Marian University

Leighton School of Nursing

Submitted in partial fulfillment for the degree of

Doctor of Nursing Practice

Provider Adherence to Practice Guidelines in Overcoming Hypothermia in the Postoperative Period

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(Signature)

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Abstract

Background: The implementation of a standardized warming protocol aims to prevent hypothermia in the postoperative period. Hypothermia in the postoperative period can result in inadvertent adverse outcomes for patients undergoing surgical procedures. In 2011, The Joint Commission (TJC) and Center for Medicare and Medicaid (CMS) issued the Surgical Care Improvement Project (SCIP) Inf-10 guidelines, known as the body temperature management guidelines, to decrease morbidity and mortality in surgical patients undergoing general anesthesia. These guidelines recommend using an active warming system, such as the 3M ™ Bair Hugger ™ System to warm patients intraoperatively.

Review of Literature: Randomized control trials (RCTs) and meta-analysis were included as part of the literature review with the use of Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Collaboration and Medline databases.

Purpose: In this study, the research aims to evaluate the effectiveness of preventing hypothermia in a hospital that adopted the evidence-based body temperature management guidelines.

Methods: The author retrospectively analyzed a total of 243 medical records, which included 158 paper medical records and 85 electronic medical records using the hospital's information management system. As part of the study, two groups, each consisting of 50 patient medical records meeting inclusion criteria, were analyzed. A total of 108 paper medical records and 85 electronic medical records were excluded from the study for not meeting criteria.

Results: Patients were randomized and divided into two groups. Group A (n=50) consisting of patients who did not receive active warming in 2010, and Group B (n=50) consisting of patients who received the active warming intervention in 2020. Group B revealed a mean body temperature that was 0.1° Celsius higher than Group A. At the end of surgery, Group A

demonstrated nearly a 15% higher incidence of hypothermia when compared to Group B. Descriptive statistics were analyzed using an independent sample t-test, assuming unequal variance for the two groups. There was a statistically significant difference between the two groups *(P < 0.028)*. The study's results support the use of forced air warming (FAW) in the intraoperative period as an effective way of preventing postoperative hypothermia in the Post Anesthesia Care Unit (PACU).

Implications/Conclusion: This study assessed the effectiveness of SCIP Inf-10 guidelines in preventing hypothermia in patients undergoing surgical procedures. Prior to 2011, there were no recommendations issued by TJC or CMS to actively warm patients. Active warming, as characterized by the 3M ™ Bair Hugger ™ System warming system has been shown to be decrease morbidity and mortality, surgical site infections and other complications. Group B, which consisted of patients having undergone surgical procedures in 2020, were actively warmed and experienced a 0% incidence of hypothermia. Group A, which consisted of patients having undergone surgery before the release of SCIP Inf-10 guidelines, experienced nearly a 15% incidence of hypothermia. It is reasonable to conclude that the utilization of body temperature management guidelines is effective in preventing hypothermia in patients undergoing surgical procedures.

Keywords: "active warming, hypothermia," "hypothermia and forced air-warming," "hypothermia protocol," "intraoperative warming and general anesthesia"

Provider Adherence to Practice Guidelines in Overcoming Hypothermia in the Postoperative Period

Introduction

This project is submitted to the faculty of Marian University Leighton School of Nursing as partial fulfillment of degree requirements for the Doctorate of Nursing Practice (DNP), Nurse Anesthesia track. In accordance with the American Society of Anesthesiologists (ASA), all patients undergoing anesthesia must have five standard physiological parameters monitored including electrocardiogram, circulation, oxygenation, ventilation and body temperature (ASA, 2019). Decades of literature have shown detrimental consequences of unmanaged body temperature regulation well beyond the postoperative period. According to Butterworth, Mackey & Wasnick (2018) "cardiac arrhythmias and ischemia, delayed drug metabolism, impaired would healing, increased risk for infection, increased postoperative protein catabolism and stress response, platelet dysfunction as well as increased peripheral vascular resistance," are factors associated with increase morbidity and mortality in hypothermic patients (p. 1214).

