a hospitalization duration of 5.1 days (SD ± 3.4). Patients with severe stroke had a longer length of hospital stay, followed by patients with moderate stroke, and patients with minor stroke had the shortest length of hospital stay *(Han et al., 2022).*

In regard to functional recovery of stroke patients, the intervention group had most of the patients returning to the pre- stroke state compared to the control group, which did not return to the pre-stroke state. These findings emphasize the importance of individualized care within the clinical management strategy. This study found that stroke severity was the strongest determinant of return to pre-stroke functional status among participants. Results of the current study are consistent with findings from a retrospective study on functional recovery in patients with acute stroke and pre-existing disability. The study showed that recovery was primarily influenced by age and stroke severity. Thrombolysis remained a significant predictor of recovery, regardless of age, stroke severity, or pre-stroke disability. Overall, the findings suggest that pre-stroke disability does not independently affect the likelihood of returning to baseline function in stroke patients *(Virani et al., 2021).*

The findings of this study determine the differences in outcomes in both intervention and control groups on stroke care in terms of significant difference between both groups regarding the length of hospital stay, mortality rates, and return to pre stroke state. Reducing the length of hospital stay for stroke patients has improved healthcare efficiency and patient recovery. Advances in early diagnosis, treatment, and rehabilitation allow many patients to recover faster and continue care at home. Shorter hospital stays reduce healthcare costs, lower the risk of hospital-acquired infections, and free up hospital resources. However, early discharge must be carefully planned to avoid complications or readmissions. Adequate rehabilitation, caregiver support, and follow-up care are essential to ensure safe recovery and maintain quality patient outcomes, while integrating clinical management strategies in stroke care. These findings concur with the findings of a study done on predictors of mortality among adult stroke patients *(Fekadu et al., 2020).*

These findings emphasize the importance of individualized care within the framework of the clinical management strategy which concurs with a study done on management protocols and encountered complications among stroke patients admitted to the hospitals. In many hospitals, significant variation in stroke management practices can result in inconsistent length of stay (LOS). In other countries like Japan a study was done that concurs with the current study where, hospitals using regional clinical pathways for stroke saw an average reduction of 7.2 days in lengths of stay (LOS) per patient, contributing to about 12% of the variation in LOS between hospitals *(Fekadu et al., 2020).*

Qualitative results from key informant interviews revealed that patient factors, including the time of presentation to the health facility and the level of severity, contribute to the effectiveness of the integrated clinical management strategy and patient outcomes. Socio-demographics such as age and patient adherence to treatment were major contributors to the effectiveness of the clinical management strategy for stroke care from the key informant perspective.

The health provider factors that influence the effectiveness of an integrated clinical management strategy were identified through key informant interviews conducted at the health care facilities using an interview guide organized around various themes. Theme 1: Health worker knowledge and skills, key informants emphasized that adequate training was critical to achieving optimal patient outcomes. The effectiveness of the integrated strategy relied heavily on staffing levels, which determined how closely patients were monitored. Theme 2: Staffing levels and workload, which involved a coordinated collaboration among physicians, physical therapists, occupational therapists, speech–language pathologists, nutritionists, and nursing staff who supported comprehensive, patient-centered care. This interdisciplinary, team-based model not only facilitated functional recovery but also addressed complex comorbid conditions and psychosocial challenges, underscoring its effectiveness in achieving holistic stroke rehabilitation. Together, these factors offer a plausible explanation for the broad functional improvements observed in this study.

Theme 3: Teamwork and multidisciplinary collaboration were found to be a key component of the integrated clinical management strategy for stroke patients. This showed that communication was key to patient care across departments, interdepartmentally, and during patient transfer. Theme 4: Attitudes of health care providers and resistance to change were also cited as influencing the effectiveness of the integrated clinical management strategy for patients with stroke.

