

EVIDENCE-BASED EDUCATION TO IMPROVE CAREGIVER KNOWLEDGE OF
FEVER MANAGEMENT IN YOUNG CHILDREN

by

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DEDICATION

I dedicate this project to the families and children I treat. My goal is that you always leave your time with me feeling empowered and confident in how to care for your children safely.

To my husband, Jace: You held us up and supported our family while I focused on my education. This journey would not have been possible without your sacrifice and encouragement.

To my children, Bodhi and Tatum: You are my why. You are the brightest part of my life, and I am eternally grateful to be your mom.

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TABLE OF CONTENTS

LIST OF FIGURES	8
LIST OF TABLES	9
ABSTRACT	10
INTRODUCTION.....	12
Background Knowledge and Significance	12
Local Problem	14
Intended Improvement	15
Project Purpose	15
Project Question	15
Project Objectives	15
Theoretical Framework	15
Perceived Severity	16
Perceived Barriers	17
Cue to Action	17
Major Concepts Defined	19
Education	19
Caregiver	19
Fever	19
Antipyretics/Antipyretic Medication	19
Literature Synthesis	20
Evidence Search	20
Comprehensive Appraisal of Evidence	21
<i>Lack of Knowledge</i>	21
<i>Caregiver Information Needs</i>	24
<i>Fever Education Interventions</i>	25
<i>Timing of Fever Education</i>	26
Strengths of Evidence	26
Weaknesses of Evidence	27

TABLE OF CONTENTS – *Continued*

Gaps and Limitations	28
METHODS	28
Project Design	28
Model for Implementation	29
Setting and Stakeholders	30
Planning the Intervention	32
Participants and Recruitment	33
Consent and Ethical Considerations	34
Timeline	35
Data Collection	35
Data Analysis	37
RESULTS	37
Characteristics of the Sample Population	37
Outcomes	38
DISCUSSION	43
Summary	43
Interpretation	44
Implications	45
Practice	45
Education	46
Research	46
Policy	47
Limitations	47
DNP Essentials Addressed	48
DNP Essential I: Scientific Underpinnings for Practice	48
DNP Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking	48

TABLE OF CONTENTS – *Continued*

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice	49
Conclusions	49
Plan for Sustainability	50
Plan for Dissemination	50
APPENDIX A: SITE APPROVAL/THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD AUTHORIZATION LETTER	51
APPENDIX B: CONSENT DOCUMENT (DISCLOSURE FORM).....	55
APPENDIX C: RECRUITMENT MATERIAL (RECRUITMENT FLYER).....	57
APPENDIX D: EVALUATION INSTRUMENTS (PRETEST AND POSTTEST QUESTIONNAIRES).....	59
APPENDIX E: PARTICIPANT MATERIAL (PERSONALIZED FEVER HANDOUT).....	64
APPENDIX F: PROJECT TIMELINE.....	67
APPENDIX G: LITERATURE REVIEW GRID.....	69
APPENDIX H: OTHER DOCUMENTS AS APPLICABLE TO THE PROJECT (CONTENT EXPERT EVALUATION FORMS).....	78
REFERENCES	81

LIST OF FIGURES

Figure 1	<i>Health Belief Model Concepts Integrated into Evidence-Based Education Session and Fever Handout</i>	18
Figure 2	<i>Flow Diagram of Evidence Search</i>	22
Figure 3	<i>Model for Improvement Applied to Intervention</i>	31
Figure 4	<i>Knowledge-Based Questions, % Correct.....</i>	40
Figure 5	<i>Participant Post-Implementation Responses</i>	43

LIST OF TABLES

Table 1	<i>Participant Demographics</i>	38
Table 2	<i>Pretest and Posttest Questionnaire Correct Responses</i>	41
Table 3	<i>Wilcoxon Signed-Rank Test Results</i>	42

ABSTRACT

Purpose: The purpose of this Doctor of Nursing Practice (DNP) project was to present caregivers of children aged 6-36 months with evidence-based education in combination with a personalized fever handout to improve caregiver knowledge on fever and fever management.

Background: Childhood fever is a common symptom seen in healthcare and a significant source of caregiver anxiety that leads to non-urgent office visits and unnecessary medication use. Most fever episodes in children can be managed at home, but lack of knowledge causes fever phobia and contributes to improper management. Providing evidence-based education on fever in the primary care setting before a fever occurs has been shown to positively affect caregiver knowledge and intent to manage fevers at home.

Methods: This quality improvement (QI) project was a quantitative, quasi-experimental study that utilized a one-group pretest-posttest design. An education session and a fever handout were given to 10 caregivers of children ages 6-36 months at Sunshine Pediatrics in Phoenix, Arizona. The mean improvement between the pretest and posttest questionnaires was measured to assess for knowledge change and caregiver beliefs.

Results: There was a statistically significant ($p < 0.01$) increase in caregiver knowledge and intent to manage fevers at home after the education session. There was a statistically significant ($p < 0.01$) decrease in caregiver fear of fevers after the education session. Participants indicated that the educational intervention was helpful, and they will not be afraid because they know what to do.

Conclusions: The evidence-based fever educational intervention for caregivers at Sunshine Pediatrics effectively improved caregiver knowledge and confidence in managing fevers at home and decreased caregiver fear and anxiety.

INTRODUCTION

Childhood fever is one of the most common symptoms seen in healthcare and a significant source of caregiver anxiety, leading to unnecessary consumption of health services and medication use (American Academy of Pediatrics [AAP] et al., 2011; Chiappini et al., 2017; Urbane et al., 2019). Most fever episodes in children are self-limiting and manageable at home, but lack of knowledge and many misconceptions about fever has led to fever phobia, which contributes to improper management by caregivers (Peetoom et al., 2016; Urbane et al., 2019). The literature shows that providing caregivers with evidence-based education in the primary care setting can give them the tools that they need to manage fevers at home safely and prevent non-urgent visits to the pediatrician or emergency room (AAP, 2011; Monsma et al., 2015; Peetoom et al., 2016). Given the significant impact of caregiver education on improving fever management and outcomes, primary care providers should proactively incorporate fever education at well-child patient appointments before a febrile illness occurs.

Background Knowledge and Significance

A temperature of 100.4°F (38°C) or greater is considered a fever. Fever itself is not an illness but a physiological mechanism that can help fight infection (AAP, 2011; Akbayram, 2021). Most fevers are short in duration and have protective mechanisms; there is no evidence that fever puts children at an increased risk of adverse effects (AAP, 2011). The most common adverse effects that parents report worrying about with fever are brain damage, epilepsy, and death (Clericetti et al., 2019). Due to the beneficial component of fever, evidence-based guidelines suggest that reducing fever is not always required and should only be done when it is causing discomfort or distress (AAP, 2011; Urbane et al., 2019).

Pediatric fever phobia is a global phenomenon amongst caregivers and healthcare providers that often leads to aggressive treatment (Clericetti et al., 2019). This phenomenon is not new. Dr. Barton Schmitt first wrote about fever phobia in 1980, and his findings are still applicable to date. Dr. Schmitt (1980) discusses how parents worry about low-grade fevers (a temperature less than 102°F or 38.9°C), a symptom that every child will experience repeatedly, and how this fear is unrealistic and unnecessary. There is overwhelming evidence in the literature that shows a deficit in caregiver knowledge regarding fevers is directly related to increased fever phobia, which leads to many unnecessary medical visits and unsafe treatment (AAP, 2011; Clericetti et al., 2019; Concilla et al., 2021; Peetoom et al., 2016; Schmitt, 1980; Urbane et al., 2019).

In a study done by Elkon-Tamir et al. (2017), 86% of caregivers presented to the emergency department (ED) with a chief complaint of fever, 31% of caregivers would give acetaminophen or ibuprofen to a comfortable child with a temperature of 100.4°F (38°C), 10% of caregivers would give acetaminophen or ibuprofen to a comfortable child with a temperature of 99°F (37.4°C), and 25% of caregivers reported that a febrile child should always be seen by a physician, showing limited caregiver knowledge of accurate fever definition and management. Ong et al. (2018) found in 2015 that non-urgent cases accounted for over 50% of the pediatric patients seen in the ED, and 48.2% of those non-urgent visits were for fever. In the study done by Concilla et al. (2021), 28.6% of caregivers presenting to the ED admitted to using both acetaminophen and ibuprofen to treat their child's fever. Because fever phobia has persisted for over 40 years, pediatric primary care providers (PCPs) should include fever education during primary care clinic visits to prevent non-urgent sick visits and inappropriate treatment by

caregivers. A systematic review of 43 studies showed that educating caregivers in the primary care clinic on childhood fever before the child is ill positively affects healthcare-seeking behaviors and medication management (Peetoom et al., 2016).

Local Problem

According to the Arizona Department of Health Services (AzDHS, 2020), 13,325 children were seen in an ED in Arizona for a primary diagnosis of fever in 2019. At Sunshine Pediatrics primary care clinic in Phoenix, AZ, fever education was not being done during well-child checks but, rather, when the patient was already sick and in the clinic for a sick visit. Many pediatric patients have a chief complaint of fever, and their caregivers bring them in because they believe the fever is harmful and do not know what is considered a true fever or how to manage it. Additionally, many patients' caregivers report using touch to measure fever without confirming the actual temperature with a thermometer. Providers at Sunshine Pediatrics also note that most caregivers who dispense antipyretic medication to their children at home report giving it for the sole reason of bringing the fever down. Many of the visits with a chief complaint of fever are unnecessary, but caregiver knowledge deficit on fever leads to them scheduling a sick visit. These trends in healthcare-seeking behaviors show the need for and importance of fever education at the primary care level. Stakeholders in this DNP project to improve caregiver fever management at Sunshine Pediatrics include pediatric primary care providers, a DNP student, and caregivers of children aged 6-36 months in the clinic.

Intended Improvement

Project Purpose

The purpose of this DNP project was to present caregivers of children aged 6-36 months with evidence-based education in combination with a personalized fever handout to improve caregiver knowledge on pediatric fever and fever management.

Project Question

In caregivers of children aged 6-36 months at Sunshine Pediatrics, will an evidence-based educational discussion combined with a personalized fever handout at well-child checks increase the caregiver's knowledge and intent to manage a fever at home?

Project Objectives

- Aim 1: Develop and present an evidence-based education intervention on fever management for caregivers of children aged 6-36 months at Sunshine Pediatrics.
- Aim 2: Develop an evidence-based personalized handout to supplement the education intervention on managing a fever at home in children 6-36 months of age.
- Aim 3: Evaluate the effectiveness of the evidence-based, caregiver-focused educational intervention through a comparison of pre-education and post-education questionnaires, which assess caregiver knowledge of fever management in children aged 6-36 months and determine the caregivers' intent and ability to manage fever at home.

Theoretical Framework

A theoretical framework helps give direction and serves as an organizing resource to help guide clinical problems and plans for change (Bonnell, 2018). The health belief model (HBM)

was developed to understand why people didn't adopt disease prevention strategies for the early detection of disease and was later applied to patient responses to symptoms and compliance with prescribed medical treatments (Becker, 1974). The HBM helped guide the development of this project's evidence-based intervention for caregivers to increase the chance of adopting the information and changing their fever management behaviors.

A person's belief of a personal threat of illness, combined with their belief of how effective the recommended health intervention is, will predict the probability that the person will adopt the behavior (Janz & Becker, 1984). The HBM has been widely used in research and successfully identifies health beliefs to predict health behaviors (Norman & Conner, 2017). When developing an educational intervention, it is important to understand health beliefs and behaviors to support and guide the evidence-based information used in the intervention (Norman & Conner, 2017). Overall, a person's course of action depends on their perceptions of the benefits and barriers of the intervention (Becker, 1974).

The HBM has six main concepts: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy. For this project, three of these concepts guided the evidence-based intervention: perceived severity, perceived barriers, and cue to action.