Background

Kurtz et al. (1996) published the first prospective study validating the use of active warming during colorectal surgeries in reducing the incidence of surgical site infections. Redistribution of heat from the body core to the peripheral compartments is attributed as the most common cause of hypothermia (Butterworth, Mackey & Wasnick, 2018). Compared to normothermic patients, those with hypothermia experience frequent complications. Therefore, body temperature regulation is crucial for patients undergoing general anesthesia and necessary for improved patient outcomes. Due to inconsistent compliance with infection prevention measures, TJC and CMS initiated The National Quality Forum Voluntary Consensus for

Hospital Care, also known as Surgical Care Improvement Project (SCIP) guidelines. The SCIP guidelines encompass a set of core measures with recommendations on the administration of antibiotics, monitoring blood glucose levels, perioperative hair removal, urinary catheter management, and perioperative temperature management for patients undergoing surgical procedures (See APPENDIX A). SCIP Inf-10 refers to the temperature body management guidelines for patients undergoing general anesthesia. The recommendations suggest that patients undergoing general anesthesia lasting longer or equal to one hour receive active warming to achieve a temperature of greater than or equal to 36° Celsius within 30 minutes before anesthesia stop time or within 15 minutes of anesthesia end time (SCIP Inf-10, 2020). The body temperature management guidelines were issued to standardize and increase compliance in 2011 (TJC, 2019). The guidelines set forth to create a unified documentation and track the quality of standards to provide quality metrics for standardized guidelines.

Problem Statement

How will patients having undergone general anesthesia lasting longer than 60 minutes ***(P),*** *after the introduction and adherence to SCIP Inf-10 guidelines issued in 2011* ***(I),*** *compare to patients having undergone general anesthesia prior to the institution of these guidelines* ***(C),*** *demonstrate a change in the incidence of hypothermia, identified as less than or equal to 36 ° Celsius* ***(O)*** *in the postoperative period* ***(T)****?*

Population

Fifty medical records were retrospectively analyzed and compared from 2010 to 50 medical records from 2020 to assess the incidence of hypothermia between the two groups. The 2010 group did not receive the active warming intervention and the 2020 group did receive the intervention. Patients over the age of 18 years old having undergone general anesthesia lasting

longer than 60 minutes were included as part of the study. Neuraxial anesthesia, a type of regional anesthesia involving the injection of medication in tissues and nerve roots, were excluded from the study. Cardiac cases are unique, in which purposeful hypothermia is an important factor during surgery (Otto, 2015). Body temperature is therapeutically reduced in cardiac cases and therefore not applicable to the study (Otto, 2015). Cardiac cases are not performed at the research site. All medical records that did not utilize general anesthesia, met the duration of surgical time or did not meet the age requirement of 18 years or older were excluded from inclusion of the study.

Setting

The research site was a non-for-profit, county-owned hospital located in Northern Indiana. Logansport Memorial Hospital that offers services in women's health, family medicine, general surgery, orthopedics and wound care. The facility performs approximately 4,000 surgical cases a year (LMH, 2019). As previously mentioned, this site does not perform cardiac cases.

Intervention

Medical records were analyzed for comparison before and after the introduction of the SCIP Inf-10 guidelines at the site of study. The hospital was unable to determine the exact date in which the guidelines were implemented. It is acceptable to assume that the guidelines were not implemented until after its introduction in 2011. According to B. Alexander (personal communication, June 4, 2019), Certified Registered Nurse Anesthetist at LMH confirms the use of SCIP Inf-10 guidelines since 2013. Medical records for patients having surgery before the warming recommendations were analyzed from 2010 and compared to patients who received the warming recommendations in 2020.

Comparison

This project aims to determine if the implementation of body management guidelines enhances patient warming and prevents hypothermia. A body temperature less than or equal to 36° Celsius is considered hypothermia. Surgical cases from 2010 and 2020 were randomized to assess body temperatures within 15 minutes of arrival to the PACU.

Outcome

The desired outcome is to determine if there is a decrease in the incidence of hypothermia for patients having undergone surgery after the implementation of SCIP Inf-10 guidelines. The long-term goal is for anesthesia providers to comply with the use of proper FAW in all patients undergoing general anesthesia, improving patient outcomes.

Time

After the intervention of FAW during the intraoperative period, the patient's goal temperature will be greater than 36° Celsius within 15 minutes of arriving to the PACU after the end of general anesthesia.

