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Reducing Antipyretic Use for Low-grade Fevers in Otherwise Healthy Children

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Hahn School of Nursing and Health Sciences

DOCTOR OF NURSING PRACTICE PORTFOLIO

by

Tricia Ann Templet, BSN, CPEN

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DOCTOR OF NURSING PRACTICE

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Final Manuscript

Reducing Antipyretic Use for Low-grade Fevers in Otherwise Healthy Children

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Abstract.

Fever phobia is persistent in the pediatric population, as fever is a common complaint for advice calls, sick visits, and urgent care/emergency department utilization. Fever phobia among parents and healthcare providers is evidenced by the quest to return a child to normothermia. Fevers under 38.5°C (101.3°F) are considered benign in healthy children, usually requiring no pharmaceutical intervention. Research consistently demonstrates pediatric nurses inappropriately medicate patients for low-grade fevers. The purpose of this evidence-based practice project was to identify knowledge of the benefits and myths of fever in otherwise healthy children and to decrease the use of antipyretics for low-grade fevers among pediatric emergency nurses.

Testing was conducted before and after a didactic presentation on the pathophysiology, benefits, and myths regarding fever. A 3-month follow-up test evaluated retained knowledge. Antipyretic administration rates were compared for three months prior to and after the intervention to evaluate reduction in administration at triage for fevers under 38.5°C (101.3°F).

Knowledge increased by only 8% after intervention and was retained at 3-month testing. A decrease in rate of administration was found, but cannot be attributed solely to this intervention.

Given the persistent lack of knowledge and tendency to over-treat low-grade fevers in children by pediatric emergency nurses, fever phobia persists and continues to lead to the misuse of resources. Presenting nurses with additional education and resources to strengthen knowledge of fever and dispel myths may help bring about needed change. Future qualitative research may reveal barriers and facilitators for making this change in nursing practice.

Keywords

Fever management, nursing knowledge, antipyretics, pediatrics, fever phobia, emergency nursing

Background

“Fever phobia”, a term coined in the 1980s to describe the phenomenon of increased anxiety surrounding the onset of an acute febrile illness, persists throughout American culture, including among health care professionals (HCPs). Fever consistently accounts for almost a third of all pediatric urgent care and emergency department visits (Wallenstein et al., 2013). Incorrect parent education regarding fever management in otherwise healthy children ages 3 months and older remains a problem, with evidence-based interventions not being utilized (Clinch & Dale, 2007). According to the authors of a position statement on behalf of the American Academy of Pediatrics, HCPs are “promoting an exaggerated desire in parents to achieve normothermia by aggressively treating fever in their children” (Sullivan, Farrar, & the Section on Clinical Pharmacology and Therapeutics and Committee on Drugs, 2011, p. 582).

Parents and HCPs alike experience fever phobia, with many HCPs being resistant to evidence-based fever treatment strategies (Purssell, 2007). This phobia often leads to unnecessary cooling techniques, over-bundling, or inappropriate use of antipyretics (Cohee, Crocetti, Serwint, Sabath, & Kapoor, 2010; Poirier, Collins, & McGuire, 2010). There is a lack of understanding about the benefits of fever in an otherwise healthy child. There are also misunderstandings about the harmful effects of fever (Purssell, 2007; Edwards et al., 2007a). Caregivers typically desire normothermia after an applied cooling technique or antipyretic administration, a state that is considered less important than the child's overall comfort (Purssell, 2007; Sullivan et al., 2011). While many children with respiratory or cardiac conditions do not tolerate fever well, a child with an uncomplicated medical history can tolerate low to moderate grade fever without discomfort (Greensmith, 2013).

