

## Abstract

The typical presentation of a person with a non-traumatic subarachnoid hemorrhage (SAH) is an abrupt onset or a thunderclap headache described as the “worst headache of their life.” A headache remains the chief complaint even after admission. Non-traumatic SAH occurs from rupture of a blood vessel in the brain. Eighty-five percent of non-traumatic SAH is caused by rupture of a cerebral aneurysm while the remaining 15% of cases are caused by a perimesencephalic (PM) venous bleed, reversed cerebral vasoconstrictive syndrome (RCVS), posterior reversible encephalopathy syndrome (PRES), or other rare causes (Marder, Narla, Fink, & Tozer Fink, 2014). The severity of a headache from SAH can cause a variety of physiological and psychological effects on the patient leading to poor clinical outcomes. Treatment with opioids and NSAIDs can be problematic. There is a lack of literature regarding headache management strategies in this population. Current practice in the neurological critical care unit varies based on provider preference due to lack of evidence-based protocols. Development of a systematic clinical decision tool will assist providers in managing SAH headache. The **purpose** of this project will be to evaluate if a standardized approach to headache management can improve headache, decrease the number of rescue and opioid medications, and decrease variation in practice.

Key words: Subarachnoid hemorrhage; Headache, Management of

## PICOT Question

In awake, non-intubated adult patients experiencing headache post-SAH, how effective is utilizing a standard approach to headache management compared to current practice in controlling headache during the first seven days post-SAH?

## Problem

Headaches secondary to SAH are difficult to manage due to the inability to use commonly prescribed medications and variations in practice due to lack of evidence-based protocols. This variation in practice can lead to poor headache control, hypertension leading to re-bleeding, CO<sub>2</sub> (carbon dioxide) retention, increased intracranial pressure (ICP), and a decrease in patient satisfaction. The use of narcotics can cause altered mental status, and non-steroidal anti-inflammatory drugs (NSAIDs) can inhibit platelet aggregation and be associated with further bleeding.

## Review of the Literature

An extensive review of literature was performed on headache management in SAH and medications used to treat headache. A gap of knowledge was found regarding treatment strategies in this unique population. Identification of predisposing factors for lack of improvement in headache were identified. Several studies found no standardization of rating headache pain or medications utilized. Some efficacy was found in certain medications, i.e., magnesium, anti-epileptics, dopamine receptor antagonist anti-emetics, and acetaminophen. The Numeric Rating Scale (NRS) is an 11-point scale (0 - 10) for the assessment of pain and has been validated in the measurement of headache pain (Kwong & Pathak, 2007).

## Theoretical Framework

Katharine Kolcaba's comfort theory, introduced in the 1990's, takes into account the holistic nature of human beings. It uses three concepts - relief, ease, and transcendence. This framework assists nursing in assessing comfort needs in any of four contexts - physical, psychospiritual, environmental, and sociocultural. (Krinsky et al., 2014).

## Taxonomic Structure of Comfort Needs Applied to the Subarachnoid Hemorrhage Patient

Concept	Relief	Ease	Transcendence
Physical	Pain	Homeostasis	Need to tolerate the pain.
Psychospiritual	Anxiety	Uncertainty about diagnosis	Need for support
Environmental	Noise, Bright lights	Lack of privacy	Need for familiar environment
Sociocultural	Absence of traditions and culturally sensitive care	Knowledge deficit; family not present	Need for information; support from family

## Ethical Considerations

- Approval from the Human Subjects committee from Wilmington University was obtained.
- IRB approval from Christiana Care was obtained.
- Informed consent obtained from each participant.
- Participants reassured that care would continue even if they did not participate.
- Approval for use of the NRS was obtained from the publisher.

## Methods

**Methods:** A retrospective medical record review of all SAH patients (N=86) admitted from January 2016 to December 2016 will be compared to the study group. Data collection measures will include: patient demographics, type of SAH, surgical intervention, GCS, Hunt & Hess, modified Fisher score, pain scores using the NRS, medications utilized for pain control, frequency of rescue, magnesium blood levels, vasospasm, and EVD. Data will be collected for 7 days from enrollment. Thirty-six patients met inclusion criteria from retrospective group. Study group will also include frequency of order set utilization to determine variation in care.

**Setting:** A large rural non-for-profit community hospital with a dedicated neurocritical care unit. The unit is managed 24/7 by 12 advanced practice providers (NPs and PAs) and 4 engaged neuro-intensivists.

### Inclusion criteria:

- All patients admitted with non-traumatic SAH between June 5th and September 5th, 2017. Age 18 years and older, conscious and able to answer questions, and NRS  $\geq$  4.

### Exclusion criteria:

- History of a craniotomy or headache disorder, recent cerebral hemorrhage, poor clinical exam (GCS < 13, Hunt & Hess > 3).
- Intubation > 48 hours

**Intervention:** A standardized order set for headache management in SAH patients was developed and implemented on June 5<sup>th</sup>, 2017. Pain assessment will be performed at least q8 - standard of nursing practice.

## Analysis

Over a 2-month period, 12 patients were admitted with SAH. Seven patients were excluded due to poor clinical exam or minimal headache. Five consecutive SAH patients were treated with the SAH headache protocol. Among the study group, 3 (60%) were female, with a mean age of 55.8 years. Causes of SAH included aSAH (40%), PM (40%), and RCVS (20%). Among the 5 study patients, 100% had the order set utilized. Variables will be summarized as percentages. The total daily NRS score and frequency of rescue medications will be measured using descriptive statistics. Paired sample t-Test will be used to compare the means of each group for statistical significance.

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## Contact Information

Dmower-wade@christianacare.org