Perceived Severity

Perceived severity refers to a person's feelings on the seriousness of leaving an illness untreated and has been shown to predict compliance with recommended treatment (Becker, 1974; Janz & Becker, 1984). It is important to note that high levels of fear or anxiety affect health behaviors. A person remembers less of the provider's instructions and is less likely to

follow those they can recall when experiencing high anxiety (Becker, 1974). This project presented evidence-based information on fever *before* a child becomes ill, which prepared caregivers and empowered them to manage a fever with evidence-based information without anxiety. The goal was to present the information while the caregiver was not threatened by a fever so that they could understand it and recall it easier when it occurs. Supplementing the face-to-face educational intervention with a personalized fever handout summarizing the information discussed will allow the caregiver to refer back to the evidence-based information when the child is ill to reinforce their knowledge and reassure them regarding their fever management decisions.

Perceived Barriers

Perceived barriers refer to feelings about the potential negative aspects of a particular health action that may act as a roadblock to adhering to the recommended behavior (Janz & Becker, 1984). Negative perceptions lead to a person doing a cost vs. benefit analysis where they weigh the effectiveness of the action against the perception that it could be dangerous (Becker, 1974). Caregivers often fear that improper fever management can cause harmful outcomes, leading to inappropriate management behaviors. Qualitative research has shown that caregiver behaviors are influenced by emotional state, specific aspects of the child and family context, and their knowledge level on fever (Thompson, 2020a). This project aimed to identify and reduce perceived barriers through reassurance and correction of misinformation to promote change successfully.

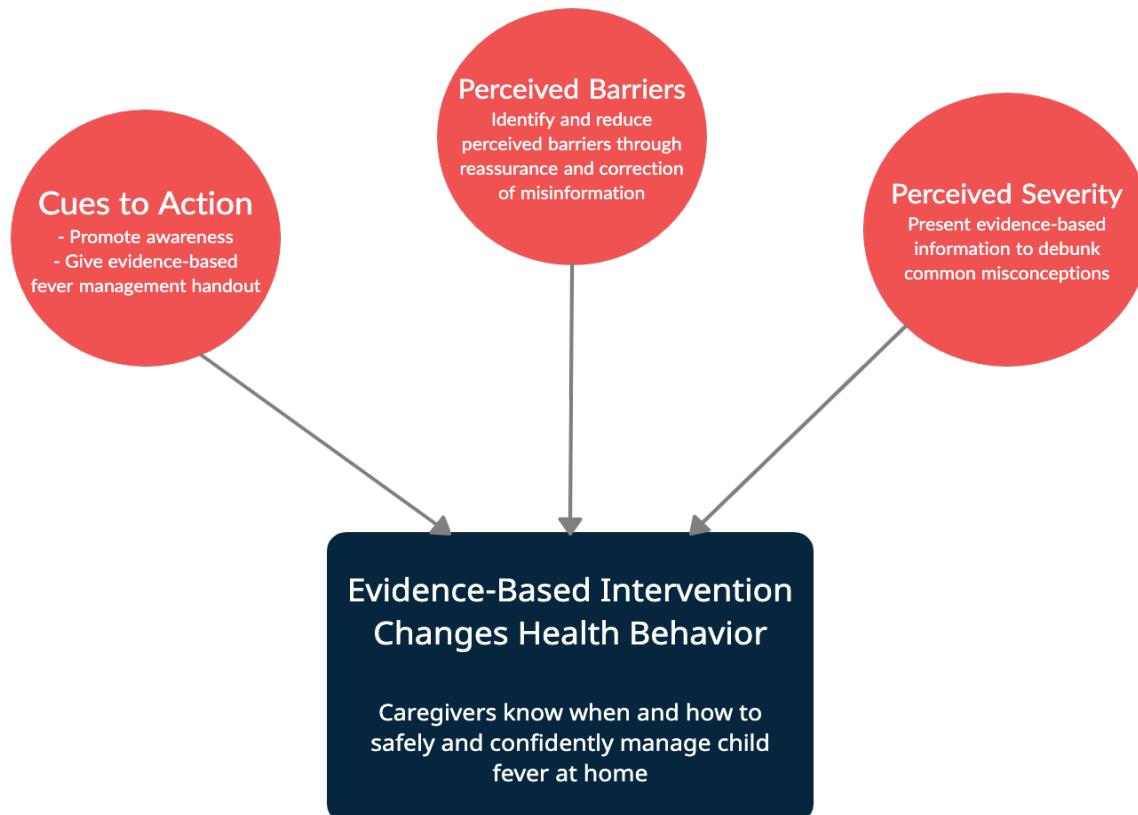
Cue to Action

Cue to action is the stimulus that triggers the decision-making process to accept a recommended health action (Norman & Conner, 2017). Internal influences, such as fever and

feelings of perceived threat, and external influences, such as provider recommendations, are required to initiate a behavior (Skinner et al., 2015). Caregivers need these cues to begin proper fever management behaviors. Their knowledge, coupled with the evidence-based education they received, will cue them on when and how to act (Krantz, 2001). Parents desire information on how to manage fever and decision points like duration of fever, how to use medications, comfort measures, danger signs, and when to seek professional care (Thompson, 2020a). The evidence-based information given to caregivers during the intervention aimed to promote awareness and use appropriate reminder systems for cueing them on when and how to act appropriately.

Figure 1

Health Belief Model Concepts Integrated into Evidence-Based Education Session and Fever Handout



Major Concepts Defined

The major concepts for this DNP project are as follows:

Education

Education is facilitating learning or the acquisition of knowledge and skills (United Nations Educational, Scientific and Cultural Organization, n.d.). For this DNP project, a literature review on the definition of fever and fever management served as the basis for an evidence-based educational intervention and caregiver handout.

Caregiver

A caregiver provides direct care for a child and assumes responsibility for the child's health, housing, safety, and well-being (McQuay, n.d.). This includes a child's parents, family members, or any other person appointed to care for the child.

Fever

For purposes of this DNP project, a fever is defined as a temperature of 100.4°F (38°C) or higher, which is consistent with the definition of fever provided by numerous pediatric healthcare facilities and professional organizations.

Antipyretics/Antipyretic Medication

An antipyretic medication is defined as an agent that reduces fever by inhibiting cyclooxygenase and reducing levels of prostaglandins in the hypothalamus (Aronoff & Neilson, 2001). Acetaminophen (Tylenol) and ibuprofen (Motrin) are examples of antipyretics.

Literature Synthesis

Evidence Search

A comprehensive literature search was conducted in PubMed and CINAHL to determine the current evidence about caregiver knowledge of childhood fever and fever management at home. Search phrases and keywords included “pediatric fever management,” “pediatric fever education,” “caregiver education,” “primary care,” “patient education handout development,” and “health knowledge, attitudes, practice.” The initial search yielded 9,542 results, of which the majority were irrelevant to the project question. A combination of MeSH terms (pediatrics/education, child/preschool, fever/diagnosis, fever/drug therapy, parents/education, caregivers/education, antipyretics, pediatrics, fever, primary healthcare) and Boolean operators (“AND” and “OR”) were used to refine the literature search further. Filter criteria included peer-reviewed/scholarly resources, the year 2016-current, and the English language. The resulting search yielded 25 articles in PubMed and 16 articles in CINAHL. An additional 30 relevant articles were selected from reference lists of the reviewed literature and Google Scholar. Articles that consisted of caregiver knowledge and practices regarding childhood fever, childhood fever management interventions, and caregiver education on childhood fever management were included. Articles dealing with fever management in infants three months old and younger were excluded due to the presence of specific fever guidelines for that unique patient population.

Of the literature reviewed, 16 full-text articles related to this DNP project were selected (Figure 1). The articles consisted of three systematic reviews, four cross-sectional studies, three descriptive qualitative studies, two integrative reviews, two randomized controlled trials, and two clinical practice guidelines that discussed the effect of caregiver knowledge on managing

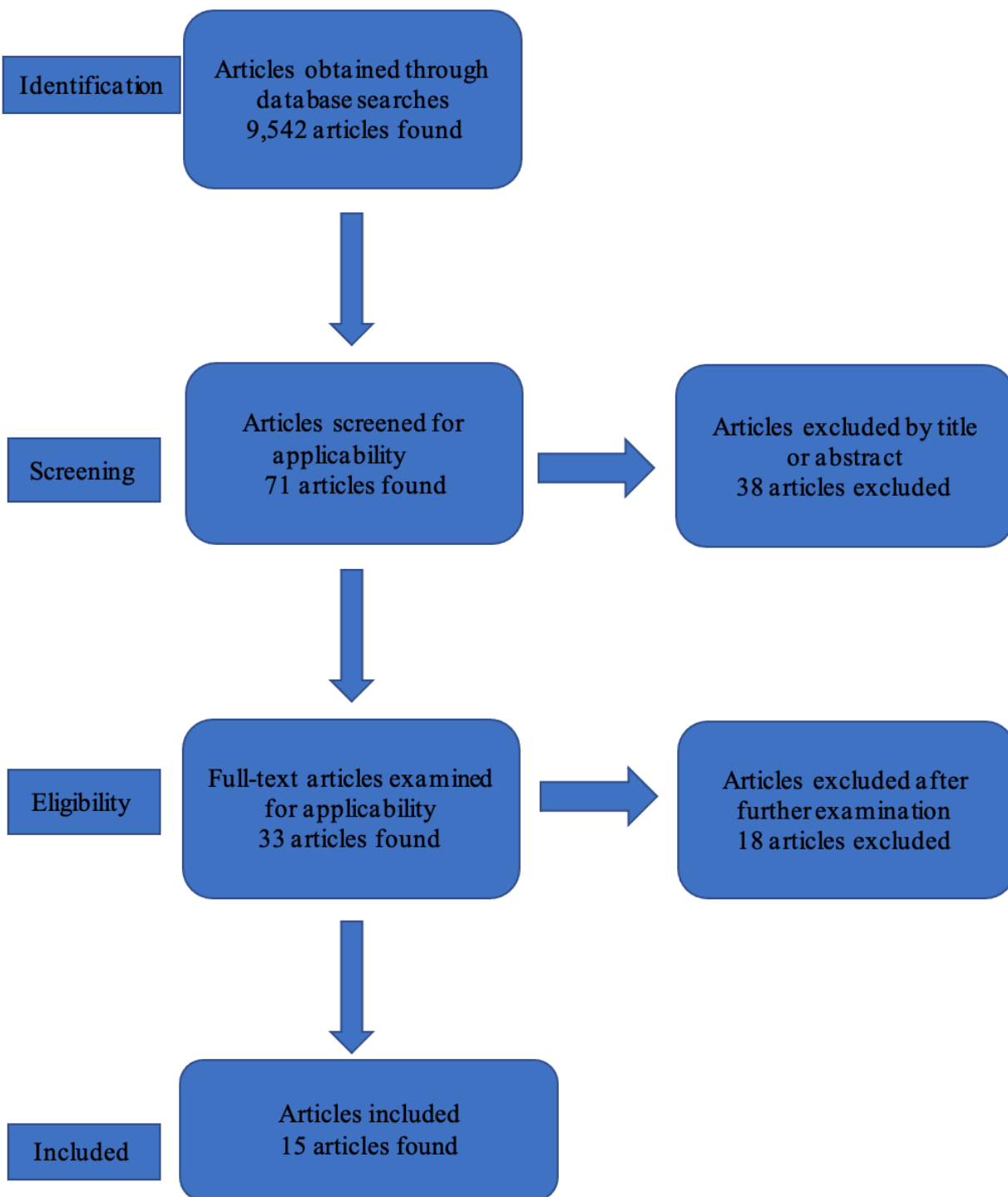
childhood fever. The final 16 articles selected shared three common themes: lack of knowledge leads to fever phobia among caregivers, caregiver information needs and interventions, and timing of fever education. The main findings and outcomes from most studies found that caregiver education increases their knowledge of fever and improves their ability and confidence to manage childhood fever at home.

Comprehensive Appraisal of Evidence

Fever commonly occurs in children and is a physiologic response that can help the body fight infection and, in most cases, requires no medical intervention (AAP, 2011; Akbayram, 2021; Thompson et al., 2020). Research shows that parent anxiety related to fever in their child has persisted for over 40 years, and it stems from a lack of knowledge on fever and misconceptions of potential harm to the child if not addressed (Concilla et al., 2021; Schmitt, 1980; Thompson et al., 2020a, 2020b). This “fever phobia” can lead to inappropriate behavior, such as potentially harmful use of antipyretic medication and improper utilization of healthcare services (Chapron et al., 2018; Concilla et al., 2021; Peetoom et al., 2017; Thompson et al., 2020b).