Edwards et al. (2007a) reported that nurses actively treat fevers to reduce temperature, to prevent the occurrence of febrile seizures, to increase comfort, and to reduce parental anxiety. A qualitative study of nurses' feelings and opinions about fever in the pediatric patient and nursing practices related to fever management by Edwards, Courtney, Wilson, Monaghan, and Walsh (2001) found inconsistencies in implemented nursing actions. Krantz (2001) suggested the need to eliminate inconsistencies in professional practice by encouraging an evidence-based approach to fever management among both parents and health professionals. Patients and families rely upon HCPs as their primary resource for information, thus many pediatric experts (Considine & Brennan, 2007; Crocetti, Moghbeli, & Serwint, 2001; Edwards et al., 2001; Walsh, Edwards, Courtney, Wilson, & Monaghan, 2006) suggest interventions to dispel misconceptions about the febrile process and provide educational tools to improve fever management practices among parents and HCPs.

In this light, Edwards et al. (2007b) employed an evidence-based peer education program for childhood fever management and evaluated its effectiveness in decreasing inappropriate antipyretic administration to febrile children. This peer education program was designed to promote evidence-based fever management strategies and improve nursing knowledge. "During the programme nurses frequently commented on the need to educate all parents in fever management to not only assist their practice but also to reduce unnecessary demands on the health system from some unnecessarily concerned parents" (Edwards et al., 2007b, p. 1977).

Another study by Greensmith (2013) evaluated nursing knowledge and attitudes related to fever and its management showed an overall lack of knowledge of fever and how to

appropriately educate parents on evidence-based fever management practices. Current fever management practices and inappropriate beliefs and attitudes regarding fever may continue to fuel the fever phobia that exists among nurses (Greensmith, 2013).

Local Problem

In a major metropolitan pediatric emergency department (PED), phobia and inappropriate fever management among registered nurses were evident from anecdotal reports, direct observation, and surveys. Current nursing practice in this setting was to provide antipyretic medications at the time of initial nursing assessment for children with fevers greater than 38°C as a standard procedure order. In turn, physicians and nurse practitioners in the setting expected that all febrile children with temperatures greater than 38°C would be medicated prior to their initial examination.

Project Purpose

The literature suggests that nurses need to be educated about the immunological benefits of fever such as increased antibody production, inhibition of bacterial growth, decreased replication of viruses, shortened duration of illness, enhanced effects of some antibiotics (Considine & Brennan, 2007; Greensmith, 2013), and potential for toxic consequences of inappropriate antipyretic dosing by caregivers (Purssell, 2007). The focus of appropriate fever management should be to enhance the physiological response to infection, to promote the child's comfort, to prevent dehydration, and to conserve energy for healing (Considine & Brennan, 2007).

Nurses may be resistant to evidence-based practice change, continuing to rely upon antipyretics to prevent febrile seizure occurrence, and resistant to the additional time it takes to educate parents. Nurses may also wish to defuse complaints by medicating for antipyresis. Thus, the purpose of this evidence-based practice project was to improve nursing knowledge about the physiologic benefits of fever and to decrease antipyretic use for low-grade fevers less than 38.5°C in the otherwise well child.

Ethical Issues

Program approval as a quality improvement project geared toward nursing education was obtained from the Institutional Review Board (IRB) of the southern California children's hospital where the project was implemented. Subsequent approval from emergency department nursing leadership was obtained in an effort to effect nursing practice change, and involvement of medical leadership was sought to effect any potential policy change to standardized procedures for antipyretic administration during triage. In addition, approval to disseminate de-identified findings was obtained from the University of San Diego Institutional Review Board.

Setting

This evidence based project was implemented in a 52-bed pediatric emergency department of a major southern California metropolitan children's hospital with a nursing population of 94 permanent and traveler nursing staff and an average yearly census of over 70,000 pediatric patients. The project took place over a 3-month period.

