Marian University

Leighton School of Nursing

Doctor of Nursing Practice

Final Project Report for Students Graduating May 2024

Microlearning Effect on Perioperative Staff Performance Warming Surgical Patients: Using Surgical Patient Temperatures Before, During, and After Surgery

Jody Marksberry

Co-Chairs: Dr. Felicia Stewart DNP, FNP-C

Felicia Stewart DNP FNP-C

Signature

Dr. Tara Fox DNP, CPNP

DNP, CPNP

Signature:

Project Team Member: Amy Little MSN, RN – Site Chair

Amy Little MSN, RN

(Signature)

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Abstract

This quality improvement project investigated the impact of microlearning on perioperative staff behavior regarding maintaining optimal patient temperatures throughout the surgical process. This project also served as a targeted data collection initiative aimed at enhancing patient experience during surgery. High level performance in healthcare has become challenging often due to fatigue arising from volumes of information workers must absorb in short periods of time. Recent literature suggests that much of the knowledge derived from information consumed in bulk is minimally retained and quickly forgotten.

Microlearning breaks down complex information into targeted segments and facilitates focused understanding. Microlearning involves a variety of easily accessible formats, such as mobile applications or online slide presentations that are accessible to the learner for acquiring current information, effectively refresh knowledge that has become inactive, or promote learners to function at higher levels with new perspective. One focus of the project was on assessing the level of importance staff placed on monitoring patient temperature as well as their knowledge of, and adherence to, institutional policies. The educational intervention consisted of an online presentation focused on thermoregulation during surgery and facility policy.

Surveys were administered to measure staff knowledge before and after the educational intervention then analyzed via paired t-tests to measure the microlearning intervention's effectiveness on staff knowledge. The educational intervention and surveys were delivered through Qualtrics to ensure participant convenience. The second phase of this project included retrospective chart reviews to discern the impact of the microlearning intervention. To provide insight into the effectiveness of the microlearning intervention, extrapolations were performed utilizing statistical inference and physical patient temperatures before, during, and after surgery.

Keywords: surgical patient warming, microlearning, patient temperature AND health

Microlearning Effect on Perioperative Staff Performance Warming Surgical Patients: Using Surgical Patient Temperatures Before, During, and After Surgery

This quality improvement project was submitted to the faculty of Marian University Leighton School of Nursing as partial fulfillment of degree requirements for the Doctor of Nursing Practice, Family Nurse Practitioner track. Intentions for this project was to research the effectiveness of a microlearning intervention structured to increase staff knowledge regarding surgical patient thermoregulation as well as explore the impact a microlearning intervention had on perioperative patient temperatures.

Optimizing patient temperature throughout the perioperative experience is important for improved patient care outcomes. By recognizing the impact thermoregulation has on surgical outcomes and the patients' experience, institutional policies may be implemented. Hence, the issue of surgical patients experiencing coldness may become better mitigated. Patient temperature is a vital metric that is identifiable and also modifiable. Patient temperature can be influenced by a range of factors and can be positively affected through interventions implemented by perioperative staff. Such interventions include active body surface warming, temperature tracking, and minimizing unnecessary exposures that result in heat loss (Hymczak et. al., 2021).

Microlearning, characterized as the segmented presentation of focused topic-based knowledge (Shail, 2019), is emerging as a powerful tool for staff development. Microlearning empowers staff with targeted knowledge and fosters informed decision-making by directing attention toward specific topics (in this case, patient warming). Such an approach is valuable in addressing information overload while encouraging continual improvement in staff performance.

The chosen target population for this project comprised perioperative staff recognized as stakeholders in the management of surgical patient temperature. Additionally, a retrospective chart review of surgical patients was selected based on convenience and adherence to inclusion/exclusion criteria. Objectives of this quality improvement project included assessing staff knowledge and the efficacy of the microlearning activity in enhancing staff performance regarding the warming of surgical patients. Additionally, the impact of the learning activity on patient outcomes was assessed with the intent to determine if patient care improved in terms of thermoregulation before, during, and/or after surgery.

Background

Despite awareness of the importance of thermoregulation in surgical settings, the issue of patient coldness continues. Balki et al. (2020) emphasized patient coldness results in significant implications for patient satisfaction, recovery, and the prevention of adverse surgical events. In addition, they proposed that enhancing the quality of perioperative thermoregulation is an essential element in addressing factors such as patients being cold. Shockingly, estimates indicate that 50% to 90% of surgical cases involve patients experiencing hypothermia (Shail, 2019). The astonishing economic impact of a single adverse event in surgery has been likened to the cost of warming 400,000 cotton blankets (Rauch et al., 2021). This comparison helps illustrate how the cost of a simple warming measure is minuscule when considering the impact it has on patient outcomes.

