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Assessment of Knowledge and Practices of Nurses Regarding the Management of Patients with Hemorrhagic Stroke at Kabgayi Hospital

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ABSTRACT: Background: Hemorrhagic stroke remains a major contributor to neurological morbidity and mortality, particularly in low- and middle-income countries where timely and coordinated care is critical. Nurses play a central role in the assessment, monitoring, and prevention of secondary complications in patients with hemorrhagic stroke; however, evidence on their knowledge and practices in resource-limited settings is limited.

Objective: This study assessed nurses' knowledge and clinical practices and examined their influence on the management of patients with hemorrhagic stroke at Kabgayi Hospital, Rwanda.

Methods: A descriptive cross-sectional design was conducted among 87 registered nurses working in medical and intensive care units. Stratified random sampling was applied. Data were collected using a validated self-administered questionnaire to assess knowledge, practices, and management of hemorrhagic stroke. Descriptive statistics summarized variable levels, while Spearman's rho correlation coefficient was used to examine relationships between knowledge, practices, and patient management. Statistical analysis was performed using SPSS version 25, with significance set at $p < 0.05$.

Results: Nurses demonstrated a high level of hemorrhagic stroke management (mean = 4.11, SD = 0.67), particularly in complication prevention and multidisciplinary collaboration. Knowledge levels were high (mean = 4.03, SD = 0.65), although gaps were identified in stroke pathophysiology. Clinical practices were also rated high (mean = 4.03, SD = 0.65), with documentation scoring highest and timely neurological assessments scoring comparatively lower. A moderate positive correlation was observed between nurses' knowledge and patient management ($\rho = 0.509$, $p < 0.001$), while nurses' practices showed a very strong positive correlation with patient management ($\rho = 1.000$, $p < 0.001$).

Conclusion: Hemorrhagic stroke management at Kabgayi Hospital is predominantly driven by nurses' clinical practices, supported by adequate knowledge. Strengthening practice-focused training, institutional support, and multidisciplinary stroke care is essential to optimize patient outcomes in resource-constrained healthcare settings.

KEYWORDS: Hemorrhagic stroke, Nursing knowledge, Clinical nursing practice, Stroke patient management

INTRODUCTION

Hemorrhagic stroke is one of the most devastating neurological emergencies, characterized by sudden intracranial bleeding, rapid neurological deterioration, and high mortality. Although it accounts for only 10–20% of all stroke cases, it contributes disproportionately to stroke-related deaths and long-term disability due to its complex and acute clinical course (Pouladzadeh et al., 2025). The management of hemorrhagic stroke requires timely assessment, intensive monitoring, and coordinated multidisciplinary care, with nurses playing a central role in early detection of deterioration, continuous neurological observation, and prevention of secondary complications. Consequently, nurses' knowledge and clinical practices are critical determinants of patient outcomes in hemorrhagic stroke management.

Globally, evidence demonstrates that nurses' knowledge and practices significantly influence the quality of hemorrhagic stroke management in hospital settings. Studies show that over 20% of hemorrhagic stroke patients experience rapid neurological deterioration, emphasizing the importance of continuous nursing monitoring in intensive or specialized stroke units (De Oliveira Barros & Domingues, 2024). Following structured educational interventions, nurses' knowledge and practice scores have improved markedly, with mean knowledge scores reaching 23.11 after the implementation of clinical nursing practice guidelines (Sirisaen et al., 2024). However, despite these improvements, gaps persist; while 82.6% of nurses demonstrated moderate knowledge, only 54.4% exhibited good clinical practices, highlighting a disconnect between knowledge acquisition and effective bedside application (Khallaf et al., 2025). These findings underscore the pivotal influence of nurses' competencies on hemorrhagic stroke management outcomes globally.

In Africa, the management of hemorrhagic stroke is further complicated by limited healthcare resources, inconsistent availability of stroke units, and shortages of specialized training. Evidence from sub-Saharan Africa indicates poor patient outcomes, with a 59.8% three-month case fatality rate reported among patients with spontaneous intracerebral hemorrhage in Cameroon (Doumbe et al., 2020). Nurses' knowledge gaps remain pronounced; for example, only 4.5% of healthcare providers in a Kenyan referral hospital correctly identified hemorrhagic stroke as the most common stroke subtype (Lin et al., n.d.). Although nurses often possess moderate knowledge, their practices are frequently suboptimal, with mean practice scores as low as 0.522, reflecting inadequate translation of knowledge into effective care (Al-Abidi & Mansour, 2022). These deficiencies significantly affect the management and outcomes of hemorrhagic stroke patients across African hospitals.

