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Knowledge, attitudes, and practices of nurses caring for surgical cerebral aneurysm patients in a Thai Tertiary Hospital

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ABSTRACT

Ruptured cerebral aneurysm after surgery is a critical condition that necessitates vigilant monitoring and early detection of complications by staff nurses. Therefore, an appropriate level of skill and knowledge related to the management of patients undergoing surgery is crucial for nurses to support these patients. The current research aimed to examine KAP indicators (knowledge, attitude, and practice) among nurses in this context, making use of a cross-sectional study design involving the participation of 111 staff nurses selected randomly from one tertiary hospital located in the northeast of Thailand. The study was carried out during February – June 2024, making use of a survey to acquire demographic data along with a questionnaire to measure the KAP indicators. Data were analyzed using the Spearman correlation coefficient and Pearson correlation coefficient. The finding revealed that the overall KAP score on caring patients with ruptured cerebral aneurysm undergoing surgery was high. However, the correlation observed between knowledge/attitude/age/duration of experience for caring patients with ruptured cerebral aneurysm undergoing surgery and practice was shown to be both positive and significant ($p<0.05$). Therefore, nurse administrators should implement a comprehensive knowledge training system, enhance specialized training, and improve nursing practices for these patients. This will help to ensure that staff nurses achieve a high level of KAP in providing optimal care for these patients.

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1. INTRODUCTION

Ruptured cerebral aneurysms are a major health concern, with approximately 3.2% of the global population receiving treatment each year [1]. The rupture rate of cerebral aneurysms, leading to subarachnoid hemorrhage (SAH), is about 9 per 100,000 people. Aneurysmal SAH accounts for 0.4% to 0.6% of all deaths, with an estimated 20% mortality rate and 30% to 40% of survivors experiencing long-term complications [2]. A literature review identifies several risk factors for developing cerebral aneurysms as; Firstly, personal factors such as advanced age [3], family history of cerebral aneurysm [4], hypertension, [3], [5], [6], female gender [6]-[8], and history of traumatic brain injuries. Secondly, health behavioral factors such as substance abuse (alcohol, methamphetamine, and cocaine) [9], [10], and smoking [5], [9], [11]. Lastly, genetic conditions such as arteriovenous malformations (AVM) [12], [13]. Essentially, health behaviors are an important factor in managing blood pressure and maintaining vascular health, particularly for patients who

have undergone cerebrovascular surgery. Recent studies indicate that high levels of substance abuse and heavy smoking are associated with increased risk. Thus, improving lifestyle choices could significantly reduce the risk of developing ruptured cerebral aneurysms [9], [11], [14].

A ruptured cerebral aneurysm is a critical emergency that demands immediate management to prevent severe neurological damage or death [15]. Importantly, a subset of stroke characterized by high fatality and morbidity, occurring at a younger age than other stroke types [16]. Accordingly, it is crucial to make an diagnosis at an early stage in order to perform aneurysm occlusion. One of the treatment options was surgical clipping of the aneurysm via craniotomy [17]. The postoperative critical period for patients with ruptured cerebral aneurysms is fraught with danger, as initial hemorrhage, early recurrent bleeding, cerebral vasospasm, seizures, cerebral edema, and delayed cerebral ischemia (DCI) are all factors which can lead to excessive levels of both mortality and morbidity [18]. Absolutely, postoperative nursing care is important for preventing complications and ensuring a smooth recovery for patients undergoing cerebrovascular surgery [19]. Their commitment to continuous monitoring and early detection of complications is crucial in preventing complications and ensuring optimal outcomes. Furthermore, a lack of knowledge among staff nurses in caring for these patients can greatly elevate the risk of complications [20]. Consequently, staff nurses must possess a solid foundation of knowledge to effectively prevent complications following surgery [21]. This process begins with a thorough risk assessment and initial evaluation for surgical patients, followed by effective management strategies for any identified risks, preventing recurrent bleeding [22], delayed cerebral ischemia, cerebral vasospasm, increased intracranial pressure (IICP), cerebral edema [22], [23], and seizure [24], [25]. Moreover, a negative attitude among staff nurses can profoundly affect patient care, potentially resulting in adverse outcomes [26].