Microlearning has emerged as a potential solution to rapidly bring staff up to speed on evolving practices, provide knowledge refreshers, and align staff with the institutional vision. According to Haghighat et al. (2023), microlearning is effective in conveying essential knowledge as it enhances the learning process due to accessibility, applicability, user compatibility, focused content, and user satisfaction. All of which are necessary to respond to the need for effective targeted education, address the dynamic nature of healthcare, and to empower staff with the ability to develop and maintain high level decision-making skills.

The microlearning survey included ten questions with one correct multiple choice scored answer for each question. The exact same questions were used for both the pre-microlearning and post-microlearning segments of the intervention. The educational aspect consisted of a PowerPoint slide presentation that delivered focused content and provided answers to the questions that were contained within the survey. Evidence- based practices, recent literature evidence and project site policy regarding perioperative thermoregulation was included in the educational intervention aspect and was to be completed after the pre-microlearning and again before the post-microlearning survey. Overall, the completion time for perioperative staff participants was estimated to be under 20 minutes.

Problem Statement

There is a need for staff development methods that are efficient, effective, and incentivized amidst the challenges of educating staff who are unfamiliar with the intricacies of patient care and keeping seasoned staff up to date on evidence-based innovative practices. It is most important that the impact of educational efforts be explored so institutions move beyond assessing whether or not the activity resulted in immediate increased staff knowledge and move toward gauging if the education was actually put into practice and impacted patient outcomes. The knowledge should result in improved care delivered and optimize patient outcomes. This DNP project aimed to explore the impact of a microlearning activity on staff knowledge regarding surgical patient thermoregulation, and the subsequent impact the microlearning exerted on policy adherence and surgical patient temperature outcomes.

Organizational “Gap” Analysis of Project Site

The fiscal health of healthcare organizations relies heavily on ethical reputation and reimbursement for services rendered. Both are influenced by patient outcomes and patient satisfaction. Poor patient outcomes result in increased healthcare costs. Reputation regarding quality of care influences decisions made by consumers in the competitive marketplace. The revenue an institution receives can be impacted when patient care outcomes are deemed subpar compared to other institutions for similar services. Lengthier hospital stays or hospital readmissions can also invoke punitive costs or denied payments for providers. Keeping a patient warm throughout the perioperative experience reduces the risk for poor surgical outcomes and fosters patient satisfaction (Balki et al., 2020).

It is a known phenomenon that the body's ability to regulate temperature is suppressed during surgery. Hence, it is important to employ intentional strategies to mitigate heat loss during surgery. Mitigating fluctuations of temperature during surgery is one example of how healthcare providers can positively influence patient outcomes and reimbursement for services rendered.

When a standard of care is not being met or best practices are not adhered to, hospitals add policies in an effort to consistently improve skilled decision making and ensure staff avoid overlooking their role in optimizing care provided in the healthcare continuum. The process for implementing a new policy typically includes a staff in-service or professional development activity which provides an opportunity for staff to not only learn of the new policy, but also understand the rationale for the policy and its impact on patient health outcomes. Effectively incentivized education efforts are also paramount to policy implementation and ensuring expectations are met.

As a part of early project planning, a basic SWOT analysis was conducted to evaluate the internal strengths and weaknesses of the site, as well as external opportunities and threats that could have an effect on the quality improvement effort. Noteworthy strengths identified include sample convenience, academic curiosity, surgical patient thermoregulation serving as an active benchmark, and the institution's recent attention toward applying microlearning for staff education efforts. These elements collectively created a conducive environment for implementation of this quality improvement project.

Conversely, the identified weaknesses to this quality improvement project encompassed project constraints, scheduling conflicts, absence of a fiscal budget, and this being a non-mandatory non- incentivized microlearning activity. Despite these challenges, the project team remained committed to leveraging available resources to plan, navigate, and execute this project.

Numerous potential opportunities were identified from analysis of project data. These include the future plans for extrapolations and data discovery. The insights derived from this academic quality improvement project can also serve as a valuable guide in steering future efforts and formulating successful strategies to address specific challenges regarding institution-wide quality improvement initiatives. This quality improvement project was positioned not only to address immediate concerns, but also to establish a foundational roadmap that may inform future quality improvement endeavors.

