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Fever Management Practices of Neuroscience Nurses, Part II: Nurse, Patient, and Barriers

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Abstract

Fever is frequently encountered by neuroscience nurses in patients with neurological insults and often results in worsened patient outcomes when compared with similar patients who do not have fever. Best practices in fever management are then essential to optimizing patient outcomes. Yet the topic of best nursing practices for fever management is largely ignored in the clinical and research literature, which can complicate the achievement of best practices. A national survey to gauge fever management practices and decision making by neuroscience nurses was administered to members of the American Association of Neuroscience Nurses. Results of the questionnaire portion of the survey were previously published. This report presents a content analysis of the responses of neuroscience nurses to the open-ended-question portion of the survey ($n = 106$), which revealed a dichotomous primary focus on nursing- or patient-related issues. In addition, respondents described barriers and issues in the provision of fever-management care to neuroscience patients. In order to advance national best practices for fever management in neurologically vulnerable patients, further work needs to be conducted, particularly with regard to necessary continuing education for staff, facilitation of interdisciplinary communication, and development of patient care protocols. Neuroscience nurses are in an excellent position to provide leadership in these areas.

Fever management is a vital component of neuroscience nursing practice because patient outcomes may be negatively affected by unmanaged fever. Although growing evidence shows that a fever may reflect the beneficial mobilization of antiinflammatory factors in the presence of infection (Holtzclaw, 2002), strong evidence also suggests that the presence of fever in the acute phase of traumatic brain injury (TBI), stroke, or subarachnoid hemorrhage is associated with worse outcomes for patients (Hajat, Hajat, & Sharma, 2000; Natale, Joseph, Helfaer, & Schaffner, 2000; Wartenberg et al., 2006). However, fever continues to be undertreated in patients with neurological insults (Albrecht, Wass, & Lanier, 1998; Kilpatrick, Lowery, Firlik, Yonas, & Marion, 2000; Thompson, Kirkness, & Mitchell, 2007) despite our knowledge of the clinical consequences.

As the provider of direct patient care, the bedside nurse is the primary decision maker regarding antipyretic interventions, regardless of whether an evidence-based protocol exists in a particular clinical setting (Kilpatrick et al., 2000; O'Donnell, Axelrod, Fisher, & Lorber,

1997). Therefore, it is important to gain a clearer understanding of the rationale for intervention choices made by neuroscience nurses in response to fever and to identify issues related to fever management for neurologically vulnerable patients.

Background

Evidence-based practice is an integral process based on the synthesis of research evidence, individual clinical expertise, and patient preference (Sackett, 1996). The implementation of evidence-based practice in nursing requires time, awareness of and access to the literature, and support for change. Barriers to using research and evidence-based practice by nurses include: insufficient time, inadequate equipment and resources, perceived lack of authority to change practice, unit culture, lack of organizational support, and lack of physician cooperation (Fink, Thompson, & Bonnes, 2005; Gerrish & Clayton, 2004; Retsas, 2000).

Standardized practice guidelines for fever management in neurologically vulnerable populations offer few explicit recommendations. Current ischemic stroke guidelines state that fever should be treated with antipyretic agents and offer “cooling devices” as an option, but they do not provide further specifics to guide practice (Adams et al., 2003). While guidelines for both adult and pediatric TBI patients assert that maintaining normothermia should be a standard of care (Adelson et al., 2003; Brain Trauma Foundation/American Association of Neurologic Surgeons, 2000), no further standards or options are offered to specifically guide practice. Prior to the publication of national guidelines, 14% of neurologically vulnerable febrile patients did not receive any intervention and some patients received only non-pharmacologic intervention, despite the presence of a management protocol specifying a first-tier pharmacologic therapy (Kilpatrick et al., 2000). These findings were confirmed during an evaluation of how best practices are presently translated into practice at one institution: in a recent study of TBI patients, less than 50% of febrile episodes were adequately treated (Thompson, Kirkness, & Mitchell, 2007). This gap in translation between patient outcomes research and bedside practice must be overcome.

Research Methods

Sample, Setting, Design, and Procedure

A survey design was used to determine how neuroscience nurses in the United States choose fever management interventions for the neurologically vulnerable patient. Institutional Review Board approval was obtained for this study. Members of the American Association of Neuroscience Nurses (AANN) were invited to participate. A 15-item questionnaire was mailed with a cover letter to participants. A full description of the survey methodology was previously described (Thompson, Kirkness, Mitchell, & Webb, 2007). Out of the 1,225 U.S. AANN members who were asked to participate, 328 usable responses (27%) were obtained. Because participation was voluntary and anonymous, return of the completed survey was deemed consent to participate.