Intervention

Because fever is a symptom of concern for parents, as well as the most common presenting complaint for urgent care or emergency department evaluation, providing education is key to promoting understanding of the benefits of fever and preventing further misuse of emergency department and urgent care services. The immediate goal of the project was to educate 80% of ED nurses in order to capture the majority of the nursing staff; and to obtain a 20% increase in nursing knowledge compared to pretest scores, consistent with similar programs (Walsh, et al., 2006; Edwards, et al., 2007a; Greensmith, 2013). A secondary goal was to obtain a 35% decrease in the administration of antipyretics in febrile children without complicated medical histories and with fevers less than 38.5°C. As the first program of its kind aimed at decreasing antipyretic use, the 35% benchmark was an attainable goal not out of reach in this setting. The didactic program utilized the work of Sullivan (2011) to educate registered nursing staff regarding the physiologic benefits of fever and its evidence-based management strategies. No change in standardized procedures were made at the time of the intervention, however the project coordinator recommended that nursing staff utilize nursing judgment to determine the need for administration of antipyretics in children with low-grade fevers.

Implementation

This fever education program was designed to prepare pediatric emergency nurses as experts in fever management. Educational sessions were held during staff meetings in August,

2014. Knowledge pretests were completed prior to the didactic presentation and posttests were completed immediately afterward. Participation was monitored by attendance at staff meetings and completion of both pre- and posttest questionnaires. An audit of the electronic medical record for the three months after the educational intervention was performed to evaluate change in the use of antipyretics for fevers less than 38.5°C. Finally, a three-month post-intervention knowledge test was administered to evaluate retention of knowledge among the nurses.

Program Costs

The overall cost of this intervention was minimal, since the program was offered during existing monthly staff meetings that were already intended for nursing education utilizing departmental audiovisual equipment. This program was feasible as part of the continuing education programs the emergency department currently incorporates into monthly staff meetings.

Evaluation Plan

The pre- and postintervention knowledge tests were conducted in August, 2014, then scored and compared. Three-month postintervention testing to assess retained knowledge was conducted in November, 2014 with an attempt to capture the same participants. Data collection regarding administration rates for antipyretics three months prior to and three months after the didactic presentation were gathered from the health information technology

department to evaluate the extent of nurses' continued reliance on the existing standardized procedure to medicate for fever $>38.0^{\circ}\text{C}$ during initial assessment.

Results

Fifty-four nurses attended the didactic presentation, representing 57% of the registered nursing workforce of this PED. Of the 54 registered nurses, 52 completed the pretest evaluation with a mean score of 52.7%. Fifty nurses then completed the posttest evaluation, which resulted in a mean score of 60.7%. The three-month postintervention evaluation was completed by only 9 nurse participants, with a mean score of 57.2%. However, data collection regarding administration rates of antipyretics indicated substantial improvement. The average percentage of children medicated with low-grade fever during the evaluation period was 54.65%, with the highest rate of 63.71% occurring in May, 3 months prior to the intervention and the lowest (37.23%) in November, 3 months after the intervention.

Discussion

The findings related to nursing knowledge show a need for programs aimed at improving understanding of the benefits and proper management of fever in the otherwise well child. Like prior work, this evidence-based practice project shows an overall poor knowledge base with minimal improvement in knowledge after a 30-minute didactic presentation. Continuing education via didactic presentation alone does not seem to be enough to produce a substantial improvement in knowledge on this topic.

This project was limited due to modest attendance of the educational session, high turnover of nursing staff throughout its 3-month duration, and poor participation in 3-month postintervention knowledge retention testing. Heavy reliance upon travel and contract nurses resulted in decreased compliance with the proposed change in practice as staffing fluctuated from month-to-month. Another limitation was the high rate of attrition from the didactic presentation to the 3-month follow-up evaluation, a problem which could have been remedied by individually contacting each participant for completion of the 3-month post-didactic evaluation.

The data pertaining to administration rates before and after didactic presentation may be attributable to nurses using judgment regarding the need for antipyretics, however emergency department processes underwent major change during this period with an increase in HCPs and implementation of a “direct bedding initiative”, whereby patients are placed in an exam room for an immediate physician encounter to improve arrival-to-provider time. The perceived decrease in administration rates might be the result of either of these factors, alone or combined, during the evaluation period.

This project did not achieve final success in changing current practice as there was minimal buy-in from nursing staff and nursing administration, which might be attributed to the observed lack of knowledge regarding the benefits of fever. Buy-in may also have been affected by the ever-growing importance of customer satisfaction scores, with fear of decreasing scores based on failure to meet parental expectations of treatment for low-grade fevers in children on initial presentation.