Conversely, threats to the project's success were recognized, including the dynamic nature of non-mandatory staff participation, the employee turnover rate, the inherent autonomy of staff to choose whether to complete or not complete tasks amongst the sheer volume of perioperative responsibilities. Mitigation strategies were implemented to navigate these challenges. A detailed visual representation of the SWOT analysis findings is represented in Appendix A.

Review of Literature

In the realm of perioperative care, maintaining optimal patient temperatures during surgery is crucial for positive outcomes. hypothermia has been shown to occur in 50-90% of surgical cases (Moola & Lockwood, 2011). This phenomenon is linked to increased blood loss, extended length of stay (Rauch et al., 2021), and adverse patient outcomes (Palmer et al., 2019), highlighting the necessity for improved practices in surgical patient warming (Munday et al., 2023). Such research explores the potential of microlearning interventions to enhance perioperative staff's knowledge of patient warming in surgical settings. The integration of targeted microlearning applications into clinical workflow represents a contemporary approach to addressing a complex issue.

Akbar et al. (2023) defined microlearning as technology-based small learning experiences. Microlearning involves breaking down complex topics and incrementally presenting targeted information. Recent generations have refined the definition of microlearning to include features such as accessibility, convenience, and mobility (Robles et al., 2023). Microlearning's allure lies in a 90% learner satisfaction rating and demonstrated improvements in knowledge scores (Zarshenas et al., 2022). Clinical learners prefer microlearning over traditional methods (Garber, 2020), appreciating the ability to self-pace their learning (Shail, 2019). Despite a 70% estimated usage among educators, the learner satisfaction rating remains high at 90% (Zarshenas et al., 2022).

Haghighat et al. (2023) suggested microlearning as an effective model for conveying targeted concepts and maximizing learner interaction, while others emphasize the need for standards and a qualitative instrument (Akbar et al., 2023) to ensure valid foundational information (Straus et al., 2009). User friendly aspects of microlearning include learner self-autonomy and clinical performance outcomes. Validation instruments can standardize microlearning platforms(Robles et al., 2023), but face-to-face interactions and checklists (Rauch et al., 2021) are essential for application and competencies. The overarching goal of microlearning is to transition from knowledge acquisition to evidence-based actions that enhance the quality of care.

Aiming to provide thermal comfort for surgical patients, patient warming has gained attention in the last decade in effort to reduce anxiety surrounding surgery (Palmer et al., 2019), and cut inadvertent costs associated with suboptimal perioperative thermoregulation (Rauch et al., 2021). Preventing thermal discomfort is multifaceted and should follow a checklist (Moola & Lockwood, 2011; Munday et al., 2023; Balki et al., 2020; Rauch et al., 2021). Active warming, such as blowing warmed air across the patient's skin, and passive warming by limiting exposure of bare skin to the elements, are strategies to mitigate the risk of hypothermia (Balki et al., 2020; Rauch et al., 2021). However, solely relying on passive warming techniques is insufficient; active body surface warming is necessary to prevent perioperative hypothermia (Rauch et al., 2021).

Conceptual Framework

Conceptual frameworks, like the Knowledge to Action (KTA) Framework , play a crucial role in guiding evidence implementation in practice. The KTA Framework, composed of Knowledge Creation and the Action Cycle, provides a dynamic and flexible model for translating evidence into sustainable healthcare interventions (Field et al., 2014; Straus et al., 2009).

The concept for this scholarly project was based upon quality improvement. Microlearning is a more recent form of education generating attention from learners and e educators. The concept of quality improvement will skirt a conceptual framework based upon the Knowledge to Action (KTA) cycle which developed in the early 2000’s out of Canada (Field et al., 2014; Straus et al., 2009).

Conceptual frameworks play a crucial role in guiding the implementation of evidence in practice, and the KTA Framework offers a dynamic and flexible model, consisting of Knowledge Creation and Action Cycles. The KTA framework is a vital tool in addressing the complex challenge of translating evidence into effective sustainable interventions (Field et al., 2014; Straus et al., 2009). A representation of the KTA framework is included in Appendix B.