Roi Et Hospital, located in Roi Et province in northeastern Thailand, serves as a key healthcare facility for the local population. It offers a variety of healthcare services, among which are the emergency department, along with both inpatient and outpatient care services. The hospital is known for its efforts to improve healthcare access in the region, focusing on both general medicine and specialized treatments. Roi Et province itself is known for its agricultural community and cultural heritage, and the hospital is vital for the healthcare services it provides for local residents. In addition to medical services, Roi Et Hospital is a tertiary hospital that cannot refuse to accept patients and must take referrals for ruptured cerebral aneurysm cases that require surgery from all hospitals in the province, including those in nearby provinces like Mahasarakham and Kalasin. Previous studies on the incidence of stroke in Thailand have reported rates of 4.0%, 3.8%, and 3.9%, respectively, indicating a consistent upward trend [27]. This increasing incidence of stroke has consequently led to a growing demand for critical care unit beds to accommodate patients requiring intensive medical attention. Additionally, given that the intensive care unit (ICU) has limited beds, not every case may be accommodated in the ICU, and patients may need to be placed in general wards. Therefore, staff nurses must possess the knowledge, attitudes, and practice (KAP) necessary to care for this patient group effectively. Additionally, given that the intensive care unit (ICU) has limited beds, not every case may be accommodated in the ICU, and patients may need to be placed in general wards. Therefore, staff nurses must possess the KAP necessary to care for this patient group effectively.

Currently, there is a limited number of studies on the KAP of staff nurses caring for postoperative ruptured cerebral aneurysm patients in Thailand. Human behavior can be explained through the three continuous processes which are described in the KAP model [28]. Similarly, the quality of nursing care is closely linked to nurses' knowledge, attitudes, and practices, as these elements are essential for delivering evidence-based care to patients [29]. Importantly, staff nurses equipped with the essential KAP are vital in preventing complications during both preoperative and postoperative care [30], [31]. Essentially, healthcare providers play a key role in offering information that supports decision-making among relatives and those affected by cerebral aneurysms [32]. As a life-threatening condition, related nursing care involves the KAP of nursing staff which will have an influence upon the subsequent disease progression and prognosis. Accordingly, this research sought to establish the current levels of knowledge, attitude, and practice of nursing professionals delivering care to patients with ruptured cerebral aneurysm undergoing surgery in the critical period, since an understanding of these KAP factors can support the provision of targeted improvements and serve as guidelines for the provision of training programs to enhance standards in clinical nursing practice in this area.

2. METHOD

This study made use of a cross-sectional design with instruments comprising both structured surveys and face-to-face interviews. The required sample size was determined via the G*power 3. 1. 9. 2 [33] correlation for a bivariate normal model with a power test of 90 and effect size of 0.3 [34]. Using a statistical significance level of .05, the sample size was found to be 92. This value was increased by 10% to allow for incomplete questionnaire survey data, resulting in a final sample size of 111 participants. A probability-based

random sampling process was used to select participants, without the use of substitution. Staff nurses who had experience of at least 3 months working on caring for patients undergoing surgery for ruptured cerebral aneurysms during a critical period in a tertiary hospital in Roi Et, in the northeast of Thailand, were considered eligible for inclusion in the study, on the condition that they were ready and willing to participate.

The data were gathered via a structured questionnaire survey administered via face-to-face interviews. The questionnaire was developed by the researcher to cover the KAP factors on the basis of the literature review. The questionnaire section concerning knowledge contains 24 items in which participants were asked to rate each item as correct or incorrect on knowledge about caring for patient with ruptured cerebral aneurysm undergoing surgery. The questionnaire had both positive and negative item questions, with negative item score reversed. The questionnaire presents eight dimensions including preoperative care assessment in the critical period, postoperative care to prevent recurrent bleeding, postoperative care to prevent cerebral vasospasm, postoperative care to support individuals with hydrocephalus, postoperative care to prevent seizures, postoperative care to support individuals with cerebral edema, postoperative care to prevent IICP, and postoperative care to prevent complications in various body systems. The score for all items were classified into three level as: low (0-8.00 score), fair (8.01-16.00 score), high (16.01-24.00). Secondly, the attitude questionnaire. A 10-item structured questionnaire was used to assess the level of attitude, each rated on a 4-point Likert scale, for which the responses indicated strong agreement, agreement, neither agreement nor disagreement, and finally disagreement. This questionnaire had both positive and negative item questions, with negative item scores reversed. All item scores were categorized at three different levels as indicated: poor (10.00-20.00), fair (20.01-30.00), and high (30.01-40.00). Lastly, a 20-item structured questionnaire assessed the participants' level of practice using a 4-point Likert scale, with participants being asked to identify whether they practiced always (7 days/week), mostly (4-6 days/week), sometimes (1-3 days/week), or never. The questionnaire presents eight dimensions includes preoperative care assessment in the critical period, postoperative care to prevent recurrent bleeding, postoperative care to prevent cerebral vasospasm, postoperative care to support individuals with hydrocephalus, postoperative care to prevent preventing seizures, postoperative care to support individuals with cerebral edema, postoperative care to prevent IICP, and postoperative care to prevent complications in various body systems. The scores for all items were classified into three levels as: 0-20.00 as poor, 20.01-40.00 as average, and 40.01-60.00 as high. All instruments were developed by the researchers.