One lesson learned is the need to allow sufficient time to obtain evaluative data for quality improvement projects. As is often the case in large hospital systems with complex electronic medical records, data must be obtained through the appropriate channels. This process proved to be lengthy and cumbersome. In the future, organizational information technology personnel might be included in program planning to facilitate later data retrieval. In spite of the difficulties encountered in obtaining information, the ultimate outcome of the program was not affected.

A surprising lesson learned was in the evaluation of nursing knowledge in this project. It is easy to assume others have the same level of knowledge as oneself in a particular area. It was difficult to step back and appreciate others' level of knowledge regarding fever, especially in light of these nurses' years of experience in a top-ranked pediatric emergency care setting. That scores achieved were comparable to those documented worldwide was somewhat disconcerting, but certainly emphasizes the importance of improving nursing knowledge of this important physiologic response in the otherwise healthy child.

Another lesson learned in the implementation of this evidence-based practice project was the need for a vested assistant project coordinator to aid in the collection of 3-month knowledge retention tests. It was speculated that poor participation may have been due to the coordinator being unavailable for test administration and collection, relying upon department managers to distribute and collect the completed tests. Having an assistant with a vested interest in the project may have helped improve participation at that time.

Finally, in completing this evaluation and attempting to make a change in nursing culture, it became obvious that more discussion needs to occur within the culture to effect a

positive change and that change needs to be fueled from within the organization. A single didactic presentation may not have been enough to ignite the practice change. More discussion and education needed to take place in order for the practice change to occur, including an attempt to capture a larger percentage of staff. In addition, it might have been helpful to make staff aware of the inappropriate rate of antipyretic use and include them in planning for solutions to the problem.

Implications for nursing practice

The current level of nursing knowledge regarding evidence-based decisions on antipyretic use in febrile children is low. Change in this area of nursing expertise is necessary to decrease the use of alternating acetaminophen and ibuprofen for low to moderate grade fevers, thus decreasing the potential for complications resulting from misuse or accidental overdose. A change in the medication policy as standardized procedure was suggested to policy makers. Such a change should entail antipyretic medication administration for children ages 3 months and older, without complicating medical histories, with fever 38.5°C or higher via standardized procedures instead of current practice of 38.0°C. A change in policy may continue the discussion between nurses, HCPs, and patients about fever and its benefits, and help dispel myths of harm, thus curbing some of the phobias experienced in this community.

There is a long way to go to improve nurses' knowledge to effect a change in practice regarding the management of fever. Continuing education alone is not sufficient to bolster nursing knowledge; other interventions are needed to continue this change in nursing practice. Work on this matter throughout the past 20 years confirms that more needs to be done.

Improving the knowledge base and attitudes of nursing staff will foster better parental education regarding appropriate fever management actions, which in turn may decrease fever phobia within the community and decrease utilization of an already strained healthcare system.

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Poster Abstract

REDUCING ANTIPYRETIC USE FOR LOW-GRADE FEVERS IN OTHERWISE
HEALTHY CHILDREN

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Project aim: The purpose of this evidence-based practice project was to identify knowledge among pediatric emergency nurses about the benefits and myths of fever in otherwise healthy children and to decrease the use of antipyretics to allow for normal physiologic response in low-grade fevers.

Background: Fever phobia remains a prominent issue in the pediatric population, with fever being the primary chief complaint for after-hours calls, sick office visits, and urgent care and emergency department utilization. Fever phobia exists in both parents and healthcare providers, as evidenced by the quest to return the child to a state of normothermia. While most infants and children will experience fever at some point, fevers under 38.5°C (101.3°F) are considered benign in those who are healthy. Therefore, no pharmaceutical intervention is typically needed. However, research consistently demonstrates pediatric nurses often medicate patients for such low-grade fevers.

Project approach: Participants in an educational intervention to reduce inappropriate antipyretic use included 54 registered nurses employed in a major metropolitan pediatric emergency care center.