Goals, Objectives, and Expected Outcomes

This quality improvement project featured a concise non-mandatory microlearning intervention delivered in PowerPoint slide format accessible to participants through management via email containing an active link. The estimated completion time for the pre/post learning knowledge survey and the brief PowerPoint learning intervention was less than 20 minutes. The overarching goal was to determine if brief, targeted learning presentations can prompt action. Perioperative staff were expected to engage in a knowledge survey which consisted of 10 multiple-choice questions. Participation was voluntary. Staff were asked to provide consent by clicking "Continue" on the first slide, which also included an active link to generic participation details. After completing the pre-microlearning survey, staff were expected to proceed to a link for the PowerPoint microlearning intervention that provided answers and insights. Following the intervention, participants were expected to click on a final link to complete a post-microlearning knowledge survey. The overall objective was to determine if breaking down complex information into targeted microlearning segments enhanced stakeholder understanding, decision-making, or performance.

Expected outcomes regarding low overall participation is due to staff turnover rate, voluntary participation, and restrictive accesses. Microlearning intervention pre-learning scores were anticipated to exhibit minimal variance. Maintaining the same questions allowed for robustness between pre/post survey groups. Patient temperatures were not expected to significantly change; rather, the aim was to reduce fluctuations in temperatures throughout surgery. This quality improvement project addressed the established goal of tracking perioperative patient temperatures and aimed to use targeted microlearning to enhance staff knowledge, foster action, and improve patient satisfaction.

Project Design and Methods

Project Site & Populations

The project was situated in a level-one trauma hospital in an urban midwest city, with a focus on vulnerable populations. The project site encompasses a broad spectrum of medical specialties, including inpatient, outpatient, emergency, adult burn, orthopedics, sports medicine, primary care, plastics, trauma, neurology, pulmonology, endoscopy, and oncology.

Two distinct populations were expected to participate in the project: Population #1 consisted of perioperative staff on the third floor main surgery area who engaged in direct patient care within pre-operative, intra-operative, or postoperative stages. Population #2 was composed of patients meeting inclusion criteria who underwent surgery during the data collection period. Patient data, specifically temperature readings representing pre, during, and post-surgery phases, were collected through retrospective chart review. No face-to-face interaction with patients occurred, and no identifiable data was retained.

Inclusion criteria for staff involved all third-floor main surgery perioperative staff, with participation / non-participation having no impact on employment or status. Surgical patient inclusion criteria encompassed surgical cases for individuals 18-65 years of age within the project site, excluding specific conditions like pregnancy, burns, trauma, police incarceration, and any surgical cases performed outside the designated main surgical area.

Exclusion criteria for both populations were clearly defined to ensure data integrity. Retrospective chart reviews captured patient data, including temperature and surgery type, recorded in Fahrenheit. Perioperative staff data was electronically collected via Qualtrics software, focusing on numerical outcomes. This approach enabled comprehensive and systematic collection of relevant data for this quality improvement project.

Measuring Instruments

To gauge the outcomes of this quality improvement project, a custom survey was created. The survey was administered to staff participants through the project site's education department management. The self-generated survey encompassed 10 questions, each offering multiple-choice answers with one correct response, as detailed in Appendix C.

More points for correct answers were awarded and less points for incorrect answers were awarded. Scores were tallied and recorded for each pre-intervention and post-intervention sample. This approach provided a quantifiable measure of the participants' knowledge survey, allowing for a comparative paired Welch's paired T-test statistical inference to assess the impact of the microlearning educational intervention. The question/answer based survey instrument served as a valuable tool in capturing both baseline and post-intervention data, enabling a comprehensive evaluation of outcomes regarding this quality improvement project.

Data Collection Procedures

Data collection leveraged retrospective chart reviews using the EPIC software at the project site. Surgical patient temperatures were gathered in two phases: a control block before the microlearning intervention and a variable block after the intervention, covering preoperative, intraoperative, and postoperative phases. Microlearning was electronically delivered to staff. Anonymity was ensured during response and tallying by requiring no identifiable data. Staff were to undergo a pre- and post-intervention electronic quiz with scores assigned for correct and incorrect responses, facilitating a behavior analysis.

Pre-microlearning surgical patient temperatures were compared with post-microlearning temperatures, evidencing the microlearning impact on staff behavior regarding patient warming.

Electronic pre-microlearning retrospective chart review preceded the educational intervention data range. The microlearning educational intervention link included pre- and post-intervention perioperative staff surveys on thermoregulation knowledge, a brief microlearning presentation, and a post-intervention survey. Targeted staff had one week for participation, followed by a brief post-intervention chart review. The entire process aims for an efficient completion time, with time allotted for data analysis. Participants' identifiable information was not requested. This streamlined process ensured efficient data collection, intervention, analysis, and dissemination.