An open-ended question was included at the end of the survey so respondents could add additional comments not solicited directly that they felt were germane to the issue. Thirty-two percent (106 respondents) chose to answer the open-ended question.

Data Analysis

Responses to the open-ended question were transcribed verbatim from the surveys into a standard word-processing program and transferred to ATLAS.ti (ATLAS.ti Scientific Software Development, Berlin) for data coding to achieve content analysis. Following initial reading and rereading of the data, initial codes were formulated by using data fracturing to glean phrases and open coding as specified in constant comparative technique. Initial codes were condensed

at this stage into 14 preliminary themes. Themes with similar labels were identified and combined, leaving 11 themes. These were organized into three meta-themes. The principal investigator conducted initial content coding and coinvestigators reviewed and validated codes and themes. Credibility and dependability were ensured by (1) use of all the raw data; (2) the phased, progressive nature of the analysis; and (3) an audit trail (Lincoln & Guba, 1985).

Results

Three meta-themes emerged from neuroscience nurses' descriptions of interventions, experiences, and issues regarding fever management in the neurologically vulnerable patient. These meta-themes were (1) Nurse, (2) Patient, and (3) Barriers and Issues. The development of meta-theme labels and families of themes is shown in Figures 1, 2, 3.

Nurse

The Nurse meta-theme was derived from a family of themes that described how individual nurses approached fever management or their feelings about the issue (Fig 1). Given that nurses have clinical decision-making ability for the management of fever in patients under their care, it was not unexpected that many comments related by respondents referred to independent nursing judgment based on factors including knowledge, attitude, and experience. The independent nursing action was clearly exemplified by the following response: "MD orders routinely read 'keep temp <37 °C,' how we accomplish this is up to us."

The individual nurse's knowledge and approach to fever management was also thought to be extremely important. As one respondent noted, "Attitude is important—is fever good or bad?" Some believe that fever has a "healing" property and believe that it is best to leave it alone.

Additionally, neuroscience nurses altered their approach to the febrile patient in ways not directly related to fever management. As one nurse stated, "With or without orders, neuro checks are done more frequently."

Many of the responses were personal opinions regarding the clinical effectiveness of various regimens: "[I] prefer tepid bath, ice packs to cooling blanket."

Not unexpectedly, there was great variability in the opinions, with other respondents expressing unfavorable opinions regarding the same intervention: "I don't like ice packs, [not] very helpful/effective."

Many of the responses also provided clarification of the rationale for choices of various therapies by nurses. For example, the nurse who did not like ice packs in the previous narrative provided further clarification, stating, "Arousable patients would not tolerate ice packs."

Other respondents provided their justification for suggested actions based on specific patient characteristics:

- "I work with pediatric [patients] ... changing position and removing covers is often all that's needed to decrease temperature."
- "We recently used neuromuscular blockade on a TBI patient ... to prevent shivering. We occasionally use Indocin® [indomethacin], but many attendings are reluctant to use it in the trauma population."
- "We move very quickly to intravascular cooling ... with neuro patients, especially acute severe TBI with [intracranial pressure or brain oxygenation] problems."

Many nurse-respondents identified a need for more information on fever management or protocols for fever: “It would be great to see evidence-based protocols for fever.”

Patient

The Patient meta-theme integrated related themes that were patient-centered (Fig 2). Temperature management of neurologically vulnerable patients was clearly seen as an important part of nursing care, with consideration of the special challenges of this population and individualization of care. This concern was illustrated in several different ways. One respondent observed, “It is always part of our treatment of TBI/severe stroke patients.” Another described more systematic integration, stating, “Have specifically stressed temperature in neuro patients through changes in the policy and pre-printed orders.”

For many nurse-respondents, an important component of fever management was the recognition that each patient must be viewed as an individual. “Not all patients have basal temperatures set at 98.6 °[F],” was one such comment. Another stated, “Some patients are more sensitive to temperature change and will show neurological changes as their temperature rises above 38 °[C].”