Lack of Knowledge

In 1980, Dr. Schmitt first wrote about parent misconceptions and fears regarding childhood fever and coined the term “fever phobia,” which is still prevalent today. Over the past four decades, the lack of knowledge and misconceptions about fever remains the same: belief that elevated fever can cause harm, caregivers’ inability to identify a fever correctly, and improper practices to lower the fever (Akbayram, 2021; Chapron, 2018; Concilla, 2021; Schmitt, 1980; Thompson et al., 2020).

Figure 2*Flow Diagram of Evidence Search*

Numerous recent studies confirm that caregivers have insufficient knowledge of fever, leading to unnecessary fear and interventions that do not align with childhood fever management guidelines (Akbayram, 2021; Chapron et al., 2018; Concilla, 2021; Thompson et al., 2020a, 2020b). Clericetti et al. (2019) conducted a systematic review covering fever phobia in over 26,000 caregivers and found that caregiver fear of fever has persisted worldwide despite the plethora of current evidence that fever itself is not dangerous. Akbayram (2021) conducted a cross-sectional study of 260 caregivers and found that 22% of caregivers did not know what degree was considered a fever, over 40% thought a temperature under 100.4°F (38°C) constituted a fever, and almost 30% gave antipyretic medication (such as acetaminophen or ibuprofen) for temperatures that were below 100.4°F (38°C). In a cross-sectional study done by Concilla et al. (2021), over 25% of caregivers thought that a temperature of 99.5°F (37.5°C) and above was considered a fever, and over 15% considered their child to have a fever when they “feel hot.” Caregivers in many studies report only using touch to assess and evaluate if a child has a fever (Akbayram, 2021; Thompson et al., 2020b).

Many caregivers also have misconceptions about how a fever progresses and the potential harm that it can cause. Of the 15,727 caregivers in the systematic review done by Thompson et al. (2020b), 77%-98% thought that a fever could rise indefinitely and harm the child through dehydration, seizures, or brain damage. Chapron et al. (2018) found that fever represented a perceived danger for 92% of caregivers, with two-thirds considering 104°F (40°C) a dangerous threshold that can cause complications such as dehydration and convulsions. At least 56.9% of caregivers in Akbayram’s (2021) cross-sectional study showed that caregivers felt very concerned if their child got a fever and their biggest fear was a febrile seizure. Caregiver

concerns and misconceptions of fever complications such as seizures and brain damage lead to fever phobia and causes a high percentage of caregivers to inappropriately, and sometimes unsafely, administer antipyretics when they are not indicated (Chiappini et al., 2017a).

The evidence shows a mixture of ways that caregivers manage childhood fever. Since the 1980s, fever guidelines continue to recommend that caregivers only administer antipyretics to alleviate discomfort (AAP, 2011; Chiappini et al., 2017a, 2017b; Schmitt, 1980), but Thompson et al. (2020b) found that in the majority of the 36 studies they reviewed, caregivers commonly gave antipyretics for the sole purpose of lowering the child's body temperature, which they believe can reduce the risk of seizure or brain damage. Multiple studies found that parents also have inadequate medication knowledge and misuse antipyretics by giving incorrect dosages, giving medication at improper intervals, or inappropriately combining or alternating medications (Akbayram, 2021; Chiappini et al., 2017a; Thompson et al., 2020b). Caregivers' improper management of fever with antipyretics puts children at risk for an antipyretic overdose (Chiappini et al., 2017a).

Caregiver Information Needs

A chief complaint of fever is one of the most common reasons for visits to the pediatrician and emergency department (Elkon-Tamir et al., 2017; Concilla et al., 2021). There is abundant evidence showing that caregivers seek knowledge on childhood fever, how to manage it, and when to seek medical attention (Kelly et al., 2019; Thompson et al., 2020a, 2020b; van de Maat et al., 2018). In a qualitative study by Thompson et al. (2020a), caregivers desired more fever-related information, such as the maximum duration of fever, maximum fever threshold, and what signs and symptoms require medical assessment. Thompson et al.'s (2020b) systematic

review found strong evidence that healthcare professionals are the most common source of information on fever, and caregivers consistently express a desire for more information from a trusted source that is accessible, simple, and provides straightforward guidance on how to manage a fever at home and when to seek medical attention. In a randomized controlled trial by Ong et al. (2018), 70% of caregivers stated that their knowledge of fever came directly from medical personnel. Caregivers seek reassurance, information, and guidance on what to do with their child's fever, especially when they are afraid of potential underlying conditions and complications (Peetoom et al., 2017). In a mixed-methods study by van de Maat et al. (2018), many parents emphasized the need for clear instructions on what fever symptoms they can manage at home and what to do if those symptoms worsen.

Fever Education Interventions

Fever management interventions that are clear, simple to follow, use mixed methods, and are reinforced over time have proven to be the most effective (Arias et al., 2019; Monsma et al., 2015; van de Maat et al., 2018). Kelly et al. (2019) developed a fever information leaflet to give to parents and found that it increased caregivers' ability to identify fever correctly and decreased inappropriate management practices. Having face-to-face educational discussions with caregivers during a healthcare visit is also vital to allow providers to adapt the information to the specific caregiver's needs and demonstrate fever management skills such as taking an accurate temperature and correctly drawing up medication (Monsma et al., 2015). Face-to-face education alone can have as low as 20% information retention rates, but if visual or written information is incorporated into the education, the information retention rates can increase to 50% (Kelly et al., 2019). Ong et al. (2017) conducted a randomized controlled trial that showed that an educational

fever pamphlet and an educational video on fever effectively increased caregiver knowledge of fever and helped caregivers feel more aware and better prepared to manage fever in their children. Caregivers who were given an information pamphlet that presented a decision guide about when and where to seek care and when to care for the child at home found it easy to follow and helpful in empowering them to manage the child's fever (Monsma et al., 2015).

Timing of Fever Education

In a recent systematic review conducted by Peetoom et al. (2017), fever education interventions at well-child checks before a fever episode occurs demonstrated positive effects on healthcare-seeking behavior and medication management. The literature underlines the importance of education *before* fever episodes or illnesses to prepare caregivers better. Since young children are seen more frequently for developmental checkups, vaccination, and anticipatory guidance, including fever education during well-child appointments, could be the most successful way of increasing and sustaining caregiver knowledge (Peetoom et al., 2017).

Strengths of Evidence

The articles included in this literature synthesis included a variety of research study designs. There are three systematic reviews (which are the highest quality of evidence), four cross-sectional studies (which analyze data & help to describe the characteristics of the population), three descriptive qualitative studies (which help provide insights from a population regarding a poorly understood phenomenon), two integrative reviews (which reviews the research to help understand a phenomenon of concern), two randomized controlled trials (which provide the most reliable evidence on the effectiveness of interventions), and two clinical practice guideline (which are developed from the best available research evidence & practice

experience). The three systematic reviews and two integrative reviews summarize a large number of studies and provide large sample sizes and more generalizable findings. Four studies used large sample sizes, and multiple studies used qualitative and quantitative data collection methods, which provides a better understanding of caregiver practices and needs in depth.

All of the evidence in this current review shows that a lack of caregiver knowledge of fever and fever management is still a prevalent phenomenon. This lack of knowledge leads to unnecessary caregiver anxiety and inappropriate interventions. All the studies came to the same conclusion: caregiver education on the definition of fever and its appropriate treatment is vital in managing fever phobia.

Weaknesses of Evidence

Over the last four decades, many research studies have reported success in educational fever interventions. However, this literature review showed that fever phobia is still a significant problem, and there has been little improvement in caregiver knowledge and management practices. Although the current literature recognizes the lack of caregiver knowledge on fever management in children, no articles identified a standardized educational intervention to improve caregiver knowledge. The lack of research on a standardized approach to fever education or a universal fever management intervention makes it hard to determine the best educational tools and strategies for fever education. Other weaknesses in the evidence include limited sample sizes in three of the studies, single-center trials in most of the studies, use of convenience or purposive sampling in seven studies, and an emergency department setting (rather than a primary care setting) in four of the studies.

Gaps and Limitations

Despite the past and current evidence showing that caregiver education on fever is necessary, the literature has not been able to pinpoint when and how this education is best received to change caregiver practices. Further studies are needed to understand if education interventions are more effective with caregivers whose child is in the clinic with an active fever or proactively during well-child visits (when the child is afebrile). Much of the literature focuses on caregiver knowledge during a febrile episode, showing that more studies are needed to determine the best timing for fever education. This DNP project aimed to develop and implement a standardized fever education intervention at well-child visits that successfully increases caregiver knowledge on fever and fever management.

METHODS

Project Design

This DNP project aimed to improve caregiver knowledge of the definition of fever and how to manage fever properly at home. Caregivers of children aged 6-36 months were presented with a 5-10 minute, in-person, evidence-based educational intervention during their child's regularly scheduled well-child visit. A personalized fever handout was reviewed with the caregiver to provide education on critical knowledge points of fever and fever management. By using the handout to guide the educational session, caregivers all received similar information regarding fever and fever management. Additionally, caregivers were given the opportunity to ask questions to clarify understanding as the information was presented. Reviewing the content on the handout with the caregiver was essential to ensure the caregiver was comfortable and confident with the information if they needed to reference it at home when their child has a fever.

The design of this DNP project was a quantitative, quasi-experimental quality improvement project at Sunshine Pediatrics utilizing a one-group pretest-posttest educational intervention on fever and fever management. The pretest-posttest design helped determine if the evidence-based fever education intervention increased caregiver knowledge on fever and management of fever at home. All participating caregivers received the same evidence-based education intervention, and pretest-posttest questionnaires were given to assess the effect of the intervention.

Model for Implementation

This DNP project used the Institute for Healthcare Improvement's (IHI) Model for Improvement (MFI), a simple tool that gives a foundation and framework for doing improvement work. The MFI has two parts: (1) three fundamental questions that can be addressed in any order, and (2) the Plan-Do-Study-Act (PDSA) cycle, which guides the testing of a change to determine if the change is an improvement. Combining the three questions from the MFI with the PDSA cycle gave the project guidance and direction.

The three fundamental questions gave the project a guiding framework by identifying the project's aim, how to know that a change was an improvement, and what change will result in improvement. The project aim was time-specific and measurable, outcome measures were established to determine if there was an improvement, and changes that were expected to result in an improvement were identified and implemented (IHI, 2022).