An evaluation of the validity and reliability of each of the questionnaire items was conducted. Two neurosurgeons and one adult and gerontology nursing lecturer assessed content validity. The content validity index (CVI) of KAP were 0.90, 0.92, and 0.95 respectively. To test the reliability, 30 individuals who did not participate in the study but met the identical inclusion criteria were used for the investigation. In this study, The Kuder-Richardson 20 (KR-20) of the knowledge questionnaire was 0.89, while the Cronbach's alpha values for the questionnaire sections on attitude and practice were respectively 0.83 and 0.87.

Descriptive analysis was performed to assess the data gathered in the study using SPSS software version 20, developed by IBM. Descriptive statistic was used to report frequency, percentages, mean, and standard deviation. Further, correlation using Pearson correlation coefficient and Spearman correlation coefficient, were used to determine significant differences between the variables at a significance level of $p<0.05$.

Ethical approval for this research was granted by the Roi Et Hospital Research Ethics Committee (Approval number 082/2567). Who has written informed consent was secured from participants with an assurance of confidentiality. In addition, prior to commencement of the data gathering process, the participants were informed of the purposes and procedures of the research and granted their written consent on this basis. Interviews were then carried out to establish a detailed case history from each participant, whereupon the questionnaire survey was subsequently administered. Participants who lacked sufficient education to complete the questionnaire were provided with assistance. No limitation was placed upon the time taken to finish the questionnaire survey. This research was carried out in February – June 2024.

3. RESULTS AND DISCUSSION

Table 1 presents the various demographic characteristics of the 111 study participants, expressing data for each variable in terms of frequency and percentage. A high proportion of the study participants were female, at 98.2%, and the age group showing the highest frequency was 28-34 years, at 44.20%. Meanwhile, 65.80% had married status, and 93.3% held a Bachelor degree. More than haft of participants had over 5 years of experience for caring patients with ruptured cerebral aneurysm undergoing surgery (60.4%). Most participants worked in Neurosurgery intensive care unit (19.00%), and had participated a 4-month training course in nursing specialty for patients with stroke.

Table 1. General characteristics among participants (n = 111)

Characteristics		Frequency	Percentage (%)
Gender	Male	2	1.8
	Female	109	98.2
Age (years)	21-27	46	41.40
	28-34	49	44.20
	35-41	10	9.00
	42-48	6	5.40
Mean±SD, Max-Min		29.23±5.21	45-22
Marital status	Married	38	65.80
	Unmarried	73	34.20
Education level	Bachelor degree	108	97.3
	Master degree	2	1.8
	Doctoral degree	1	.9
Duration of experience for caring patients with ruptured cerebral aneurysm undergoing surgery	<1 year	11	9.9
	1-5 years	33	29.7
	>5years	67	60.4
Working department	Surgical intensive care unit	17	15.30
	Acute care unit	17	15.30
	Neurosurgery intensive care unit	21	19.00
	Trauma intensive care unit	19	17.10
	Neurosurgery unit	18	16.20
	Trauma unit	19	17.10
Training courses for nursing specialty in nursing for patients with stroke (4 months)	Yes	78	70.3
	No	33	29.7

In Table 2, the obtained KAP scores were categorized in high level. The mean knowledge score 19.11 (SD = 2.46), mean attitude score 35.44 (SD = 4.10), and mean practice score 47.27 (SD =7 .26). In Table 3, knowledge, attitude, age, and duration of experience for caring patients with ruptured cerebral aneurysm undergoing surgery were shown to be significantly positively correlated with practice (r = .607, .526, .213, and .806 respectively). However, no correlation was found between education level and practice (p = .453).

In Table 4, the overall mean practice score was 2.33 (SD = 0.35). The lowest mean score was recorded for postoperative care in preventing seizures, which was 1.59 (SD = 1.21). Conversely, the highest mean score was for postoperative care in preventing vasospasm, with a score of 2.71 (SD = 0.49).

Table 2. Different levels of variables with practice toward caring for patients with ruptured cerebral aneurysm undergoing surgery in critical period (n = 111)

Variables	Mean	SD	Levels
Knowledge	19.11	2.46	High
Attitude	35.44	4.10	High
Practice	47.27	7.26	High

Table 3. Factors correlation with practice toward caring for patients with ruptured cerebral aneurysm undergoing surgery in critical period (n = 111)

Variables	Correlation coefficient	p-value
Knowledge	$.607_{(p)}$	.000**
Attitude	$.526_{(p)}$	.05*
Age (years)	$.213_{(p)}$	.05*
Educational level	$-.072_{(s)}$	.453
Duration of experience for caring patients with ruptured cerebral aneurysm undergoing surgery	$.806_{(s)}$	000**

r_p Pearson correlation coefficient; r_s Spearman correlation coefficient

Table 4. Mean and standard deviation of participants' scores on practice toward caring for patients with ruptured cerebral aneurysm undergoing surgery in critical period (n = 111)