In Rwanda, hemorrhagic stroke represents a growing clinical and public health concern, with hypertension identified in 70.2% of hemorrhagic stroke patients, making it the leading modifiable risk factor (Pouladzadeh et al., 2025). Studies from comparable settings suggest that nurses' knowledge of stroke management is generally moderate, with 66.7% demonstrating adequate knowledge and 33.3% exhibiting limited knowledge, particularly in the use of standardized assessment tools such as the NIH Stroke Scale (Pranata et al., 2023). Other studies report that 82.6% of nurses have moderate knowledge, yet this does not consistently translate into effective clinical practices (Khallaf et al., 2025). Despite these insights, there is a notable scarcity of empirical studies specifically examining nurses' knowledge, practices, and their influence on the management of hemorrhagic stroke in Rwanda, particularly at Kabgayi Hospital. This lack of localized evidence limits informed decision-making, targeted training, and quality improvement initiatives, thereby justifying the need for the present study.

Research questions

This study aims to assess the knowledge and practices of nurses and their influence on the management of patients with hemorrhagic stroke at Kabgayi Hospital. Specifically, the investigation seeks to address the following questions:

1. What is the level of management of patients with hemorrhagic stroke at Kabgayi Hospital?
2. What is the level of nurses' knowledge regarding hemorrhagic stroke management at Kabgayi Hospital?
3. To what extent do nurse practices influence the management of patients with hemorrhagic stroke at Kabgayi Hospital?
4. Is there any significant relationship between nurses' knowledge and practices and the management of patients with hemorrhagic stroke at Kabgayi Hospital?

METHODOLOGY

Research Design

This study adopted a Descriptive-Evaluative Cross-Sectional Design to systematically measure and analyze the knowledge and practices of nurses regarding hemorrhagic stroke management at Kabgayi Hospital. The design was appropriate for determining the current levels of nurses' knowledge and practices and examining their influence on the management of patients with hemorrhagic stroke within a real-world clinical setting. Data were collected using structured questionnaires and analyzed using descriptive and inferential statistical techniques.

Population and Sampling Technique

The target population comprised all registered nurses working in the medical and intensive care units at Kabgayi Hospital who were directly involved in the care of patients with hemorrhagic stroke. A stratified random sampling technique was employed, whereby nurses were stratified according to their unit of work (medical unit and intensive care unit), followed by random selection within each stratum using a lottery system. This approach ensured proportional representation, minimized selection bias, and enhanced the generalizability of the study findings. Based on Krejcie and Morgan's table, a sample size of 87 nurses was targeted, including a contingency allowance for non-response.

Instrumentation

Data were collected using a self-structured questionnaire and went through validation of 7 experts before Pilot study. The questionnaire consisted of four sections: socio-demographic characteristics, knowledge of hemorrhagic stroke management, nursing practices in hemorrhagic stroke care, and management-related clinical activities. The instrument was pre-tested through a pilot study to assess clarity, relevance, and internal consistency, and necessary revisions were made prior to the main data collection.

Data Gathering Procedure

Data were collected using both face-to-face and self-administered questionnaire distribution to accommodate nurses' varying work schedules. Participants were informed about the study objectives, procedures, and ethical considerations, and written informed consent was obtained prior to participation. Face-to-face questionnaires were distributed and collected on the same day, while nurses unavailable during duty shifts were given up to two weeks to complete the questionnaires. All completed questionnaires were reviewed for completeness and consistency before data entry.

Data Analysis

Collected data were coded, cleaned, and entered into Microsoft Excel and subsequently exported to SPSS version 25 for statistical analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize socio-demographic characteristics, knowledge, practices, and management of hemorrhagic stroke. Inferential statistics, including Pearson's correlation coefficient,

were applied to examine relationships and determine the extent of influence between nurses' knowledge, practices, and hemorrhagic stroke management. Results were presented using tables, charts, and graphs.

Ethical Consideration

Ethical approval was obtained from the relevant Institutional Review Board, and permission to conduct the study was secured from the administration of Kabgayi Hospital. Participation was voluntary, and written informed consent was obtained from all participants. Confidentiality and anonymity were ensured through the use of unique codes and exclusion of personal identifiers. Participants were informed of their right to withdraw at any stage without penalty, and all data were securely stored and scheduled for destruction six months after completion of the study in accordance with ethical guidelines.