The PDSA cycle consists of four steps that test a change (otherwise referred to as the intervention). In the "plan" step, a plan should be developed to implement and test the intervention (IHI, 2017). For this DNP project, objectives, predictions, evidence-based

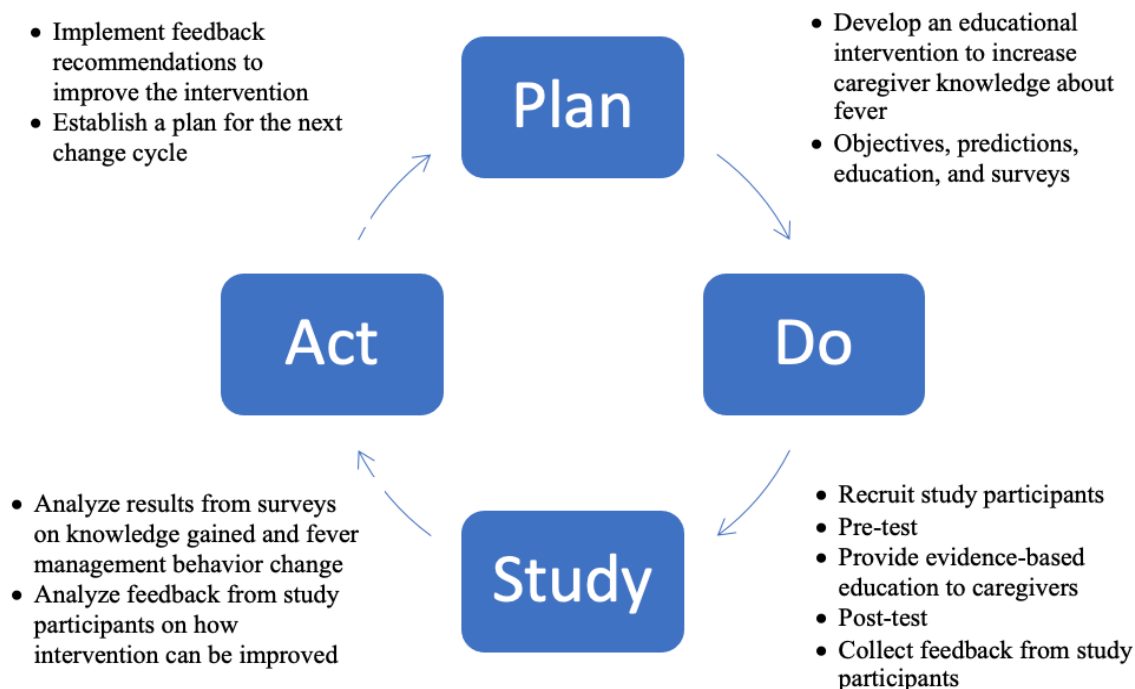
education, and questionnaires were developed to collect data. In the “do” step, the change should be tested on a small scale (IHI, 2017). For this step, the DNP student recruited study participants from Sunshine Pediatrics, delivered the pretest questionnaire, provided evidence-based fever education with a personalized fever handout, delivered the posttest questionnaire, and collected feedback from study participants. In the “study” step, the analysis of the data is completed and compared to project predictions (IHI, 2017). For this step, results were analyzed from the surveys to determine if there was a change in caregiver knowledge and fear of fever. In the “act” step, the change should be refined based on what was learned from the test (IHI, 2017). The DNP student shared results of the project with the project site (Sunshine Pediatrics) and is developing a plan to implement this intervention at other sites to collect more generalizable data. Although only a single PDSA cycle was implemented due to the time constraints for this project, the PDSA cycle is intended to be repeated until the intervention requires no more changes (IHI, 2022). Figure 3 visually outlines how the MFI and PDSA cycle guided the project.

Setting and Stakeholders

The recruitment and data collection setting for this project was Sunshine Pediatrics, a privately owned pediatric primary care clinic located in central Phoenix, Arizona, Maricopa County. This practice setting serves families with children ages newborn to 21 years old. The practice has two physicians and one pediatric nurse practitioner. Support staff included one front desk agent, three medical assistants, and one referral coordinator. The stakeholders included Sunshine Pediatrics clinic providers and staff, caregivers of children aged 6-36 months, children who receive care in the clinic, and the DNP student.

Figure 3*Model for Improvement Applied to Intervention*

What are we trying to accomplish? Improve caregiver knowledge of fever and fever management in children ages 6-36 months old.
How will we know that a change is an improvement? Caregivers will report learning new information about fever and fever management.
What change can we make that will result in improvement? Educate caregivers on definition of fever as well as when and how to manage fever at home. Provide caregivers with a personalized handout on fever and fever management at home.



The project was low risk for Sunshine Pediatrics providers and support staff because it did not require any time or effort on their part. Potential benefits for the providers and support staff included reducing non-urgent medical visits and phone calls. The caregivers of the eligible children had the most risk because they had to commit the most time to fill out the pretest and

posttest surveys and participate in the educational intervention. The caregivers and their children benefited the most from improved knowledge of fever and reduced improper antipyretic dosing.

Planning the Intervention

Current literature was reviewed to plan and develop the intervention for this DNP project. The intervention included a 5-10-minute face-to-face education session where the DNP student educated the caregivers on the definition of fever and how to manage fever at home. A personalized fever handout (Appendix E) that was developed based on evidence-based information on fever from the American Academy of Pediatrics (AAP) was utilized to guide the educational session.

Caregivers of children aged 6-36 months at the clinic for a well-child check who chose to participate were given a pretest questionnaire (Appendix D) during the rooming process. Once the pretest was completed, the DNP student provided a 5-10-minute educational session with a fever handout that discussed fever and fever management at home. A fever toolkit was given to the caregiver during the education session. The toolkit included a personalized fever handout (Appendix E) that included the child's weight and proper medication dosing, a no-touch forehead thermometer, and a medical-grade oral syringe to draw up accurate doses of medication. All items within the toolkit were independently purchased and provided free of cost to caregivers by the DNP student. The face-to-face session presented current evidence-based information on the definition of fever, debunked common myths regarding fever, described how the caregiver could manage fever at home, and provided guidance on when to seek healthcare for fever. The education session also offered a hands-on portion where caregivers were taught how to take a temporal temperature properly. The caregiver was also shown how to administer the correct

medication at the correct dose based on the child's weight using a medical-grade oral dosing syringe if future medication management for fever is necessary. Immediately after the session, the caregiver was given the posttest questionnaire (Appendix D) to assess if the educational intervention was successful. The caregiver was able to take the personalized fever toolkit home for future use and reference. The DNP student ended the session by asking the caregiver if there were any other questions on fever before leaving the room.

Participants and Recruitment

Caregivers of children 6-36 months of age who presented to Sunshine Pediatrics for a well-child check were shown the recruitment flyer by the medical assistant and asked if they would like to participate. The recruitment flyer (Appendix C) was presented to the caregivers during the rooming process to explain the project's purpose and participation benefits. The inclusion criteria to participate in this DNP project were (a) caregiver of a child 6-36 months of age who were patients at Sunshine Pediatrics and presented for a well-child check, (b) English speaking, and (c) the child being seen was a healthy child with no chronic or underlying conditions that affect the immune system. Children who had chronic or underlying health conditions that could affect the immune system (such as sickle cell disease, cancer, or taking steroids) were excluded because fever management has to be individualized to their health status and condition; therefore, this standardized, evidence-based fever education did not apply to them. There were no additional exclusion criteria for this project. The goal of this project was to recruit at least 10 caregivers.

As an incentive to participate and to promote recruitment, caregivers who chose to participate were given a complementary fever toolkit to take home, which included a

personalized fever handout (Appendix E) with the child's weight and proper medication dosing, a no-touch forehead thermometer, and a medical-grade oral syringe to draw up accurate doses of medication. As previously noted, this fever toolkit was independently purchased and personally funded by the DNP student. No additional incentives or compensation were offered to caregivers for participating in this project.

Consent and Ethical Considerations

The central principles of ethics for research involving human subjects are respect for persons, beneficence, and justice. Respect for persons is defined as a moral principle to respect the choices of autonomous decision-makers and protect the interests of those who have diminished autonomy (National Institutes of Health [NIH] & Resnik, 2015). The DNP student respected that participant caregivers should make their own informed decision about whether to participate in the project. Beneficence is the ethical obligation to do good and avoid causing harm (NIH & Resnik, 2015). The purpose of this DNP project was to benefit the caregivers by improving their knowledge and preventing harm from unsafe fever management practices. Justice is treating people fairly (NIH & Resnik, 2015); all caregivers who met the project inclusion criteria were allowed to participate despite their gender, race, age, or socioeconomic status. These three principles were upheld for all participants while conducting this project.

The DNP student presented all participating caregivers with a disclosure form (Appendix B) and the recruitment flyer (Appendix C) with the project details. All volunteering caregivers were informed that participation was voluntary and that they were able to withdraw from the project at any time. There were no anticipated risks or burdens for participants other than the time required to complete the educational intervention and pretest/posttest. As an incentive to

participate, caregivers were given a fever toolkit, including a personalized fever handout with the child's weight and proper medication dosing, a no-touch forehead thermometer, and a medical-grade oral syringe to draw up accurate doses of medication.

Before beginning implementation and data collection, the DNP student received approval from the University of Arizona Institutional Review Board and site approval from Sunshine Pediatrics (Appendix A).

Timeline

The DNP student developed a project timeline (Appendix F) to outline the steps in the planning, pre-implementation, implementation, and evaluation phases of the DNP project. Timeline development was also essential to ensure the timely progression of the DNP project. Planning for this project took place from October 2021 – May 2022. The planning phase involved identifying a clinic's need for fever education, researching fever and fever management practices, obtaining clinic permission to implement the project, and preparing the proposal. The pre-implementation phase took place from May 2022-July 2022, where the evidence-based fever handout was developed, and IRB approval was obtained. The implementation phase took place in August 2022 and involved recruiting participants, providing evidence-based fever education, and collecting data. The final phase was evaluation and took place from September 2022 – October 2022. The evaluation phase included analyzing data and presenting the final results.

Data Collection

The pretest-posttest questions for this project were drawn from already published surveys in two previous studies conducted by Concilla et al. (2021) and Kelly et al. (2019). The questions tested caregiver knowledge of fever definition and evidence-based fever management practices

and assessed caregiver intent to manage fever at home and comfort level with fever. The pretest questionnaire included four demographic questions, six knowledge-based questions on fever and fever management, and three Likert scale questions to measure current caregiver beliefs, opinions, and practices for fever management. The posttest questionnaire included the same six knowledge-based questions on fever and fever management, three Likert scale questions to measure caregiver beliefs, opinions, and practices post-education, and an additional three Likert scale questions to evaluate the participant's satisfaction with the educational intervention. An open response section for feedback was included at the end of the posttest questionnaire if caregivers wished to leave any additional feedback. To contribute to the validity of the project's data, one pediatrician and one pediatric nurse practitioner served as content experts to review the intervention materials for applicability before project implementation (Appendix G).

The caregivers completed the pretest and posttest questionnaires using Qualtrics software on an iPad provided by the DNP student. Qualtrics is the only experience management platform that is Health Information Trust Alliance (HITRUST) certified and uses transport layer security encryption to protect and secure all transmitted data (Qualtrics, 2022). All pretest and posttest questionnaires were given in the same order, and participants had to select an answer before moving forward to the next question, preventing any unanswered questions. The pretest was administered immediately before the educational intervention, and the posttest was administered immediately after the educational intervention was complete. The DNP student collected data from 10 participants over two days.

Data Analysis

The data collected from the pretest and posttest questionnaires were continuous and ordinal. The continuous data did not appear to have a normal distribution; therefore, the non-parametric Wilcoxon signed-rank test was used for analysis. Microsoft Excel software was used to analyze the data via the Wilcoxon signed-rank test. The Wilcoxon signed-rank test compared pre-intervention and post-intervention questionnaire results to assess if there was a change in caregiver knowledge and the beliefs and practices of fever and fever management. The alpha value was set to 0.01 to determine if the change was statistically significant. Any additional comments made on the posttest survey were summarized, and any presenting themes were identified.

RESULTS

Characteristics of the Sample Population

A total of 10 eligible caregivers participated in the fever education session and completed a pretest and posttest questionnaire. Some 40% (n=4) had only one child, 20% (n=2) had two children, 30% (n=3) had three children, and 10% (n=1) had four or more children. Additionally 70% (n=7) of the participating caregivers own a thermometer at home, and 30% (n=3) do not. Also 70% (n=7) of caregivers reported using a temporal thermometer, 30% (n=3) reported using touch, and 0% (n=0) reported using the oral, rectal, or axillary route. When asked about where they get their information on fever, 80% (n=8) reported their child's healthcare provider, 70% (n=7) reported family and friends, 30% (n=3) reported using Google, 40% (n=4) reported using social media, and 0% (n=0) had no sources or selected other. See Table 1 for participant demographics.

Table 1*Participant Demographics*

Characteristic	Sample n=10 (%)
Number of Children?	
• 1	4(40%)
• 2	2 (20%)
• 3	3(30%)
• ≥ 4	1(10%)
Own a Thermometer at Home?	
• Yes	7(70%)
• No	3(30%)
How do you Measure Their Temperature?	
• Oral	0
• Rectal	0
• Axillary	0
• Temporal	7(70%)
• Tactile	3(30%)
• I do not check	0
Sources of Information?	
• Child's provider/healthcare worker	8(80%)
• Family/friends	7(70%)
• Google	3(30%)
• Social Media	4(40%)
• I don't have any sources	0
• Other	0

Outcomes

The fever education intervention took place on August 15, 2022, and August 16, 2022. All 10 participating caregivers completed the pretest and posttest questionnaires using Qualtrics on the DNP student's iPad, and no questions were left unanswered. The data collected was not identifiable, was exported to Microsoft Excel for analysis, and was analyzed on September 20, 2022.