Pretesting was conducted prior to a didactic presentation on the pathophysiology, physiologic benefits, and common myths regarding fever. Immediate posttest results were evaluated. A 3-month follow-up survey was administered to evaluate retained knowledge. Evaluation of antipyretic administration rates for a three month period after the education intervention were compared to the same time period immediately before to evaluate reduction in use of antipyretics based on standardized procedures for fevers less than 38.5°C (101.3°F).

Outcomes: Analysis of the change between the pre- and posteducational intervention demonstrated only an 8% increase in knowledge among pediatric emergency nurses. Data regarding retention of knowledge and change in the use of antipyretics is pending.

Implications: Given the persistent lack of knowledge and tendency to over-treat low-grade fevers in infants and children among the pediatric nurses in this setting, fever phobia may persist and continue to drain resources from an already overextended area of pediatric primary care. Presenting nurses with additional education to strengthen their knowledge of the physiologic benefits of fever and to dispel myths surrounding its dangers and changes in practice protocols may help to bring about change in the culture of fever phobia.

Reducing Antipyretic use for Low-grade Fevers in Otherwise Healthy Children

Tricia Templett, BSN, CPEN, DNP Student
Susan Instone, DNSc, RN, CPNP



Background

- "Fever phobia" persists throughout the healthcare arena, with fever consistently accounting for almost one third of all pediatric urgent care and emergency department visits (Wallerstein et al., 2013)
- Incomplete patient education regarding fever management in otherwise healthy children remains a problem, with evidence based interventions not being utilized (Cinch & Dale, 2007)
- There is an "inappropriate attitude amongst nurses to fever" (Greensmith, 2013, p. 313) with need for continuing education
- According to the AAP Position Statement, health care providers are "prompting an exaggerated desire in parents to achieve normothermia by aggressively treating fever in their children" (Sullivan et al., 2011, p. 562)

Aim/Purpose

- To quantify knowledge among pediatric emergency nurses about benefits and myths of fever
- To decrease overuse of antipyretics in children with low grade fevers, allowing for normal physiologic response

Practice Innovation

- Didactic presentation utilizing Sullivan's PowerPoint presentation on fever and antipyretic use in children

Evidence

- Didactic presentations are utilized to teach cognitive elements for increasing knowledge (Coleman, 2011)
- Didactic presentations provide a more diversified teaching experience (Urbanová & Čtrnáctová, 2009)

Evaluation Method

- Knowledge pretesting evaluation
- Posttest immediately after education session
- 3-month follow-up evaluation to assess retained knowledge
- 3-month pre- and post intervention antipyretic administration rates to determine change in behavior

Results

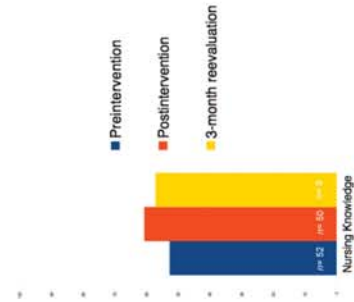
- Minimal gain in nurse knowledge after didactic presentation regarding physiology of fever, with similar 3-month retention of knowledge scores.
- Substantial decrease in rates of antipyretic use by nurses in children with low-grade fevers.
- Unclear if this change is a result of education or a variation in individual nurse practice or a recent change in emergency department processes with use of direct patient bedding and increased MD/NP staffing

Conclusions/Implications For Clinical Practice

- Improvement of nursing knowledge pertaining to evidence-based practice of antipyretic use in febrile children is necessary to appropriately manage low to moderate grade fevers
- Continuing education alone is not sufficient to bolster nursing knowledge; other interventions are needed to effect a change in practice