Organizational "Gap" Analysis of Project Site

Anesthesia providers at the proposed site use FAW intraoperatively to prevent hypothermia in the postoperative period as recommended by the SCIP guidelines. However, the facility has not tracked the incidence of hypothermia since introducing the body management temperature guidelines. Although body temperature is monitored in the PACU and the use of active warming is implemented during surgery, the organization is unaware as to whether adherence has made a positive impact in warming patients. Maintaining body temperature higher than 36° Celsius is a desired quality indicator and necessary for improved patient outcomes.

Review of the Literature

A search of available literature was completed with the use of Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Collaboration and Medline databases. The search terms including "active warming, hypothermia," "hypothermia and forced air-warming," "hypothermia protocol," "intraoperative warming and general anesthesia" were used. There was a time limit of five years imposed upon articles for review. Articles that did not meet the time requirement along with pediatric related articles were excluded as part of the literature review. RCTs and meta-analysis written in English were selected as pre-search inclusion requirements. Only studies including general anesthesia were selected and rated on evidence classification. All articles including the use of neuraxial anesthesia were excluded from the search. Of articles reviewed, five articles met pre-search inclusion and exclusion criteria to provide evidence for this project (See APPENDIX B).

Literature Synthesis

Scott and colleagues (2015) determined whether adherence to the SCIP Inf-10 measures of body temperature management is associated with improved outcomes and a reduced incidence of morbidity and mortality. Two groups were designated as the "SCIP-compliant" and "SCIP-noncompliant." The SCIP noncompliant group demonstrated a greater incidence of complications including, "congestive heart failure, valvular cardiac disease, peripheral vascular disease, hypertension, pulmonary disease, and renal insufficiency/failure" (Scott et al., 2015, p. 118). The primary findings of the study demonstrate a reduced risk of mortality and decreased length of stay with compliance to the SCIP Inf-10 guidelines, which utilizes the use of FAW. This study demonstrates the importance of proper management of body temperature for patients undergoing general anesthesia.

Alderson and colleagues (2014) sought to compare the use forced air warming through a blanket to the use of reflective blankets or clothing to warm patients undergoing anesthesia intraoperatively. Alderson and colleagues concluded the use of FAW to demonstrate and maintain better control of temperature regulation by 0.5 to 1.0 ° Celsius when compared to other methods of warming.

Alparslan et al. (2018) compared FAW systems in prevention of intraoperative hypothermia by comparing tympanic membrane temperatures of patients assigned to FAW with upper body blankets and FAW with underbody blankets. No difference was found between the two groups. Therefore, it was concluded that both methods of FAW possess similar efficacy. The implications for practice suggest that both lower and upper body warming methods are effective in preventing hypothermia in patients undergoing abdominal procedures. As the previous study demonstrated, FAW continues to prove to be an effective method of preventing hypothermia.

John et al. (2016) conducted a single-blind randomized study to compare perioperative hypothermia in patients receiving resistive heating or FAW. Core temperatures were monitored from induction of anesthesia through admittance into the PACU. John and colleagues concluded that the use FAW is more effective than resistive heating in preventing postoperative hypothermia. At the end of surgery, the resistive heating group demonstrated nearly a 20% higher incidence of hypothermia when compared to the FAW group (John et al., 2016). These recommendations support the use of FAW to improve patient outcomes in the postoperative period and address the clinical problem of hypothermia seen in the PACU.

Nieh & Su (2016) completed a meta-analysis of twenty nice articles to examine proper warming systems for the prevention of hypothermia through the use of meta-analysis procedures, proposed by Higgins. After careful systematic review with meta-analysis, the researchers

summarized that FAW was superior to passive insulation and circulating-water mattresses in preventing the incidence of hypothermia.

There is strong evidence that supports the use of FAW as an effective way to prevent hypothermia in those undergoing general anesthesia when compared to other methods of warming. Therefore, it is recommended that FAW be utilized in the intraoperative period to decrease the clinical problem of hypothermia seen in the postoperative period. The proposed site has already implemented the use of FAW. The researcher of the study seeks to assess the effectiveness of this intervention by completion of a retrospective chart review.

Evidence Based Practice: Verification of Chosen Option

The hospital in which the study was conducted adopted an evidence-based practice guideline for body temperature management as part of a quality improvement initiative. Literature supports the use of FAW as the most effective method in preventing postoperative hypothermia.