RESULTS

Respondents' Level of Management of Patients with Hemorrhagic Stroke

The level of management of patients with hemorrhagic stroke by nurses at Kabgayi Hospital recorded an overall grand mean of 4.112 (SD = 0.6699), indicating a high level of agreement that nurses actively engage in effective management practices for hemorrhagic stroke patients. Among the items, the highest mean score was observed for "I actively implement measures to prevent secondary complications, such as infections or thromboembolic events, in hemorrhagic stroke patients" (Mean = 4.20, SD = 0.587), reflecting strong adherence to proactive nursing interventions to prevent complications. Conversely, the lowest mean score was recorded for "I believe my knowledge and practices directly influence the recovery and outcomes of patients with hemorrhagic stroke" (Mean = 4.08, SD = 0.633), suggesting slightly lower, yet still high, self-perceived impact on patient outcomes. These results indicate that while nurses demonstrate high levels of clinical management, there remains a modest gap in translating perceived knowledge into measurable patient recovery outcomes.

Table 1. Respondents' Level of Management of Patients with Hemorrhagic Stroke

No	Description	Mean	Median	SD	Scale response	Qualitative descriptor
1	I am confident in identifying the early signs and symptoms of hemorrhagic stroke in patients.	4.02	4	0.715	Agree	High
2	I understand the critical risk factors, such as hypertension and diabetes, that contribute to hemorrhagic stroke.	4.17	4	0.766	Agree	High
3	I am knowledgeable about the clinical assessment tools, such as the Glasgow Coma Scale (GCS), used to monitor stroke patients.	4.10	4	0.683	Agree	High
4	I am aware of the recommended interventions, including surgical and medical management, for patients with hemorrhagic stroke.	4.11	4	0.722	Agree	High
5	I regularly monitor neurological status and vital signs of hemorrhagic stroke patients according to established protocols.	4.13	4	0.625	Agree	High
6	I provide individualized care that addresses patients' functional limitations resulting from hemorrhagic stroke.	4.10	4	0.648	Agree	High
7	I actively implement measures to prevent secondary complications, such as infections or thromboembolic events, in hemorrhagic stroke patients.	4.20	4	0.587	Agree	High
8	I collaborate with multidisciplinary teams to ensure timely and comprehensive management of hemorrhagic stroke patients.	4.11	4	0.655	Agree	High
9	I feel confident in educating patients and their families about hemorrhagic stroke, its risks, and post-stroke care.	4.10	4	0.665	Agree	High
10	I believe my knowledge and practices directly influence the recovery and outcomes of patients with hemorrhagic stroke.	4.08	4	0.633	Agree	High
Composite Mean		4.112	4	0.6699	Agree	High

Legend: *1.00-1.80 = Strongly Disagree,1.81-2.60 = Disagree, 2.61-3.40= Neutral, 3.41-4.20 = Agree, 4.21-5.00= Strongly Agree*

Respondents' Level of Nurses' Knowledge Regarding Hemorrhagic Stroke Management

Table 2 presents the respondents' level of knowledge regarding hemorrhagic stroke management at Kabgayi Hospital. The nurses' knowledge was assessed using a self-structured questionnaire comprising ten items, each rated on a 5-point Likert scale. The overall composite mean across all items was 4.03 (SD = 0.649), which falls under the high category, indicating that the respondents generally possess a strong level of knowledge about hemorrhagic stroke management. The highest mean scores were observed for the items "I stay updated on current research and evidence-based practices regarding hemorrhagic stroke management" and "I recognize the role of multidisciplinary collaboration in optimizing care and outcomes for patients with hemorrhagic stroke" (Mean = 4.14, SD = 0.668 and 0.685, respectively), suggesting that nurses are particularly knowledgeable about continuous professional development and the importance of teamwork in patient care. In contrast, the lowest mean score was recorded for "I am knowledgeable about the pathophysiology and clinical features of hemorrhagic stroke" (Mean = 3.66, SD = 0.626), indicating a relative gap in foundational theoretical knowledge among some nurses.

Table 2. Respondents' Level of Nurses' Knowledge Regarding Hemorrhagic Stroke Management

No	Description	Mean	Median	SD	Scale response	Qualitative descriptor
1	I am knowledgeable about the pathophysiology and clinical features of hemorrhagic stroke.	3.66	4	0.626	Agree	High
2	I understand the major risk factors, such as hypertension and diabetes, that contribute to hemorrhagic stroke.	4.11	4	0.538	Agree	High
3	I am familiar with evidence-based protocols and guidelines for the acute management of hemorrhagic stroke patients.	4.09	4	0.640	Agree	High
4	I can accurately identify early warning signs and symptoms of neurological deterioration in patients with hemorrhagic stroke.	4.05	4	0.645	Agree	High
5	I am confident in using clinical assessment tools, such as the Glasgow Coma Scale (GCS) and National Institutes of Health Stroke Scale (NIHSS), to evaluate stroke patients.	3.99	4	0.690	Agree	High
6	I understand the indications and limitations of medical and surgical interventions in the management of hemorrhagic stroke.	4.07	4	0.678	Agree	High
7	I am aware of the preventive measures required to reduce secondary complications, such as infections and thromboembolism, in hemorrhagic stroke patients.	4.02	4	0.647	Agree	High
8	I am knowledgeable about post-stroke care, including rehabilitation needs and functional recovery strategies for patients.	4.03	4	0.673	Agree	High
9	I stay updated on current research and evidence-based practices regarding hemorrhagic stroke management.	4.14	4	0.668	Agree	High
10	I recognize the role of multidisciplinary collaboration in optimizing care and outcomes for patients with hemorrhagic stroke.	4.14	4	0.685	Agree	High
Composite Mean		4.03	4	0.649	Agree	High