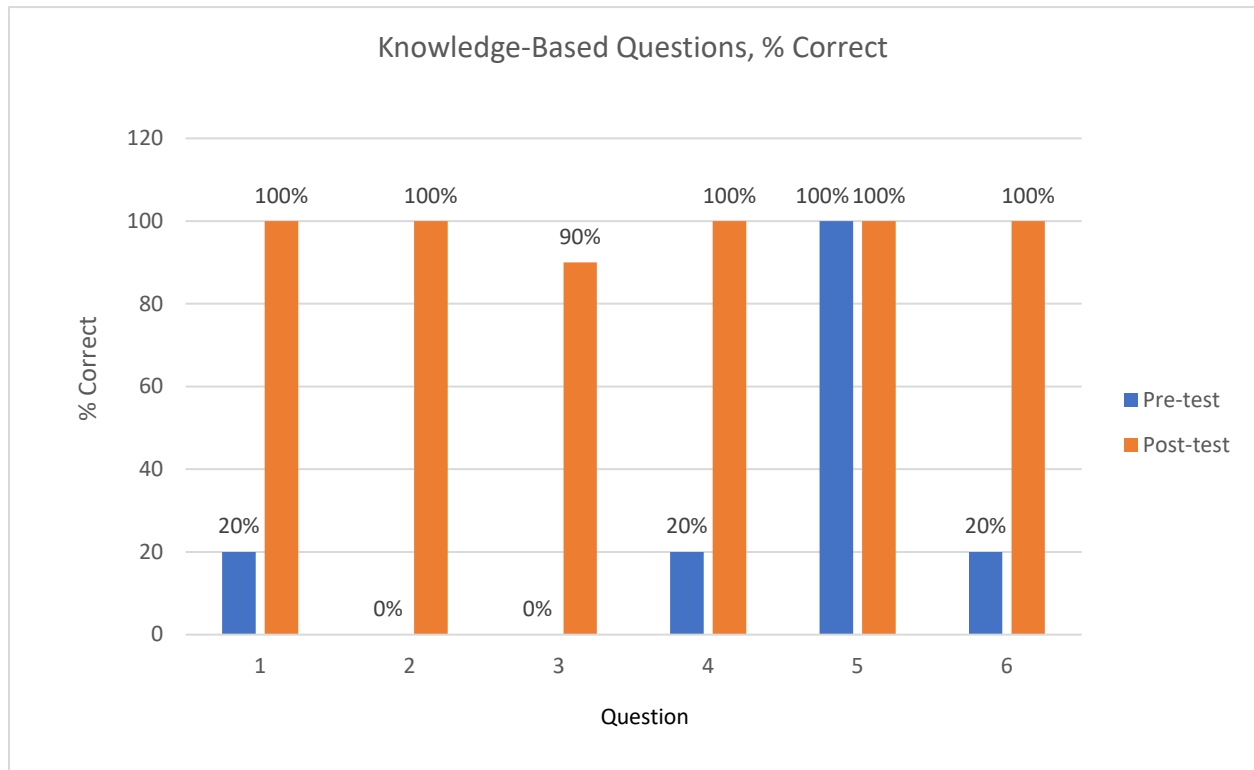
The purpose of this project was to improve caregiver knowledge of pediatric fever management, decrease fear of fever, and increase the caregiver's intent and ability to manage their child's fever at home. The data was separated into four different groups to be analyzed.

Group I included questions one through six on the pretest and posttest questionnaires, which were multiple choice knowledge-based questions that assessed caregiver knowledge of fever and fever management. Group II included question seven on the pretest and posttest questionnaires, a Likert scale question that assessed the caregiver's ability to manage a fever at home. Group III included question eight on the pretest and posttest questionnaires, a Likert scale question that assessed the level of caregiver fear of consequences of fever in general. Group IV included question nine on the pretest and posttest questionnaires, a Likert scale question that assessed caregiver fears that fever will cause seizures or brain damage.

Group I pretest and posttest scores measured caregiver knowledge of fever and fever management and had a *p*-value of 0.00512, which was statistically significant. The mean score of the pretest knowledge-based questions was 26.2%, and the mean score of the posttest knowledge-based questions was 98.3% (Figure 4). The mean difference in the scores showed there was a 72.1% increase in the average score of the knowledge-based questions. After participating in the educational intervention, two participants showed an increase of three out of six points, three participants showed an increase of four out of six points, and five participants showed an increase of five out of six points.

Figure 4

Knowledge-Based Questions, % Correct



See Table 2 for a breakdown of the knowledge-based question responses and Table 3 for the Wilcoxon signed-rank test results for each group's data analysis.

Table 2*Pretest and Posttest Questionnaire Correct Responses*

Question	Answer	Pretest n(%)	Posttest n(%)	Difference in correct response %
1. What temperature do you think is a fever?	When they feel hot	2(20%)	0(0%)	↑ 80%
	98.7°F and above	0(0%)	0(0%)	
	99°F and above	5(50%)	0(0%)	
	100.4°F and above	2(20%)	10(100%)	
	101°F and above	1(10%)	0(0%)	
	I do not understand the question	0(0%)	0(0%)	
2. Every child with a fever needs fever-reducing medication (such as Tylenol or Motrin)?	True	10(100%)	0(0%)	↑ 100%
	False	0(0%)	10(100%)	
3. At what temperature do you give your child medicine (such as Tylenol or Motrin)?	When they feel hot	3(30%)	0(0%)	↑ 90%
	99°F and above	4(40%)	0(0%)	
	100°F and above	2(20%)	1(10%)	
	101°F and above	1(10%)	0(0%)	
	102°F and above	0(0%)	0(0%)	
	It depends on how they are feeling	0(0%)	9(90%)	
4. What should you do if your child has a fever of 102°F but is acting like their usual self?	Give medicine	4(40%)	0(0%)	↑ 80%
	Take them to the doctor	4(40%)	0(0%)	
	Give them fluids, allow them to rest, and monitor them	2(20%)	10(100%)	
	Send them to daycare	0(0%)	0(0%)	
5. If your child has a fever, you can give them Aspirin.	True	0(0%)	0(0%)	0%
	False	10(100%)	10(100%)	
6. A fever can be good for my child's health.	True	2(20%)	10(100%)	↑ 80%
	False	8(80%)	0(0%)	

The three Likert scale questions were analyzed individually due to the difference in intent and fear being measured. Group II pretest and posttest scores on question seven had a *p*-value of 0.0034, a statistically significant *increase* in the caregiver's intent and ability to manage fevers at home. Group III pretest and posttest scores on question eight had a *p*-value of 0.005, a statistically significant *decrease* in caregiver worry about the consequences of fever in general. Group IV pretest and posttest scores on question nine had a *p*-value of 0.005, a statistically

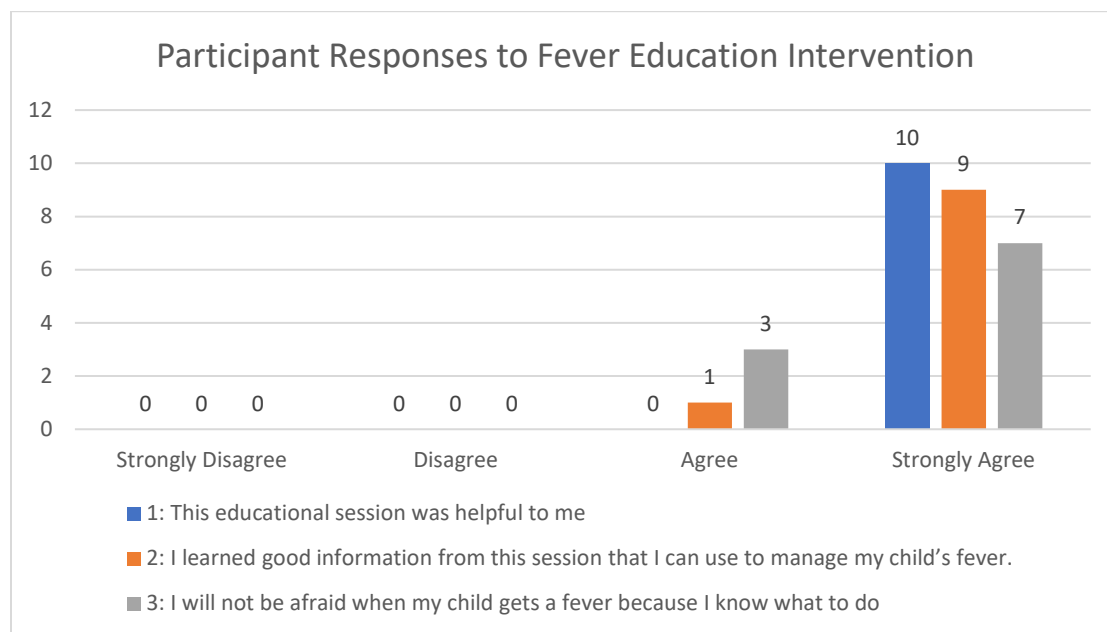
significant *decrease* in caregiver fear that fever will cause seizures or brain damage. See Table 3 for the data analysis breakdown of each group.

Table 3

Wilcoxon Signed-Rank Test Results

Data Analysis Group	Question	Pre-Education Average	Post-Education Average	Change	p-value	Statistically Significant
I	1-6: Knowledge-Based Questions	26.2%	98.3%	+72.1%	p<0.01	Yes
II	7: If my child gets a fever, I know what to do at home.	Strongly Disagree (0) Disagree (2) Agree (8) Strongly Agree (0)	Strongly Disagree (0) Disagree (0) Agree (3) Strongly Agree (7)	+0.9 levels	p<0.01	Yes
III	8: I am worried about the consequences of fever in general.	Strongly Disagree (0) Disagree (0) Agree (8) Strongly Agree (2)	Strongly Disagree (4) Disagree (6) Agree (0) Strongly Agree (0)	-1.6 levels	p<0.01	Yes
IV	9: I am afraid fever will cause febrile seizures or brain damage.	Strongly Disagree (0) Disagree (0) Agree (4) Strongly Agree (6)	Strongly Disagree (0) Disagree (10) Agree (0) Strongly Agree (0)	-1.6 levels	p<0.01	Yes

There were three additional Likert scale questions on the posttest questionnaire, which evaluated the participant's satisfaction with the educational intervention. For question one, 100% (n=10) of participants selected "Strongly Agree" that the educational session was helpful to them. For question two, 90% (n=9) of participants selected "Strongly Agree," and 10% (n=1) selected "Agree" that they learned good information from the educational session that they can use to manage their child's fever. For question three, 70% (n=7) selected "Strongly Agree," and 30% (n=3) selected "Agree" that they will not be afraid when their child gets a fever because they now know what to do. See Figure 4 for a breakdown of the results.

Figure 5*Participant Post-Implementation Responses*

The posttest questionnaire also had an open response section if caregivers wished to leave any additional feedback. Only two participants chose to leave feedback. One participant wrote, “I am glad to know this information now,” and the other participant wrote, “Thank you for the thermometer. I wish someone told me this stuff with my 3 older kids”. Both responses share an underlying theme that they had not received fever education before the intervention.