Hand in hand with this view of patient individuality was the notion that neuroscience patients must be managed differently than other patients. As one respondent noted, “Temperatures differ in TBI [patients].... Some days the resident is bundled in layers of clothes...and the next [day] with just briefs on in bed. It seems to be sporadic and something our staff has become accustomed to looking for.” Another nurse noted, “Brain-injured patients probably won't respond to Tylenol® [acetaminophen] [or] antipyretic drugs but that is almost always what the MDs want to try first.”

This difficulty with managing temperature in various neurologically vulnerable populations was echoed by many participants. As one respondent wrote, “Subarachnoid hemorrhage [patients] are the most difficult to manage.” Another stated, “I have not found any regime that effectively treats neurogenic hyperthermia.”

It was clear that most nurse-respondents saw the need for a more proactive approach to fever management in neurologically vulnerable patients. One simply stated, “We don't intervene early enough.” Another observed, “We do a poor job managing fever control in all our patients, especially the neurologically injured.”

Barriers and Issues

The final meta-theme of Barriers and Issues was developed using any theme described by participants as preventing best practice (Fig 3). It would appear from the survey responses that hospital policies and procedures may serve as barriers to independent or collaborative nursing action. As one respondent noted, “Hospital policy states 39 °C for ice packs.” Another nurse working with patients on an acute care unit wrote, “Outside the ICU, many devices such as cooling blankets [and] circulating water cooling pads are not available to our patients—per policy only for ICU patients, so even if I wanted to use them, I could not.”

Additionally, the lack of a protocol was clearly expressed as an issue by many nurse-respondents, one of whom stated, “I wish we did use a protocol for fever management. Our trauma surgeons are usually the primary doctors ... but even the neurosurgeons do not have any protocol for hyperthermia.” Another expressed frustration, stating, “I am unhappy with my private hospital policy (lack of).”

One respondent spoke of a group's difficulty reaching agreement while developing a fever protocol: “Attempts to develop protocol for management of fever [is] challenging as providers

[are] unable to arrive at a consensus on treatment.” This sentiment was also expressed by other respondents, who stated that it would be difficult to develop a protocol because there was significant provider practice variability: “We are not a teaching hospital so every doctor/group has their own way of managing this.” Or, as another put it, “At our facility, every doctor does his/her own thing.”

In some cases where nurses are noting some progress with protocols, they express concern over the direction that these have taken. “We are seeing [a] more aggressive model for temperature control,” wrote one respondent, “but with a heavy hand towards antibiotics and cultures as the treatment method preferred.”

The incorrect use of protocols, when available, was also identified as an issue. Some respondents wrote of the need to support newer nurses in the use of the procedures. As one respondent noted, “New RNs must be monitored/mentored in how to use the protocol. For example, some will just switch the cooling blanket off and on all day without giving enough or any Tylenol® [acetaminophen]. Some will set the blanket ... to 4 °C rather than following safe guidelines. Some allow their patients to shiver for hours.”

One nurse stated that one perceived issue with implementing fever management protocols is time. “Narrow temperature window for TBI patient is RN time consuming,” the respondent wrote.

Some respondents reported that their attempts to collaborate with physician colleagues to implement a change in practice were not always successful. One wrote, “Prefer lower temperature model, but MDs rarely authorize it.” Another respondent stated, “Trauma [service] typically does not treat elevated temperatures despite neurological injury.”

Not all responses were negative. Some nurses reported they were able to achieve change in their environment by working collaboratively. One nurse wrote, “I am beginning to change practice with regard to aggressive treatment early on. I was able to get neurosurgery to decrease to 38 °C from 38.5 °C.” Another stated, “Our institution has begun using [circulating water cooling pads] with SAH [subarachnoid hemorrhage] patients to maintain normothermia.... The nursing staff pushed for the use, it requires a physician order.”

Discussion

Our findings suggest that achieving best practice by providing evidence-based nursing care to the neurologically vulnerable patient with fever is fraught with clinical challenges and difficulties in implementing change. In this population of neuroscience nurses, fever management was seen as an important component of their care of neurologically vulnerable patients, but various barriers to success were identified. Barriers or issues described generally implied tension between two or more of the stakeholders in patient care, such as the institution, the individual nurse, fellow nurses, or physician colleagues. Examples cited by nurse-respondents included lack of an institutional protocol, incorrect use of protocols by nurse colleagues, or lack of physician response to requests for indicated intervention for fever. The types of barriers described in our study are similar to those identified in previous studies identifying barriers to evidence-based practice (Fink et al., 2005; Gerrish & Clayton, 2004; Retsas & Nolan, 1999).