Theoretical Framework

The John Hopkins Nursing Evidenced-Based Practice (JHNEBP) model is a performance improvement theoretical framework that will guide the research project (See APPENDIX C). The JHNEBP model can be used by a single individual or group of researchers to guide a project work. The goal of the model is to discover the latest research findings and quickly incorporate it into patient care using three phases including, identification of the practice question, collection of the evidence and translation of the evidence for use in practice known as the PET process (Schaffer, Sandau & Diedrick, 2013). This project work will assess the intervention of FAW in patients undergoing general anesthesia.

Goals, Objectives and Expected Outcomes

The goal of this DNP project is to evaluate whether adherence to the SCIP Inf-10 guidelines reduces the incidence of hypothermia in the postoperative period. The use of FAW is supported by evidence-based research in preventing postoperative hypothermia. The short term objective of the project is to evaluate the incidence of postoperative hypothermia before and after the introduction of SCIP Inf-10 guidelines for body temperature management and provide the facility with the findings so that the organization may assess its performance. It is expected that the incidence of hypothermia will be decreased after the introduction of the guidelines. If there is variation in data and no improvement in the incidence of hypothermia, further education will be necessary to improve this quality indicator.

Project Design

The DNP project assesses the effectiveness of a performance improvement guideline that has already been implemented at the site. The design of the project is in the form of a retrospective chart review from a single institution to compare the incidence of hypothermia before and after the adoption of the SCIP Inf-10 guidelines. The data for this project will include the collection of qualitative data, specifically the temperature in Celsius for patients having undergone general anesthesia for longer than 60 minutes recovering in the PACU.

Project Site and Population

Logansport is a rural city located in Northern Indiana with a population of nearly 18,000 residents (U.S.Census, 2020). This study took place at Logansport Memorial Hospital (LMH), a non-for-profit, county-owned regional center that serves the population of Cass County and surrounding north-central Indiana communities (LMH, 2019). LMH provides a full range of surgical, obstetrical, interventional diagnosis, and pain management services. The facility houses

83 in-patient beds and performs approximately 4,000 surgeries a year (LMH, 2019). In 2018, the hospital delivered nearly 500 babies and received 18,000 emergency room visits (LMH, 2019).

Setting Facilitators and Barriers

The cost effectiveness of evaluating the performance improvement guideline was a facilitator in carrying out the DNP project. No funds were allocated for the completion of the project. However, the disadvantage of both electronic and paper medical records included the chance of human error in documentation. The possibility of misinterpreting and coding information extracted from paper charts were barriers to the study. Incomplete documentation, including missing charts, information that is unrecorded were barriers that may have skewed findings. For the study, it was assumed that no warming device was used if not documented, this was a limitation of the study as providers may have utilized the warming device but omitted documentation. Record keeping is an essential and legal requirement for healthcare professionals. It is possible that patients may have received the active warming intervention but was not reflected accurately in the documentation.

Methods

After obtaining approval from the Institutional Review Board (IRB) at Marian University (MU), access to anesthesia medical records for patients having undergone surgical procedures during the months of January, February and March of 2010 and 2020 was granted (See APPENDIX D). This institution did not require further approval or authorization to review patient's medical charts at the facility. The anesthesia records were analyzed to compare the two groups, the researcher collected the temperature of patients upon arriving to the PACU. The temperatures documented were stored in Excel without any identifiable patient information.

The study is easily replicated by comparing and analyzing temperatures documented in the PACU before and after the adoption of SCIP Inf-10 guidelines at any institution. The minimum, maximum and mean temperatures were calculated for both groups. Further analysis using independent sample t-test, assuming unequal variance for the two groups was completed.

Measurement Instrument

The effectiveness of the guideline was evaluated using the JHNEBP model. This model provides a three-step process, referred to as the PET (practice question, evidence and translation) process. The researcher evaluated the outcome of this performance improvement guideline by comparing the temperatures of two groups, one group before the introduction of the SCIP-Inf-10 guidelines and second group after the introduction of the guidelines. Temperatures in Celsius were recorded during the postoperative period for comparison using descriptive statistics. The outcome measured the incidence of hypothermia, defined as less than 36° Celsius in the postoperative period.