DISCUSSION

Summary

Fever is a symptom that all children experience many times throughout their lives. A lack of knowledge on fever contributes to caregiver anxiety, leading to improper management of fever and unnecessary medical visits (AAP, 2011; Clericetti et al., 2019; Concilla et al., 2021; Peetoom et al., 2016; Schmitt, 1980; Urbane et al., 2019). This DNP project’s purpose was to

present caregivers of children aged 6-36 months with evidence-based education in combination with a personalized fever handout to improve caregiver knowledge on pediatric fever and fever management. Ten caregivers at Sunshine Pediatrics participated in a 10-minute education session on fever and fever management. Participants completed pretest and posttest questionnaires to assess any improvement in knowledge of fever, intent to manage fever at home, and comfort level with fever. Participants were allowed to utilize the personalized fever handout while completing the posttest questionnaire, as they will be able to use the handout at home. At the end of the posttest questionnaire, three additional Likert scale questions evaluated the participant's satisfaction with the educational intervention. The outcomes of this project show that providing fever education in primary care during well-child checks is essential to increase caregiver knowledge and confidence in fever and fever management.

Interpretation

This project's key findings show a statistically significant ($p < 0.01$) improvement in caregiver knowledge of pediatric fever and fever management after the education session—the average score of the posttest knowledge-based questions improved by over 70%. After the intervention, 100% (n=10) of participants correctly identified that a fever is 100.4°F and above, and 100% (n=10) of participants correctly identified that a fever can be good for their child's health. Additionally, encouraging key findings included the statistically significant increase in caregiver intent and ability to manage fevers at home, a statistically significant decrease in caregiver worries about the consequences of fever, and a statistically significant decrease in caregiver fear that fever will cause seizures or brain damage. Caregiver knowledge and confidence in fever and fever management improved significantly after the short educational

session with the fever handout. These findings are supported by the systematic review conducted by Peetoom et al. (2016), which showed that educating caregivers before fever episodes can change fever management practices and healthcare-seeking behaviors. The similarity between this project and Peetoom et al. supports the timing of fever education being done during well-child checks. Although, it is unclear if a single educational session during one well-child check will be effective in the long term. The goal is for caregivers to receive repeat education with the personalized fever handout during every 6–36-month well-child check to reinforce caregiver knowledge and confidence in fever and fever management. The outcomes of this project indicate that implementing fever education during well-child checks is an effective approach to improving caregiver knowledge of fever and decreasing fever phobia.

Implications

Practice

Some 80% of participants in this project, along with many participants in the literature, stated that their child's healthcare provider was their main source of information, placing pediatric primary care providers in a pivotal position to provide education on fever and fever management. Caregivers consistently express that they want more information on fever from a trusted source that is simple and provides guidance on managing a fever at home (Thompson et al., 2020b). Providing fever education to caregivers at well-child checks can decrease unnecessary clinic visits and phone calls, reduce caregiver anxiety, and decrease improper management of fever at home. The data from the implementation of this project supports the importance of providing fever education with a personalized fever handout to caregivers at well-child checks to increase caregiver knowledge and confidence in managing fevers safely.

Education

Caregiver knowledge of fever and fever management is important to prevent unsafe medication management practices and unnecessary visits to clinics and emergency departments. The results of this DNP project show a deficiency in caregiver knowledge on fever and fever management and a need for ongoing education on this topic during well-child checks. Discussing fever education with caregivers and giving them a personalized fever handout can improve fever knowledge and management practices. The evidence-based fever handout created for this DNP project can be easily used by healthcare providers in primary care to address this need.

Research

A large body of research has been conducted that shows how caregiver education on fever can increase their knowledge and decrease their fear and improper management of fevers. Implementing this project with a larger sample across multiple sites would be useful to compare the findings. More research needs to be done on the long-term effectiveness of providing fever education during well-child checks. It is unclear if the same level of fever education should be given at each well-check or if the education should be tailored to specific age groups (i.e., more thorough, age-specific education at the 6-, 9-, 12-, 15-, and 18- month appointments that becomes more generalized as the child progresses into toddlerhood). Following participants over a long period of time would be helpful to understand the long-term efficacy of fever education during well-child checks and the impact it has on unsafe management practices and unnecessary visits to the clinic or emergency department. Additionally, there has been no research on using a standardized tool, such as the personalized fever handout, to guide fever education.

Policy

Fever is a symptom that every child will experience at some point. Fever phobia has been a known problem in the literature for over 40 years. Educating caregivers on fever has been proven to increase knowledge and decrease fear, yet a standardized approach has not been developed. A proposed policy change would be for the American Academy of Pediatrics (AAP) to have fever added as a category in the anticipatory guidance section of the Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents to ensure it is being addressed at well-child checks. Another proposed policy change would be for the AAP and the National Association of Pediatric Nurse Practitioners (NAPNAP) to publish an updated clinical practice guideline on fever management in young children greater than three months of age. The findings of this DNP project and published literature on the benefits of fever education can help promote a policy change to encourage fever education during every well-visit.

Limitations

There were several limitations with this DNP project. The project sample was a convenience sample from a single site, which does not reflect the general population and creates biased results. No validated fever handout exists, so the personalized fever handout was developed by the DNP student, which could have affected the reliability or validity of the results. The pretest and posttest questionnaire questions were developed based on the information on the fever handout, which threatens the validity of the posttest results. However, two content experts reviewed the intervention materials before project implementation, which helped mitigate bias and contribute to the validity of the project's data. Time constraints were also a significant limitation. The time available to implement the education session and measure change over time

negatively impacted the ability of this project to show long-term effectiveness. A future study is needed to see if the intervention decreased sick visits with a chief complaint of fever and improper management practices.

DNP Essentials Addressed

The DNP Essentials are eight foundational competencies that are core to all advanced nursing practice roles created by the American Academy of Colleges of Nursing (AACN) (AACN, 2006). Three DNP Essentials, numbers I, II, and II, were used to guide this project.

DNP Essential I: Scientific Underpinnings for Practice

The doctoral-prepared nurse must integrate nursing science with knowledge, use science-based theories, and develop and evaluate new practice approaches based on nursing theories (AACN, 2006). Combined with nursing science, basic science, and psychosocial sciences, knowledge was used to develop an educational intervention that would benefit patients, improve care, and evaluate outcomes.

DNP Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

The doctoral-prepared nurse develops and evaluates care delivery approaches that meet the current and future needs of patient populations (AACN, 2006). The DNP student used advanced communication to lead this quality improvement project. A need of the patient population was identified, and a new, cost-effective care delivery model (the educational intervention) was developed to address a practice problem and meet the needs of the patients.

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The doctoral-prepared nurse must use analytic methods to critically appraise literature and apply relevant findings to improve practice (AACN, 2006). The DNP student identified a problem, did a thorough literature search, synthesized and critically appraised the literature, and developed an evidence-based intervention to facilitate a change in practice delivery to promote safe, timely, effective, efficient, and patient-centered care.

Conclusions

This DNP project evaluated the implementation of an evidence-based intervention to increase knowledge on fever and fever management and decrease fever phobia in caregivers. An educational session using a personalized fever handout was implemented at Sunshine Pediatrics in Phoenix, Arizona. Ten caregivers participated in a 10-minute face-to-face educational session on fever and fever management. Pretest and posttest questionnaires were analyzed and showed a statistically significant increase in knowledge on fever and fever management and a statistically significant decrease in caregiver fear of fever. The findings of this project are consistent with past research, supporting the idea that caregiver education and a personalized fever handout can improve knowledge of fever and fever management and decrease fever phobia. Future research should focus on developing and using a standardized fever educational tool, the long-term effectiveness of fever education at well-child checks, and the impact of fever education on unnecessary sick visits.

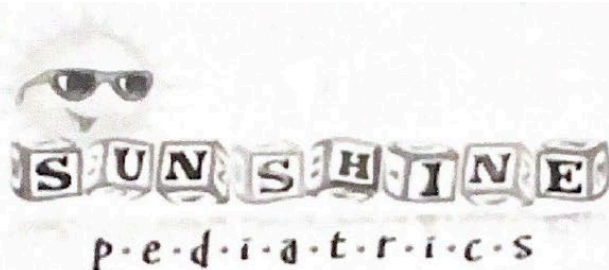
Plan for Sustainability

The content should be reviewed using the PDSA cycle to see if any changes need to be made to promote sustainability at the clinical site. The nurse practitioner (NP) and Executive Director of Sunshine Pediatrics were provided with printed and electronic versions of the fever handout to allow continued use. The NP verbalized her desire to use the fever handout to provide caregiver education on fever. The usability of the evidence-based fever handout allows for quick adoption of the intervention by any provider without the need for a training session.

Plan for Dissemination

The results of this DNP project were shared with the providers at Sunshine Pediatrics. Sunshine Pediatrics has two clinic locations, and the handout can be shared electronically for reference and continued use by both current and future providers. DNP student contact information was also left if further questions or inquiries on the intervention emerge. The DNP student also plans to adapt and make any necessary modifications to the educational intervention so that it may be implemented at additional sites. This will expand education on fever and fever management to more caregivers of children ages 6-36 months. The goal is to generate data that is more generalizable and can potentially be published or presented, thereby reaching a multitude of pediatric primary care practices as a standardized tool to combat unnecessary fever phobia and improve patient outcomes.

APPENDIX A:
SITE APPROVAL/THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD
AUTHORIZATION LETTER



5040 N 15th Ave #104
Phoenix, Arizona 85015
(623) 245-0505

June 16, 2022

Human Subjects Protection Program
The University of Arizona
845 N Park Ave., Suite 537A
Tucson, AZ 85719

Please note that Mrs. Olivia Rochelle Meier, University of Arizona Doctor of Nursing Practice student, has permission of the Sunshine Pediatrics Clinic to conduct a quality improvement project at our facility for her project, "Caregiver Education on Fever Management in Pediatric Primary Care in Arizona."

Mrs. Meier will conduct a survey of caregivers of children ages 6-36months at Sunshine Pediatrics Clinic. She will recruit caregivers through a recruitment flyer. The recruitment flyer will provide a description of the project, what they will be asked to do, and the time involved. Mrs. Meier's activities will be completed by December 16, 2022.

Mrs. Meier has agreed to provide to my office a copy of the University of Arizona Determination before she recruits participants. She will also present aggregate results to the providers.

If there are any questions, please contact my office.

Signed,

Pauline Ann GNP 6/16/22
Gregory Exec. Director 06/17/2022

V 2013-01



University of Arizona IRB
 845 N Park Ave., Suite 537A
 Tucson, AZ 85719
 Fax: 520-621-9810
VPR-IRB@arizona.edu

NOT HUMAN RESEARCH

June 24, 2022

Olivia Meier

Dear Olivia Meier:

On 6/24/2022, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title:	Evidence-Based Education to Improve Caregiver Knowledge of Fever Management in Young Children
Investigator:	Olivia Meier
IRB Submission ID:	STUDY00001499
Sponsor:	None
Prime Sponsor:	None
IND, IDE, or HDE:	None
Documents Reviewed:	<ul style="list-style-type: none"> • Advisor Attestation for DNP Project by student Olivia Meier.pdf, Category: Institutional Approval; • Content Expert Evaluation Form #1, Category: Other; • Content Expert Evaluation Form #2, Category: Other; • Disclosure Form.doc, Category: Consent Form; • Fever Handout Draft 3pdf.pdf, Category: Other; • Meier_IRB Protocol for Determination of Human Research v2021-11.docx, Category: IRB Protocol; • Posttest Questionnaire.docx, Category: Data Collection Tool; • Pre-Test .docx, Category: Data Collection Tool; • Recruitment Flyer.docx, Category: Recruitment Materials; • SiteAuthorizationSunshinePediatrics.pdf, Category: External Site Authorization;





University of Arizona IRB
845 N Park Ave., Suite 537A
Tucson, AZ 85719
Fax: 520-621-9810
VPR-IRB@arizona.edu

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving humans in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

All Covered Individuals must disclose all sponsored and non-sponsored Research Projects to the Office for Responsible Outside Interests (OROI) prior to Conducting Research if the individual is an Investigator. Please visit the [OROI](#) website for more information.

We value your feedback and would appreciate you taking the time to complete our survey about your experience with the IRB staff:
https://uarizona.co1.qualtrics.com/jfe/form/SV_dgQSVxqciPhiiUd.

If questions arise at any time during your study, please email the general IRB inbox at VPR-IRB@arizona.edu.