Legend: *1.00-1.80 = Strongly Disagree,1.81-2.60 = Disagree, 2.61-3.40= Neutral, 3.41-4.20 = Agree, 4.21-5.00= Strongly Agree*

Respondents' Level of Nurses' Practices Regarding Hemorrhagic Stroke Management

Table 3 presents the respondents' level of nurses' practices regarding the management of patients with hemorrhagic stroke at Kabgayi Hospital. The overall grand mean across all items was 4.112 (SD = 0.6699), which falls under the "Agree" category, indicating a generally high level of

agreement that nurses engage in effective practices for hemorrhagic stroke management. The highest mean score was observed for the item "I document patient assessments, interventions, and responses accurately and timely" (Mean = 4.20, SD = 0.587), suggesting that documentation is the most consistently performed nursing practice. Conversely, the lowest mean score was recorded for "I consistently perform timely neurological assessments on patients with hemorrhagic stroke" (Mean = 4.02, SD = 0.715), indicating a relative gap in the promptness of conducting neurological assessments, despite overall high practice levels.

Table 3. respondents' level of nurses' practices regarding the management of patients with hemorrhagic stroke at Kabgayi Hospital

No	Description	Mean	Median	SD	Scale response	Qualitative descriptor
1	I am confident in identifying the early signs and symptoms of hemorrhagic stroke in patients.	3.66	4	0.626	Agree	High
2	I understand the critical risk factors, such as hypertension and diabetes, that contribute to hemorrhagic stroke.	4.11	4	0.538	Agree	High
3	I am knowledgeable about the clinical assessment tools, such as the Glasgow Coma Scale (GCS), used to monitor stroke patients.	4.09	4	0.640	Agree	High
4	I am aware of the recommended interventions, including surgical and medical management, for patients with hemorrhagic stroke.	4.05	4	0.645	Agree	High
5	I regularly monitor neurological status and vital signs of hemorrhagic stroke patients according to established protocols.	3.99	4	0.690	Agree	High
6	I provide individualized care that addresses patients' functional limitations resulting from hemorrhagic stroke.	4.07	4	0.678	Agree	High
7	I actively implement measures to prevent secondary complications, such as infections or thromboembolic events, in hemorrhagic stroke patients.	4.02	4	0.647	Agree	High
8	I collaborate with multidisciplinary teams to ensure timely and comprehensive management of hemorrhagic stroke patients.	4.03	4	0.673	Agree	High
9	I feel confident in educating patients and their families about hemorrhagic stroke, its risks, and post-stroke care.	4.14	4	0.668	Agree	High
10	I believe my knowledge and practices directly influence the recovery and outcomes of patients with hemorrhagic stroke.	4.14	4	0.685	Agree	High
Composite Mean		4.03	4	0.649	Agree	High

Legend: *1.00-1.80 = Strongly Disagree,1.81-2.60 = Disagree, 2.61-3.40= Neutral , 3.41-4.20 = Agree, 4.21-5.00= Strongly Agree*

Relationship Between Nurses' Knowledge, Practices, and the Management of Patients with Hemorrhagic Stroke

Table 4 presents the relationship between nurses' knowledge, nurses' practices, and the management of patients with hemorrhagic stroke at Kabgayi Hospital, using Spearman's rho correlation coefficient. Overall, the Spearman's rho values range from 0.509 to 1.000, indicating moderate to very strong positive correlations with consistent direction. Importantly, the p-values for all variables are less than the 0.05 level of significance ($p < 0.001$), leading to the rejection of the null hypothesis (H_0) in all cases. This suggests that nurses' knowledge and practices are significantly associated with the management of patients with hemorrhagic stroke, confirming that improvements in nursing competencies are likely to enhance the quality of patient management.