Data Collection

The data collector retrospectively analyzed a total of 243 medical records, which included 158 paper medical records and 85 electronic medical records using the hospital's information management system. Charts were chosen randomly and reviewed once by one single data collector. Every patient chart that qualified for inclusion was assigned a numerical identifier for the purpose of data collection. No identifiable patient data was collected. The temperatures recorded in PACU were stored in a Microsoft Excel spreadsheet.

Data Analysis

Statistical analysis was performed utilizing IBM SPSS Software Version 2020. Descriptive statistics were analyzed using an independent sample t-test, assuming unequal

variance for the two groups (See APPENDIX E). Statistical significance for the test was set at 0.05. There was a statistically significant difference between the two groups *(P < 0.028)*.

The minimum, maximum and mean temperatures in Celsius was calculated for each group (See APPENDIX F). Group A (2010 group) mean body temperature was (36.4°; n = 50), compared to Group B (2020 group) mean body temperature of (36.5°; n = 50) (See APPENDIX F). At the end of surgery, Group A demonstrated nearly a 15% higher incidence of hypothermia when compared to Group B (0% incidence). The final analysis observed that the use of the body temperature management guidelines has not only reduced the incidence of hypothermia in the site of study.

Conclusion

The Joint Commission (2019) offers guidelines regarding body temperature management to improve patient outcomes. The project intervention analyzed the effectiveness of a quality improvement initiative specifically designed to reduce the incidence of hypothermia in the postoperative period for patients undergoing surgical procedures. The JHNEBP model was a performance improvement theoretical framework that served to guide the research project.

This study showed the incidence of hypothermia was reduced by utilizing forced air warming devices. Data was statistically significant, showing no incidence of postoperative with hypothermia with compliance to body temperature management guidelines. As part of quality assurance measures, it is essential for anesthesia providers to comply with the use of active warming systems. Small sample size limits ability to generalize findings outside the setting in which the study was conducted. Future studies in large healthcare systems and multi-center regions would be required to generalize these finding to other practice environments. The results

indicate that the use of intraoperative FAW is effective in preventing hypothermia in the postoperative period.

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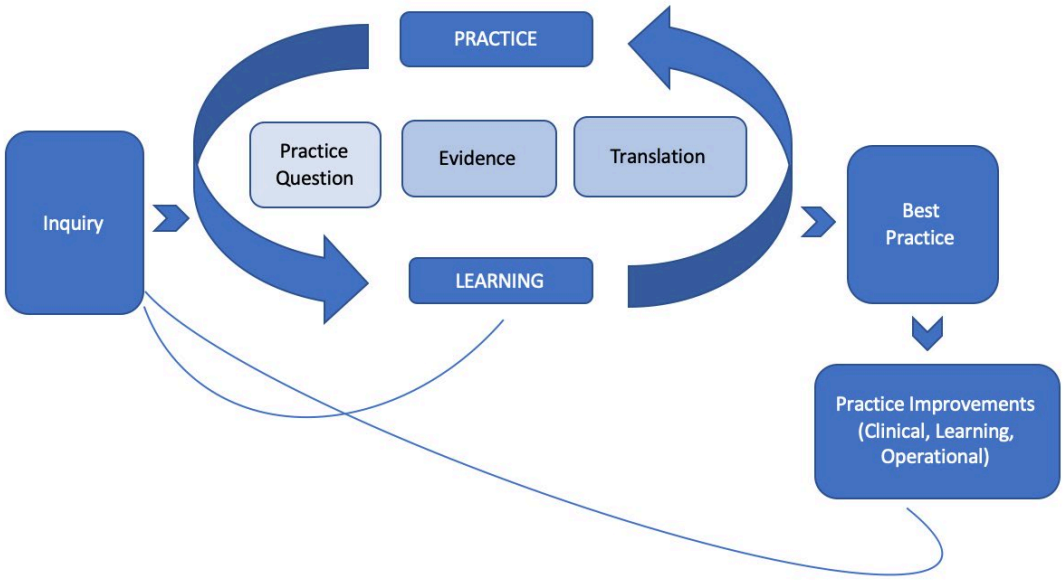
Appendix A

Surgical Care Improvement Project (SCIP) Performance Measures Applicable to the Peri-Operative Period