Items	Mean	SD
1. Preoperative care assessment in critical period	2.17	.83
2. Postoperative care to prevent recurrent bleeding	2.66	.48
3. Postoperative care to prevent cerebral vasospasm	2.71	.49
4. Postoperative care to support individuals with hydrocephalus	2.54	.48
5. Postoperative care to prevent seizure	1.59	1.21
6. Postoperative care to support individuals with cerebral edema	2.28	.71
7. Postoperative care to prevent increased intracranial pressure (IICP)	2.55	.53
8. Postoperative care for preventing complications in various body system	2.16	.41
Overall nursing practice	2.33	.35

The results confirmed a high level of knowledge for a majority of respondents, particularly those with more than five years of experience, as they were more likely to exhibit strong practices in caring for patients with ruptured cerebral aneurysms. Moreover, it was observed that many participants had previously attended specialized training courses in stroke care, further enhancing their expertise. Similarly, nurses' experience and the correlation between knowledge, attitude, and practice [35]. As a result, it is essential for staff nurses to possess a deep understanding of ruptured cerebral aneurysms to effectively prevent complications, such as recurrent bleeding [22], vasospasm, delayed cerebral ischemia, IICP, cerebral edema [22]-[24], and seizure [24], [25]. Their role in continuous monitoring and early detection of complications is vital to preventing further issues and ensuring optimal outcomes for these patients. Indeed, ongoing learning is most effectively reinforced through the consistent practice of procedures [36]. Besides, knowledge is one of the essential characteristics for staff nurses because it shapes their perception and approach to care. The greater their knowledge, the stronger their drive to apply their skills and expertise in performing tasks with professionalism and excellence [37]. As a result, staff nurses with a high level of knowledge in this research demonstrate a positive impact on the quality of nursing practice skills.

Furthermore, the majority of participants demonstrated a highly positive attitude, particularly those with over five years of experience in caring for patients with ruptured cerebral aneurysm undergoing surgery. Their frequent encounters with patient changes contributed significantly to shaping these attitudes. As a result, their perspectives were molded through experience and the continuous learning process. A similar previous study found that more working experience positively correlates with better knowledge and attitudes [38]. Therefore, staff nurses who experienced a positive change in their knowledge and attitudes may influence the quality of care [39].

Although staff nurses' practice in caring with ruptured cerebral aneurysm has high category because staff nurses who had knowledge scores were categorized in high level. In addition, this may be due to the fact that most staff nurses possess high knowledge levels, which could lead to high skill levels in caring for patients after cerebral aneurysm surgery. Absolutely, if individuals have knowledge and a positive attitude, it leads to improved skills in caring for these patient [36]. Besides, this study found that the highest scores for practice in caring for these patients were postoperative care for preventing vasospasm, followed by postoperative care for preventing recurrent bleeding.

Furthermore, this study was significant positive correlation between the staff nurses' KAP toward caring of patients with ruptured cerebral aneurysm undergoing surgery in critical period with p -value<0.05. Likewise, nurses' knowledge and attitude show a positive correlation with their practice [40].

KAP This may be attributed to the fact that staff nurses with extensive knowledge tend to develop more positive attitudes, which in turn enhances their practice in caring for postoperative patients [35]. Additionally, this study found a significant positive correlation between staff nurses' age, duration of experience with ruptured cerebral aneurysms, and their practices in caring for these patients during critical periods, with a p-value<0.05. Consequently, older staff nurses with their extensive experience tend to provide exceptional postoperative care which ensures the highest quality of care [38].

4. CONCLUSION

The KAP of staff nurses play an important caring in postoperative ruptured cerebral aneurysm patients. The study suggests that regular supervision should be provided to newly recruited nurses or those working in units that care for these patients. According to this research, we recommend implementing structured training programs focused on preventing complications after postoperative ruptured cerebral aneurysm surgery, alongside ongoing professional development to ensure that staff nurses remain updated on the latest knowledge and research advancements. This will enhance the prevention of complications following postoperative ruptured cerebral aneurysm surgery, ultimately leading to more effective nursing care.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

This research has no conflict of interest.

DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author, [SU]. The data, which contain information that could compromise the privacy of research participants, are not publicly available due to certain restrictions.

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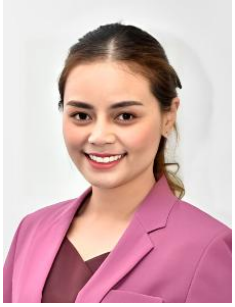

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