APPENDIX B:
CONSENT DOCUMENT (DISCLOSURE FORM)

**Evidence-Based Education to Improve Caregiver Knowledge of Fever Management in
Young Children**

Olivia Meier

You are being asked to participate in a quality improvement project. Your participation in this project is voluntary, and you do not have to participate. This document contains important information about this project and what to expect if you decide to participate. Feel free to ask questions before deciding whether or not to participate.

The purpose of this project is to present caregivers of children ages 6-36 months with evidence-based education and provide a personalized fever handout to improve caregiver knowledge on fever and fever management.

If you choose to participate in this project, you will be asked to:

1. Complete a short pretest questionnaire before the educational session.
2. Participate in a short educational session given by the DNP student (approximately 5-10 minutes) at the end of your clinic visit today.
3. Answer a posttest survey following the educational session to assess knowledge change.

It will take approximately 10-15 minutes for you to complete all questionnaires and education associated with this intervention. There are no foreseeable risks to you as a result of participating in this project. You will receive a complementary fever toolkit but will not be further compensated for participation. Identifying information will not be collected beyond the number of children you have and the child's age for which you are seeking care today. Your responses are anonymous, and your name will not be collected or linked to your answers.

The information that you provide in the project will be handled confidentially.

For questions, concerns, or complaints about the project, you may contact:

Olivia Meier
DNP-PNP Student
Phone: 702-498-4342
Email: oliviameier@email.arizona.edu

APPENDIX C:
RECRUITMENT MATERIAL (RECRUITMENT FLYER)

Know What to Do When Your Young Child (6-36 months) Gets a Fever

Fever is common in children, and all caregivers will need to manage a feverish child at some point! It feels scary when your child has a fever, but it doesn't have to be!

How will you know how to manage your child's fever?

Participate in a short fever education session
today at the end of your clinic visit!

Benefits to you and your child:

- Learn about what fever is and why it happens
- Reduce fear and anxiety when your child gets a fever
- Learn what to do when your child gets a fever
- Receive a complementary fever toolkit to take home

**** To participate, you must be a parent or caregiver of a child 6-36 months of age who is presenting for a well-child visit.**



For more information, please contact:
Olivia Meier
(702) 498-4342
Email: olivameier@email.arizona.edu

APPENDIX D:
EVALUATION INSTRUMENTS (PRETEST AND POSTTEST QUESTIONNAIRES)

Pretest Questionnaire

Demographics

- 1) How many children do you have?
 - a) 1
 - b) 2
 - c) 3
 - d) ≥ 4
- 2) Do you have a thermometer at home?
 - a) Yes
 - b) No
- 3) How do you check your child's temperature?
 - a) Oral thermometer
 - b) Rectal thermometer
 - c) Armpit thermometer
 - d) Forehead thermometer
 - e) Tactile (using your hands)
 - f) I do not check my child's temperature
- 4) What are your sources of information on managing children with fever? (Select all that apply)
 - a) Your pediatrician/healthcare workers
 - b) Family members/friends
 - c) Google
 - d) Social Media
 - e) I don't have any sources of information
 - f) Other (Please specify): _____

Answer the following questions based on your knowledge of fever and managing fever at home.

- 1) What temperature do you think is a fever?
 - a) When they feel hot
 - b) 98.7°F and above
 - c) 99°F and above
 - d) 100.4°F and above
 - e) 101°F and above
 - f) I do not understand the question
- 2) Every child with a fever needs fever-reducing medication (such as Tylenol or Motrin)
 - a) True
 - b) False
- 3) At what temperature do you give your child medicine (such as Tylenol or Motrin) for fever?
 - a) When they feel hot

- b) 99°F and above
 - c) 100°F and above
 - d) 101°F and above
 - e) 102°F and above
 - f) It depends on how they are feeling
- 4) What should you do if your child has a fever of 102°F but is acting like their usual self?
- a) Give medicine
 - b) Take them to the doctor
 - c) Give them fluids, allow them to rest, and monitor them
 - d) Send them to daycare
- 5) If your child has a fever, you can give them Aspirin.
- a) True
 - b) False
- 6) A fever can be good for my child's health.
- a) True
 - b) False
- 7) If my child gets a fever, I know what to do at home.
- a) Strongly disagree
 - b) Disagree
 - c) Agree
 - d) Strongly Agree
- 8) I am worried about the consequences of fever in general.
- a) Strongly disagree
 - b) Disagree
 - c) Agree
 - d) Strongly Agree
- 9) I am afraid fever will cause febrile seizures and/or brain damage
- a) Strongly disagree
 - b) Disagree
 - c) Agree
 - d) Strongly agree

Posttest Questionnaire

Answer the following questions based on your knowledge of fever and managing fever at home.

- 1) What temperature do you think is a fever?
 - a) When they feel hot
 - b) 98.7°F and above
 - c) 99°F and above
 - d) 100.4°F and above
 - e) 101°F and above
 - f) I do not understand the question
- 2) Every child with a fever needs fever-reducing medication (such as Tylenol or Motrin)
 - a) True
 - b) False
- 3) At what temperature do you give your child medicine (such as Tylenol or Motrin) for fever?
 - a) When they feel hot
 - b) 99°F and above
 - c) 100°F and above
 - d) 101°F and above
 - e) 102°F and above
 - f) It depends on how they are feeling
- 4) What should you do if your child has a fever of 102°F but is acting like their usual self?
 - a) Give medicine
 - b) Take them to the doctor
 - c) Give them fluids, allow them to rest, and monitor them
 - d) Send them to daycare
- 5) If your child has a fever, you can give them Aspirin.
 - a) True
 - b) False
- 6) A fever can be good for my child's health.
 - a) True
 - b) False
- 7) If my child gets a fever, I know what to do at home.
 - a) Strongly disagree
 - b) Disagree
 - c) Agree
 - d) Strongly Agree
- 8) I am worried about the consequences of fever in general.
 - a) Strongly disagree
 - b) Disagree
 - c) Agree

- d) Strongly Agree
- 9) I am afraid fever will cause febrile seizures and/or brain damage
 - a) Strongly disagree
 - b) Disagree
 - c) Agree
 - d) Strongly agree

Rate your agreement with the following statements:

- 1) This educational session was helpful to me.
 - a) Strongly agree
 - b) Agree
 - c) Disagree
 - d) Strongly disagree
- 2) I learned good information from this session that I can use to manage my child's fever.
 - a) Strongly agree
 - b) Agree
 - c) Disagree
 - d) Strongly disagree
- 3) I will not be afraid when my child gets a fever because I know what to do.
 - a) Strongly agree
 - b) Agree
 - c) Disagree
 - d) Strongly disagree

Additional Comments:

APPENDIX E:
PARTICIPANT MATERIAL (PERSONALIZED FEVER HANDOUT)

What is a Fever?

- A body temperature of 100.4°F (38°C) or higher
- Most fevers are good for sick children. They help the body fight infection
- Most fevers with viral illnesses range between 101.0°F and 104.0°F and may last for 2-3 days. They are not harmful.

Fever Level Ranges

- Low Grade Fever: 100.4 – 102.0°F
 - Helpful to your child, good range.
- Average Fever: 102.0 – 104.0°F
 - Helpful, treat if causes discomfort
- High Fever: Over 104.0°F
 - Causes discomfort, but harmless. Always treat
- Very High Fever: Over 106.0°F
 - Important to bring down - seek care

FEVER

Advice for caregivers on how to manage fever in children

- If your child has a fever, don't panic, and don't worry too much about the temperature, focus on the symptoms!
- Goal is to improve your child's comfort!



American Academy of Pediatrics. (2022).
Healthychildren.org.
<https://www.healthychildren.org>

Myths Vs Facts

MYTH. My child feels warm, so they have a fever.

FACT. Children can feel warm for many reasons, always take their temperature with a thermometer.

MYTH. All fevers are bad for children

FACT. Fevers help the body fight infection. Normal fevers between 100.4°F and 104°F can be good for sick children.

MYTH. Fevers above 104.0°F can cause brain damage

FACT. Only temperatures above 108.0°F can cause brain damage. It is very rare for a temperature to get this high.

MYTH. All fevers need to be treated with medicine.

FACT. Fevers only need to be treated if they cause your child to feel bad. Most fevers don't cause discomfort until above 102.0°F

MYTH. High fevers will cause seizures.

FACT. Seizures due to a fever are rare. If they do happen, it feels scary to watch but usually stop within 5 minutes. They don't cause any permanent harm.



Medication Management

- Fevers only need to be treated with medicine if it is causing discomfort
- If medicine needs to be used, you can use either ibuprofen (Children's Motrin), OR acetaminophen (Children's Tylenol), not both!
- Medication can take 1-2 hours to see the effect
- Do not use Aspirin

Child's Name: _____

Date: _____ Weight: _____

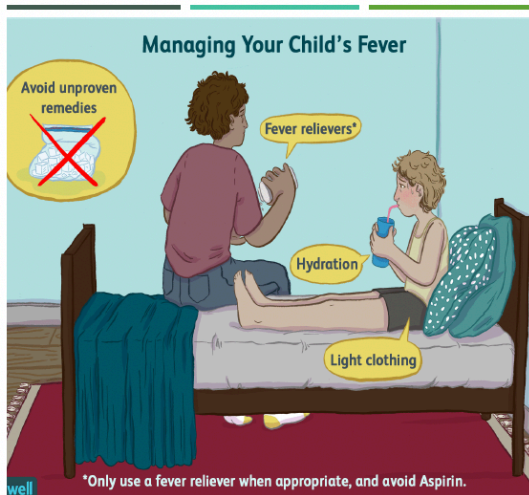
- Ibuprofen (Children's Motrin)
100mg/5mL give _____ mL every 6 hours as needed for fever discomfort

OR

Acetaminophen (Children's Tylenol)
160mg/5mL give _____ mL every 4 to 6 hours as needed for fever discomfort

Treatment for All Fevers

- Encourage extra fluids! Fluids can lower the fever. Extra fluids will also help avoid dehydration.
- Allow your child to rest as much as they want. Rest helps the body heal!
- Dress your child in light clothing.
- Your child can return to school or daycare once the fever has been gone for 24 hours without medicine.
- If you feel your child needs to be seen or they are becoming worse, always call your doctor.



“What do I do!?”

1. Manage at Home

- Low grade - average fever with no other symptoms
- Your child is acting like themselves or only mildly sick
- Also see “Medication Management” and “Treatment for All Fevers”

2. Contact Doctor within 24 hours

- Fever that lasts more than 24 hours *without* other symptoms like a cough, diarrhea or vomiting
- Fever returns after being gone more than 24 hours
- Recent travel outside the country
- You think your child needs to be seen, but the problem is not urgent

3. Seek Care Now

- Change in breathing pattern
- Refuses to drink fluids
- Temperature of 101.0°F or higher for more than 5 days
- Fever over 104.0°F
- Very fussy
- If your child isn't urinating or having a wet diaper at least once every 6-8 hours
- Pain or burning when peeing
- Your child looks or acts very sick

4. Go to ER Now

- You child won't stop crying/can't be comforted
- Stiff neck – can't touch chin to chest
- Severe headache
- Hard to wake up
- Not alert when awake – seems, “out of it”, acts or talks confused

APPENDIX F:
PROJECT TIMELINE

Date	Project Phase	Tasks
October 2021 – May 2022	Planning	<ul style="list-style-type: none"> • Identify clinic needs related to fever education • Review the literature on fever education • Obtain clinic permission to implement evidence-based fever education • Prepare project proposal
May 2022 – July 2022	Pre-Implementation	<ul style="list-style-type: none"> • Evidence-based handout development • Preparation of recruitment materials • Questionnaires and fever handout reviewed by content experts • Project proposal defense • Obtain IRB approval
August 2022	Implementation	<ul style="list-style-type: none"> • Recruit caregivers of children ages 6-36 months that present for well-child check • Provide pretest questionnaire to participating caregivers • Conduct a 10-minute evidence-based education session to caregivers on fever and fever management with personalized handout • Provide posttest questionnaire with intervention feedback from participants • Collect Data
September 2022-October 2022	Evaluation	<ul style="list-style-type: none"> • Analyze Data • Present final results • Plan for sustainability and dissemination

APPENDIX G:
LITERATURE REVIEW GRID

Project Question: In caregivers of children aged 6-36 months at Sunshine Pediatrics, will an evidence-based educational discussion combined with a personalized fever handout at well-child checks increase the caregiver’s knowledge and intent to manage a fever at home?