SCIP Infection Measure designator	Performance measure title
INF-1	Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision
INF-2	Prophylactic Antibiotic Selection for Surgical Patients
INF-3	Prophylactic Antibiotics Discontinued Within 24H after Surgery End-Time
INF-4	Cardiac Surgery Patients With Controlled 6AM Postoperative Blood Glucose
INF-6	Surgery Patients with Appropriate Hair Removal
INF-9	Urinary Catheter Removed on Postoperative Day 1 or Postoperative Day 2 with Day of Surgery being Day 0
INF-10	Surgery Patients with Peri-operative Temperature Management

Adapted from The Joint Commission [TJC]. Surgical care improvement project core measures set. (2019).

Appendix B



Adapted from Dearholt, S., Dang, D., (2018). *Johns hopkins nursing evidence-based practice: Model and guidelines* (3rd ed.).

Appendix C

Citation	**Variables of Interest (Keywords)**	**Literature Type & Research Tools**	**Research Design & Sample Size**	**Theo r-etical Foun datio n**	**# References & SWOT Critique**	**Key Findings**
Alderson, P., Campbell, G., Smith, A., Warttig, S., Nicholson, A., & Lewis, S. (2014). Thermal insulation for preventing inadvertent perioperative hypothermia. *The Cochrane Database of Systematic Reviews, 6*(6), 009908. doi:10.1002/14651858.CD009908.pub2 Database: COCHRANE	Warming techniques, warming systems*, thermal insulant*, body temperature regulation, hypothermia, active* warming, thermal or temperature	Level of evidence=1	Systematic Review including RCTs and quasi-randomized controlled N=22 trials	None	#=59 S=systematic review W= Low evidence quality data; some of the references were excluded from the study but still listed O= Further research needed to identify significance in 1 degree Celsius compared to 0.5 degrees Celsius T=Concerned about the potential for skewed results from operating theatre staff changing their behavior when they knew ways of keeping the patient warm had changed	1. There is no clear benefit of extra thermal insulation with compared to standard care 2. Forced air warming (FAW) seems to maintain better than extra insulation, by 0.5 degrees Celsius and 1 degree Celsius

Alparslan, V., Kus, A., Hosten, T., Ertargin, M., Ozdamar, D., Toker, K., & Solak, M. (2018). Comparison of forced-air warming systems in prevention of intraoperative hypothermia. *Journal of Clinical Monitoring and Computing, 32*(2), 343-349. doi:10.1007/s10877-017-0017-z Database: COCHRANE	Intraoperative hypothermia, forced-air warming systems, underbody and upper body blankets	Level of Evidence= 1	Prospective and randomized control study N=92 patients	None	#=25 S= Number of references W=Used two different brands for lower and upper body blankets O= Future studies to compare same manufacture in FAW systems	1. There was no statistical difference between the two groups when intraoperative hemodynamic data was collected in recovery 2. Results showed that use upper and lower body forced-air warming was effective in preventing intraoperative hypothermia in patients undergoing lower abdominal surgery in supine position
John, M., Crook, D., Dasari K., Elkelani, F., El-Haboby, A., & Harper, C. (2016). Comparison of resistive heating and forced-air warming to prevent inadvertent perioperative hypothermia. British Journal of Anaesthesia, 116(2), 249-54. doi: 10.1093/bja/aev412	Equipment; hypothermia; temperature; warming devices	Level of Evidence= 1	RCT single-blinded study	None	#106 patients undergoing non-emergency surgery were recruited S= Large sample size W= Small pilot study prior to large scale feasibility by recruiting 40 patients undergoing elective surgery O= More research and replication of study plausible T= Hypothermia at end of surgery in both warming groups was common (FAW=36% and resistive 54%)	1. Forced air-warming is more beneficial and effective than resistive heating in preventing postoperative hypothermia 2. Significantly higher rate of hypothermia at end of surgery in resistive heating group compared with forced air-warming (P=0.017)