Further to these findings, the key informant interviews showed that several health facility factors influenced the effectiveness of the integrated clinical management strategy. These factors included availability of equipment and supplies, infrastructure and specialized units, efficiency of referral and support services, and institutional support. Key informants noted that facilities with adequate resources and organizational support achieved better patient outcomes. Therefore, our study's qualitative findings showed that when health care providers who care for stroke patients are committed and follow protocols as intended, patient outcomes improve. On the contrary, if some providers rely on previous or routine practices, it affects the consistency in applying the integrated clinical management strategy for stroke patients, and inadequate staffing affects how closely patients are monitored. Findings from the current study concur with other studies in a systematic review and meta-analysis of protocols used in the management of patients with hypertension in Sub-Saharan Africa *(Mohammed et al., 2020).*

Current study findings have also been demonstrated in a systematic review and meta-analysis of studies on integrated care for stroke patients. The results showed that the integrated care models enhanced stroke patients' health-related quality of life and ability to perform activities of daily living, and reduced depression. Adherence to protocols varied, with strong implementation of comprehensive services, patient focus, and standardized care delivery, while gaps were noted in geographic coverage, information systems, governance structures, and financial management *(Camacho & Lip, 2024).*

Results of a qualitative study on health care providers' perceptions of factors influencing the provision of acute stroke care in urban and rural settings demonstrate that data were collected through two focus groups and five one-on-one interviews and were consistent with the current study. Analysis revealed four sub-themes: systemic challenges, clinician-related factors, supplementary support, and patient-related factors. Within the urban hospital setting, acute stroke care was well organized and extensive, supported by a dedicated acute stroke unit and specialist nursing services. Conversely, stroke care in the rural hospitals was comparatively limited and frequently restricted by inadequate infrastructure or limited access to available resources *(Sarfo, 2021).*

The study results demonstrated statistically significant improvements in patient outcomes among those receiving the intervention compared with the control group. Findings showed that patients who had timely assessment upon arrival, had initial assessment done within the expected timeline at the door, had an integrated clinical management strategy initiated, and had consultant review done upon arrival at the health care facility, had improved patient outcomes and met the composite criteria of effectiveness due to good patient outcomes.

7. Conclusion

This study demonstrated that the effectiveness of the integrated clinical management strategy for stroke patients that was measured using multiple patient outcomes, which were combined to form a composite variable. This included length of hospital stay, mortality, functional recovery, and development of complications. Assessing patient factors influencing the effectiveness of the clinical management strategy for patients with stroke, it was found that patients in the intervention group were 1.4 times more likely to have a good outcome than those in the control group, thus rejecting the null hypothesis. The additional burden of other chronic conditions worsens the outcome of hospitalized stroke patients.

Findings from the interviews revealed that the effectiveness of the integrated clinical management strategy relied heavily on staffing levels, which determine how closely patients are monitored. Teamwork and multidisciplinary collaboration were found to be key components of the integrated clinical management strategy for stroke patients, as were the attitudes of health care providers, and resistance to change was also cited as influencing the effectiveness of the integrated clinical management strategy for patients with stroke. Finally, patient-related factors, such as time of presentation to health care facilities, age, stroke type, and severity, contributed significantly to the effectiveness of the integrated clinical management strategy for stroke care.

8. Recommendations

Based on the study findings, the following recommendations are proposed to determine the effectiveness of an integrated clinical management strategy for stroke patients.

First, patient, health care provider, and facility factors should be incorporated into the care of stroke patients as follows: stroke patient demographic factors, such as age, gender, social support, and health literacy, should be systematically incorporated into care planning, as these influence recovery trajectories and adherence to secondary prevention.

Second, older adults often require enhanced coordination with social and rehabilitation services, while socioeconomic factors may necessitate additional support to ensure equitable access to care. Core components underpinning the effectiveness of pathway strategy include strong multidisciplinary teamwork, standardized assessments and documentation, patient and caregiver education, psychological screening and support, and clear transition points between care settings.

Third, integrating digital health tools and tele-rehabilitation can further enhance the continuity and accessibility of care.

Fourth, overall, the effectiveness of an integrated stroke clinical management strategy depends on implementation fidelity, staff training, and continuous quality improvement mechanisms supported by outcome and process monitoring.

Fifth, the developed framework should be routinely used in the intensive care units. Finally, the core components of the integrated clinical management strategy include a multidisciplinary approach, standard assessments, regular team members, education modules for patients and caregivers, a component of psychological support (screening interventions), and continuous remote monitoring via electronic health.

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