Pub. Year; Author’s Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
1980, Schmitt	Fever phobia – misconceptions of parents about fevers	Cross-sectional study	<ul style="list-style-type: none"> - This is the original study that coined the term “fever phobia” - The study shows that back in 1980, parents were greatly concerned about fever in their children <p>Established guidelines to begin giving parents anticipatory guidance and education regarding fever in their children</p>	<ul style="list-style-type: none"> - This study shows that fever phobia has been a problem for over 40 years - Schmitt developed 10 guidelines to try to combat fever phobia and many are still relative and applicable today. <p>Shows that the research regarding fever risks has not changed much therefore the steps to guiding parents to manage fever at home remain stable and should be included in anticipatory guidance at appointments</p>
2017, Peetoom et al.	Does well-childcare education improve consultations and medication management for childhood fever and common infections? A systematic review	Systematic review	<ul style="list-style-type: none"> - Educational interventions during well-child checks that are aimed at educating parents prior to new childhood illness episodes were shown to be effective in improving parental care practices <p>WCC education for parents’ interventions prior to new episodes of childhood fever demonstrated predominantly positive effects on healthcare seeking (physician consultations, telephone consultations, home visits) and medication management</p>	<ul style="list-style-type: none"> - Timing the education to be done <i>before</i> a child is sick may be more beneficial than at an appointment when the child is already sick. <p>Most parents receive information when their child is ill but it might be more desirable to educate parents in the setting of well-child clinics prior to their child becoming ill, in order to prepare parents for future illness management</p>

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2016, Peetoom et al.	Childhood fever in well-child clinics: a focus group study among doctors and nurses	Descriptive qualitative study	<ul style="list-style-type: none"> - Fever-related questions are common among parents and is driven by parental worries showing that future intervention should aim to lower worries among parents - Fever information should focus on improving fever management and practical skills since parents seem to lack knowledge of fever pathophysiology and self-management strategies <p>Information should be easy to find, easy to understand, and verbal information should be supported by hard copy visual information</p>	<ul style="list-style-type: none"> - Fever education should aim to increase caregiver knowledge on fever and how to manage it at home <p>The information given should be simple, easy to understand, and given verbally AND written.</p>
2015, Monsma, Richerson & Sloand	Empowering parents for evidence-based fever management: an integrative review	Integrative review	<ul style="list-style-type: none"> - Developing an evidence-based toolkit can give parents tangible tools to help them provide safer and less costly care for their febrile child <p>Factors that must be considered when designing effective fever management educational interventions for parents are parental culture, health literacy, knowledge deficits, and beliefs</p>	<ul style="list-style-type: none"> - Parental culture, health literacy, knowledge deficits and beliefs all must be addressed to maximize evidence-based behaviors <p>The most effective educational interventions are 1:1 educational conversation between caregivers and providers that are reinforced by written and pictorial information. This should be structured, relevant, and</p>

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
				reinforced over time (at each well child visit)
2021, Akbayram	Fever management in preschool children; what do the parents know? what are they doing?	Cross-sectional study	It was found that most parents had insufficient information regarding fever, were extremely anxious, measured fever frequently, used wrong practices such as waking children up at night, using antipyretics at low temperatures, and alternating antipyretics	<ul style="list-style-type: none"> - This study shows the need for parents to be informed by healthcare providers on proper management of fever at home - Providers need to help prevent incorrect antipyretic practices (such as alternating ibuprofen/acetaminophen, waking children up at night to give medicine, and giving medicine for temperatures less than 100.4°F (38°C)) Providers need to give parents health education on fever in children and how to safely manage at home
2017, Elkon-Tamir et al.	Fever phobia as a reason for pediatric emergency department visits: does the primary care physician make a difference?	Cross-sectional study	<ul style="list-style-type: none"> - Caregivers of children had limited knowledge of correct fever definition, management, and complications. - Despite being educated, the majority of caregivers were still misinformed regarding many aspects of fever and its management It is not the fever itself, but the <i>fear of possible complications and accompanying symptoms</i> that	<ul style="list-style-type: none"> - This study shows that there are missed opportunities to teach caregivers the correct facts about fever in children and its management Implementation of educational programs regarding the management of the febrile child is needed in clinics

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			alarms caregivers – this is an important idea to understand	
2018, Ong et al.	Assessing effective methods to educate caregivers on fever in children aimed at reducing input to the paediatric emergency department	Randomized controlled trial	<ul style="list-style-type: none"> - Both an educational fever pamphlet and a video on managing fever can help to increase the knowledge of caregivers - Both interventions helped caregivers perceive themselves as more aware about managing a fever in children <p>Caregivers would rely on the interventions for future management of fever in children</p>	<ul style="list-style-type: none"> - Educational interventions such as a fever pamphlet handout and/or video can be effective to help parents manage fever in children - Caregivers will rely on/use the resources given to them by their provider to try to manage fever at home
2019, Kelly et al.	Randomized controlled trial of an intervention to improve parental knowledge and management practices of fever	Randomized controlled trial	<ul style="list-style-type: none"> - Knowledge of the correct definition of fever is key to parents' management practices for fever <p>An information leaflet increased the number of parents' correctly answering questions about managing fever and also showed that information retention is high after 2 weeks.</p>	<ul style="list-style-type: none"> - Providing a fever handout can be effective in increasing caregiver knowledge on fever and how to treat it <p>The intervention needs to provide simple, clear information in order to decrease concern and anxiety and increase caregiver confidence in treating fever in their children</p>
2019, Arias, Chen & Moles	Educational interventions on fever management in children: a scoping review	Scoping review	<ul style="list-style-type: none"> - The studies reviewed showed positive effects of educational interventions on fever - Face-to-face education, demonstration, and observation seem to be 	<ul style="list-style-type: none"> - This shows the importance of completing face-to-face education instruction as well as fever measurement technique and medication dosing demonstration.

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			<p>the teaching strategies to have the greatest influence on effect size in an intervention</p> <p>Using multiple teaching methods is a good strategy to allow the highest effect size</p>	<p>Use of a personalized handout to give to the caregiver after the education session can help aid them in managing fever at home</p>
2020, Thompson et al.	Fading confidence: a qualitative exploration of parents' experiences caring for a febrile child	Qualitative descriptive study	<p>Themes found</p> <ul style="list-style-type: none"> ○ Parental confidence through caregiving tasks ○ Emergent feelings of inadequacy ○ referrals and limitations of community practice ○ information needs ○ information sources <p>Parents can respond calmly and effectively to initial fever but the changing presentation kills their confidence and parents routinely seek information about childhood fever</p>	<ul style="list-style-type: none"> - Accessible, relevant and reliable resources that target key decision points during care of a febrile child are sought by parents and have the potential to improve care for families - Parents want to know parameters that can guide their decision making <ul style="list-style-type: none"> ○ Ex: they want to know how long is too long for a fever to last and what the upper limit of a fever should be <p>Educational handout needs to include simple, clear concise fever information about duration, max fever threshold, associated signs and symptoms and what indicates a need for medical assessment</p>
2016, Chiappini et al.	2016 Update of the Italian pediatric society guidelines for management of fever in children	Clinical practice guidelines	<ul style="list-style-type: none"> - Method of temperature measurement at home should be axillary or infrared thermometer 	<p>These guidelines will help guide the information used during patient education and on the handout given to caregivers.</p>

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			<p>(tympanic with or without contact)</p> <ul style="list-style-type: none"> - Tylenol and Ibuprofen are the only antipyretic drugs recommended for use in children. <p>Combined or alternated use of the two is NOT recommended.</p> <p>These medications are not contraindicated in children who are febrile with asthma</p>	
2011, American Academy of Pediatrics	Clinical report – fever and antipyretic use in children	Clinical report	<ul style="list-style-type: none"> - Appropriate counseling on the management of fever begins by helping parents understand that fever, in and of itself, is not known to endanger a generally healthy child - There is no evidence that children with fever are at increased risk of adverse outcomes such as brain damage <ul style="list-style-type: none"> o Fever is actually beneficial <p>Therefore, goal of antipyretic therapy is not to lower fever but instead to only improve overall comfort of the child if needed</p>	This DNP project education should focus on monitoring for signs/symptoms of serious illness, improving the child's comfort by maintaining hydration, and educating parents on the appropriate use, dosing, and safe storage of antipyretics
2019, Clericetti et al.	Systematic review finds that fever phobia is a worldwide issue among caregivers and healthcare providers	Systematic review	<ul style="list-style-type: none"> - Fever phobia is a common phenomenon worldwide that affects caregivers and healthcare providers 	<ul style="list-style-type: none"> - Developing practice guidelines for the symptomatic management of fever in children is a step in the process of

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			All reports suggested that fear of fever and over treating fever was common among caregivers, physicians and nurses.	developing evidence-based care There is a need for parents to be educated with evidence-based fever management and treatment in the primary care clinic
2018, van de Maat et al.	Development and evaluation of a hospital discharge information package to empower parents in caring for a child with a fever	Qualitative study	<ul style="list-style-type: none"> - Parents find fever mostly alarming, especially high fever - If parents did not feel recognized in their concern, anxiety increased as well as the threshold to seek healthcare - Information was needed especially for times when the provider wasn't available <p>Parents reported improved knowledge about fever and improved confidence in caring for a child at home after consulting the information package</p>	<ul style="list-style-type: none"> - Rather than telling parents that they should manage their child's illness at home, healthcare professionals should recognize parental intuition and <u>provide clear and reliable information about alarming signs, considered or excluded diagnoses, the management of fever and about available medical services.</u> - The need for verbal explanation supported by written and visual cues has been reported to be the most successful <p>This shows the importance of having a face-to-face education on fever & management and also providing caregivers with a fever handout to refer back to at home when needed</p>
2021, Concilla et al.	A survey of caregivers' knowledge on detection and	Cross-sectional observational study	<ul style="list-style-type: none"> - Majority of caregivers have a thermometer at home but method of 	<ul style="list-style-type: none"> - There are caregiver knowledge gaps in identification of fever as

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
	management of pediatric fever		<p>taking a temperature ranged</p> <ul style="list-style-type: none"> - Only 44% of caregivers correctly defined a fever to be at or above 38°C <p>Dehydration was the most common concern, with seizures, worsening infection, brain damage, and death as additional reported fears</p>	<p>well as concerns that fever would lead to dehydration and severe infection</p> <ul style="list-style-type: none"> o These concerns lead to seeking care very early in a child's illness in the ED and pediatrician office <p>This shows the opportunity for further caregiver education to decrease or alter the timing or location of care sought in a pediatric febrile illness</p>

APPENDIX H:
OTHER DOCUMENTS AS APPLICABLE TO THE PROJECT (CONTENT EXPERT
EVALUATION FORMS)

Expert Evaluation Form
Reviewer:

1. The information in the fever handout is factual information.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly Agree

2. The information in the fever handout will be useful for caregivers.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly Agree

3. The information for the management of fever is true based on literature and current evidence.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly agree

4. How long have you been in practice?

28 years

5. How often do you see children with fever in your practice?

Daily

6. Please provide additional comments in relation to concerns/comments regarding any changes that should be made to the fever education handout.

well done

Pauline Jones 6/16/22

Expert Evaluation Form

Reviewer:

Dr. Nicolas Peters

1. The information in the fever handout is factual information.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly Agree

2. The information in the fever handout will be useful for caregivers.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly Agree

3. The information for the management of fever is true based on literature and current evidence.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly agree

4. How long have you been in practice?

9 years

5. How often do you see children with fever in your practice?

weekly

6. Do you have any further suggestions, comments or concerns regarding the fever education handout? Do you feel any changes need to be made?

It might be helpful to write all temperatures in tenths of degree like "104.0" since that is how digital thermometers report them like that. I would add that a daily temperature of 101.0 or higher for more than 5 days should be seen by a doctor.

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