Nieh, H., & Su, S. (2016). Meta-analysis: Effectiveness of forced-air warming for prevention of perioperative hypothermia in surgical patients. *Journal of Advanced Nursing, 72*(10), 2294-314. doi:10.1111/jan.13010	body temperature; forced-air warming; hypothermia; meta-analysis; nursing; perioperative care; systematic review; thermal comfort	Level of Evidence= 1	Systematic Review incorporating meta-analysis N = 29 trials (1875 patients)	None	#= 55 S= Larger sample size; meta-analysis W=Nonblinded meta-analysis; due to the heterogeneity among trials, the comparison of insulation/warming performance between FAW and other warming systems was affected by intervention timing, type of surgery, anesthesia method and sample size O= developed T= Conduct a large-scale and highly randomized control trial to further investigation	1. Forced-air warming was more effective than passive insulation and circulating-water mattresses; 2. There was no statistically significant difference among forced-air warming, resistive heating blankets, radiant warming systems and circulating-water garments 3. Thermal comfort provided by forced-air warming was superior to that of passive insulation, resistive heating blankets and radiant warming systems, but inferior to that of circulating-water mattresses

Scott, A., Stonemetz, J., Wasey, J., Johnson, D., Rivers, R., Koch, C., & Frank, S. (2015). Compliance with surgical care improvement project for body temperature management (scip inf-10) is associated with improved clinical outcomes. *Anesthesiology,123*(1), 116-25. doi:10.1097/ALN.0000000000000681	The authors retrospectively analyzed the electronic medical record data from 45,304 inpatients at a single institution to assess whether compliance with SCIP Inf-10 (body temperature management	Level of evidence=2	Retrospective study N=45,304 electronic medical records	None	#= 36 S= Large sample size; extensive literature review described with comparison to findings of study W=Participants at low risk for developing cardiovascular complications O= Addressed critiques of SCIP management guidelines T= Anesthesia providers adherence to guidelines; IRB approval from John Hopkins medical center	1. In the SCIP-compliant group, patients demonstrated a decreased incidence of hospital acquired-infections and cardiovascular effects. 2. In the non-SCIP compliant group, patients there was a greater incidence of congestive heart failure, valvular cardiac disease, peripheral vascular disease, hypertension, pulmonary disease, and renal insufficiency/failure 3. The use of active warming is an inexpensive perioperative intervention that can be used to improve patient outcomes and therefore the authors strongly encourage this method to decrease hypothermia in the postoperative period

Adapted from Davidson, J. U. (2003). Example knowledgebase development template. In Rankin, S. H., Dumas, M. A., & Reavis, C. (Eds.), *Grantsmanship: Developing a program of research, Appendix B* (pp. 77-78). Washington, DC: National Organization of Nurse Practitioner Faculties.

Appendix D

MARIAN UNIVERSITY
Indianapolis ®

Institutional Review Board

DATE:	11-19-2019
TO:	Esmeralda Espinoza
FROM:	Institutional Review Board
RE:	IRB #B19.118
TITLE:	Provider Adherence to Practice Guidelines in Overcoming Hypothermia in the Postoperative Period
SUBMISSION TYPE:	New Project
ACTION:	Determination of Exempt Status
DECISION DATE:	11-19-2019

The Institutional Review Board at Marian University has reviewed your protocol and has determined the procedures proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol and you are cleared to proceed with your project. The protocol will remain on file with the Marian University IRB as a matter of record. Please be mindful of the importance of reporting only de-identified, HIPAA-compliant information about the patient in any exhibit or publication.

Although researchers for exempt studies are not required to complete online CITI training for research involving human subjects, the IRB **recommends** that they do so, particularly as a learning exercise in the case of student researchers. Information on CITI training can be found on the IRB's website: http://www.marian.edu/academics/institutional-review-board.

It is the responsibility of the PI (and, if applicable, the faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project. Please contact me if you are unsure whether your proposed modification requires review. Proposed modifications should be addressed in writing to the IRB. **Please reference the above IRB protocol number in any communication to the IRB regarding this project.**

Bryan Larsen, Ph.D.

Appendix E

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
VAR2010	50	35.50	38.00	36.4260	.43650
VAR2020	50	36.10	37.70	36.5660	.26543

Appendix F

t-Test: Two-Sample Assuming Unequal Variances

	2010	*2020*
Mean	36.426	36.566
Variance	0.19053469	0.07045306
Observations	50	50
Hypothesized Mean Difference	0	
df	81	
t Stat	-1.9377733	
P(T<=t) one-tail	0.02806782	