Respondents showed clear evidence that clinical expertise guided their fever management decisions.

The identification of several institutional barriers highlights the importance of an organizational culture that empowers nurses to implement changes in their institutions. These findings are supported by the growing body of literature on implementation of evidence-based nursing that identifies lack of organizational support as one of the biggest impediments to implementation (Kajermo, Nordstrom, Krusebrant, & Lutzen, 2001; Retsas, 2000; Retsas & Nolan, 1999).

Some of the successful strategies for shifting organizational culture have been to promote a patient-centered approach and to create a learning environment (Gerrish & Clayton, 2004). Other improvement strategies that have been shown to positively impact participating nurses' ability to use research evidence in their clinical decision making include adding research competencies within clinical ladder programs, promoting journal clubs, creating research- and evidence-based nursing workshops, and instituting nursing grand rounds (Fink et al., 2005).

Communication—with nurses, physicians, or other healthcare team members—was another factor that respondents said limited both independent and collaborative nursing action. This finding again reinforces results in previous studies examining barriers to evidence-based nursing (Gerrish & Clayton, 2004; Kajermo et al., 2001; Oranta, Routasalo, & Hupli, 2002). All healthcare providers share the common goal of best patient care. Thus, refocusing the multidisciplinary team on this effort and taking collective ownership of that goal may be a successful strategy for overcoming some communication difficulties (Daly, 2004; Yeager, 2005). Although lack of time and the nature of the practice environment are often cited as contributing to breakdowns in communication and multidisciplinary collaboration, the benefits of successful collaboration (e.g., better patient outcomes and enhanced clinical effectiveness) are worth the effort (Yeager). Strategies for improving multidisciplinary collaboration and communication may include regular multidisciplinary team meetings, a joint practice committee or interdisciplinary care rounds, and integrated care paths or practice protocol (Yeager).

Respondents in our study viewed patients as individuals, in accordance with evidence-based practice. Respondents showed clear evidence that clinical expertise guided their fever management decisions. Occasionally the patient was seen as a barrier to effective treatment of fever, but this was mainly because of the difficulties inherent in caring for certain types of neuroscience patients, rather than in the individuals themselves.

What is presently lacking in the literature is more information regarding the clinical application of research findings and the interplay between other forms of knowledge, such as clinical expertise, to inform best practices in these difficult-to-manage populations. To move forward in developing national guidelines for fever or hyperthermia management in neuroscience patient populations, further effort is needed, particularly the continuing education of staff, facilitation of interdisciplinary communication, and development and testing of patient care protocols.

Limitations

The present study is limited by its use of a mailed survey with a 27% response rate and by inherent self-selection with a single open-ended question that could not be probed for clarification. The major limitation when using mailed surveys as the primary data source for research is low response rates (Dillman, Eltinge, Groves, & Little, 2002). Because we collected data based on a voluntary return, the data are limited to those who returned surveys and answered the open-ended question.

Credibility and resonance of findings may be limited by potential systematic differences between survey responders and nonresponders and those willing to provide additional

information on the open-ended question. Therefore, our respondents may represent a group of neuroscience nurses with a particular interest in fever management. The scope and nature of fever management and related problems may thus be underrepresented. Replication of our results using other samples or other qualitative methods, such as focus groups or interview-based case studies, would be helpful in ensuring the validity of these findings.

Summary

This study compiled and analyzed neuroscience nurses' perceptions of issues surrounding clinical decision making in the care of neurologically vulnerable febrile patients. The results reinforced previous findings that the bedside nurse is a primary decision maker in the institution of fever management strategies. The findings also note barriers in some institutions to implementing evidence-based practices, such as more aggressive treatment of elevated temperature in neurologically vulnerable patients. These issues and barriers may be institution-, physician-, or nurse-related. In order to move forward in developing national guidelines for fever or hyperthermia management in these populations, further work needs to be conducted, particularly with regard to continuing education for staff, facilitation of interdisciplinary communication, and development and testing of patient care protocols. Neuroscience nurses are well positioned to lead the way to best practices for fever management—grounded in current evidence—for the neurologically vulnerable patient.

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Fig 1.
Graphic Representation of Nurse Meta-theme and Related Codes

Fig 2.
Graphic Representation of Patient Meta-theme and Related Codes

Fig 3.
Graphic Representation of Barrier/Issues Meta-theme and Related Codes