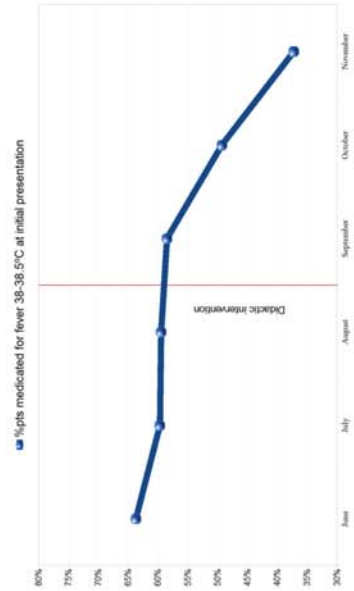
Tables/Graphs

Nursing Knowledge of Physiology of Fever



Antipyretic Administration Rates Prior to MD/NP Evaluation

Based on Standardized Procedures



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Stakeholder Presentation



Reducing antipyretic use for low-grade fevers in otherwise healthy children

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Background

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- Incorrect patient education regarding fever management in otherwise healthy children remains a problem, with evidence based interventions not being utilized (Cinch & Dale, 2007)
- There is an "inappropriate attitude amongst nurses to fever" (Greensmith, 2013, p. 313) with need for continuing education
- According to the AAP Position Statement, health care providers are "promoting an exaggerated desire in parents to achieve normothermia by aggressively treating fever in their children" (Sullivan et al., 2011, p. 582)



Aim/Purpose

- To quantify knowledge among pediatric emergency nurses about benefits and myths of fever
- To decrease overuse of antipyretics in children with low-grade fevers, allowing for normal physiologic response

Practice Innovation

Didactic presentation utilizing Sullivan's PowerPoint presentation on fever and antipyretic use in children



Evidence

- Didactic presentations are utilized to teach cognitive elements for increasing knowledge (Coleman, 2011)
- Didactic presentations provide a more diversified teaching experience (Urbanová & Čtrnáctová, 2009)

Evaluation Method

- Knowledge pretesting evaluation
- Posttest immediately after education session
- 3-month follow-up evaluation to assess retained knowledge
- 3-month pre- and postintervention antipyretic administration rates to determine change in behavior





Cost

Minimal cost impact

- Utilization of time at monthly staff meetings designated for nursing education

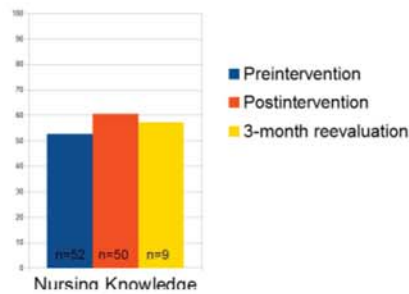


Results

- Minimal gain in nurse knowledge after didactic presentation regarding physiology of fever, with similar 3-month retention of knowledge scores
- Substantial decrease in rates of antipyretic use by nurses for children with low-grade fevers
- Unclear if this change is a result of education, a variation in individual nurse practice, or due to recent changes in emergency department processes with addition of ED South and use of direct patient bedding and increased MD/NP staffing

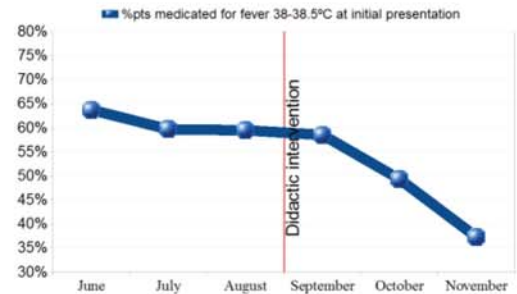
Results

Nursing Knowledge of Physiology of Fever



Results

Antipyretic Administration Rates Prior to MD/NP Evaluation
Based on Standardized Procedures



Limitations

- Attendance of didactic presentation did not meet benchmark of 80%
- Poor participation rate at 3-month retention test (n=9), likely owing to the fact that project investigator was unavailable to collect 3-month retention of knowledge tests without a designated assistant investigator



Conclusions/Impact on Practice

- Improvement of nursing knowledge pertaining to evidence-based practice of antipyretic use in febrile children is necessary to appropriately manage low to moderate grade fever
- Continuing education alone is not sufficient to bolster nursing knowledge; other interventions are needed to effect a change in practice



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