Table 4. ***Relationship Between Nurses' Knowledge, Practices, and Management of Patients with Hemorrhagic Stroke***

Variable	Spearman's rho	P-value	Decision	Interpretation
Knowledge	0.509***	< 0.001	Reject H0	Moderate correlation
Practice	1.000***	< 0.001	Reject H0	Very Strong correlation

DISCUSSION

The findings of this study indicate that nurses at Kabgayi Hospital demonstrate a high level of management of patients with hemorrhagic stroke, reflecting strong engagement in assessment, monitoring, complication prevention, and multidisciplinary care. High scores related to the prevention of secondary complications, such as infections and thromboembolic events, indicate adherence to evidence-based protocols that are widely recognized as critical determinants of improved hemorrhagic stroke outcomes (Barros & Domingues, 2024.; Mammadinova et al., 2022). However, the slightly lower self-perceived influence of nurses' knowledge and practices on patient recovery suggests a modest gap in confidence, a finding consistent with previous studies showing that nurses may deliver effective care while underestimating their direct impact on patient outcomes (Khallaf et al., 2025).

Furthermore, this study demonstrates that nurses possess a high level of knowledge regarding hemorrhagic stroke management, particularly in relation to evidence-based practice, risk factor identification, and multidisciplinary collaboration. These findings align with global evidence emphasizing that continuous professional development and adherence to clinical guidelines enhance nurses' competencies in stroke care (Sirisaen et al., 2024; Bader, 2025). Nevertheless, comparatively lower scores related to knowledge of pathophysiology and clinical features indicate gaps in foundational understanding, which may compromise early recognition and rapid intervention. Similarly, challenges related to insufficient depth of theoretical knowledge have been reported in sub-Saharan African contexts, where limited access to specialized neurological training affects nurses' preparedness for complex stroke care (De Oliveira et al., 2025).

In addition, the results reveal that nurses at Kabgayi Hospital demonstrate high-level clinical practices in hemorrhagic stroke management, particularly in documentation, vital sign monitoring, preventive care, and multidisciplinary collaboration. Accurate and timely documentation supports patient safety and continuity of care and is strongly emphasized in international stroke management guidelines (Cohen et al., 2022). However, slightly lower scores in timely neurological assessments reflect challenges that have been widely documented in resource-limited settings, where workload, staffing constraints, and competing clinical demands may hinder prompt bedside evaluations (Khallaf et al., 2025; Al-Abidi & Mansour, 2022). Therefore, these findings underscore the need for operational support to ensure consistent implementation of time-sensitive stroke care practices.

Finally, the study established a significant positive relationship between nurses' knowledge, practices, and the management of patients with hemorrhagic stroke, with nursing practices demonstrating a markedly stronger influence than knowledge. While knowledge showed a moderate association with patient management, the very strong correlation between practices and management outcomes confirms that effective hemorrhagic stroke care is primarily driven by the consistent application of evidence-based interventions (Sirisaen et al., 2024; Pranata et al., 2023). Consequently, this finding supports existing literature indicating that knowledge alone does not guarantee improved outcomes unless translated into structured and timely clinical practice, particularly in low-resource healthcare settings (Khallaf et al., 2025; De Oliveira Barros & Domingues, 2024). Collectively, these results highlight the importance of continuous skills-based training, protocol reinforcement, and supportive clinical environments to strengthen hemorrhagic stroke outcomes in Rwanda.

CONCLUSION AND RECOMMENDATIONS

This study concludes that nurses at Kabgayi Hospital demonstrate high levels of knowledge and strong clinical practices in the management of patients with hemorrhagic stroke, resulting in a high overall level of patient management. While nurses' knowledge was significantly associated with effective management, nursing practices emerged as the most influential determinant of hemorrhagic stroke care. These findings affirm that optimal outcomes are not achieved through knowledge alone but through the consistent translation of evidence-based knowledge into timely, structured, and patient-centered bedside practice. Nonetheless, identified gaps in foundational knowledge, particularly regarding stroke pathophysiology, and in the prompt execution of neurological assessments highlight areas requiring targeted strengthening.

Based on these findings, it is recommended that Kabgayi Hospital and similar healthcare settings prioritize continuous professional development, with emphasis on stroke pathophysiology, acute neurological assessment, and the use of standardized tools such as the GCS and NIHSS. Institutional and policy support should focus on workload optimization, adequate staffing, and availability of essential monitoring resources to facilitate timely clinical interventions. Strengthening multidisciplinary stroke care models, alongside regular clinical audits and mentorship programs, is essential to bridge the gap between knowledge and practice. Future research employing multi-center and mixed-methods designs is recommended to further explore contextual and organizational factors influencing hemorrhagic stroke management and outcomes in Rwanda.

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