Ethical Considerations & Protection of Human Subjects

Prior to initiating data collection for this DNP quality improvement project, approval was sought from the Marian University Internal Review Board (IRB). The project site waived their organization's IRB review. The official IRB Determination Form was promptly submitted upon proposal approval and review by all team members.

All participants were safeguarded under the Health Insurance Portability and Accountability Act of 1996 (HIPAA), ensuring the privacy of patients' health information according to Modifications to the 2013 HIPAA Privacy, Security, Enforcement, and Breach Notification Rules (DHHS, 2013). All information collected for evaluating project impact was devoid of potential patient identifiers.

The risk to participating patients was minimal and comparable to the risks associated with receiving indirect care. Participant confidentiality was upheld through the coding of results. The list of participants and their corresponding identification numbers was securely stored on a monogamous user laptop, featuring password-protected access, and exclusively accessible to the project leader.

Data Analysis & Results

Data analysis for this quality improvement project entailed two statistical datasets. For dataset population #1 (perioperative staff), inferential statistical comparison was conducted on pre-intervention quiz scores and post-intervention quiz scores using Welch's paired t-test. Mishra et al. (2019), which is aligned with this project's objectives. The application of Welch's paired t-test was supported in the context of comparing the same participants in a before-and-after format. Welch's paired t-testing also addresses potential biases in the standard deviations of pre-intervention versus post-intervention quiz scores, ensuring robust analysis (Bobbitt, 2021). This statistical approach aimed to validate any discernible changes regarding whether the microlearning intervention significantly influenced perioperative staff's performance.

The second layer of analysis of this quality improvement project focused on improving surgical patient perioperative care. Data for surgical patient temperature were collected for dates before and after the microlearning intervention through retrospective chart reviews. Statistical analysis compared pre-intervention and post-intervention temperatures, detecting any variations indicative of positive change in patient care outcomes at the project site.

For dataset population #2 (patients undergoing surgery during the period of this quality improvement project), descriptive statistics encompassed the highest temperature, lowest temperature, average temperature, most repeated temperature, service with the highest recorded temperature, service with the lowest temperature, service with the greatest temperature change, and service with the least temperature change. Finally, data analysis revealed the percentage of cases reviewed that fell below the facility-defined hypothermia range of less than 96° F.

A total of 59 surgical patient cases underwent scrutiny. Each case encompassed three distinct phases: preoperative, intraoperative, and postoperative, both before and after microlearning intervention. The pre-microlearning data analysis comprised n=28 participants, while post-microlearning analysis involved n=31 participants. Results from the perioperative staff survey yielded inconclusive outcomes due to zero full completion rate among perioperative staff. Descriptive statistics are provided in Appendix E.

Statistical analysis of pre/post-microlearning data demonstrated overall p-values below .05 hence the rejection of the null hypothesis and acceptance of the alternative. It underscored the impact of raising awareness on influencing outcomes. The average pre-microlearning temperature registered at 98.1^{o} F, whereas the post-microlearning average stood at 97.7^{o} F. The lowest temperatures recorded were 95.9^{o} F pre-microlearning and 94.7^{o} F post-microlearning.

In the pre-microlearning phase, one surgical case recorded temperatures below the facility policy threshold of 96.0^{o} F, constituting 3.6% of the reviewed cases. Conversely, during the post-microlearning phase, four cases fell below the policy 96^{o} F threshold, comprising 12.9% of cases reviewed. The overall highest temperature recorded was 100.9^{o} F within the urology service, while the overall lowest temperature recorded was 94.7^{o} F also in the urology service.

During the post-microlearning phase the overall lowest temperature recorded was 94.7^{o} F as well as the overall highest temperature change of 4.1^{o} F were discovered within the Vascular service. The overall highest temperature recorded was 100.0^{o} F found within the orthopedic service during the post-microlearning phase. Interestingly, during the pre-microlearning phase the neurology service exhibited no temperature change among patients. It was the gynecological service during the post-microlearning phase with no recorded temperature change.

Statistical inference was computed using Microsoft Excel. The data collection template provides an overview of project analysis in Appendix D.

Discussion

This quality improvement project revealed statistically significant evidence which underscored the pressing need for further research into microlearning applications. Impact made from the awareness of a metric such as thermoregulation was also highlighted. The academic inquisitive nature of the quality improvement project was the strength that overcame hurdles. The project faced obstacles including restricted access to data and staff throughout the project phases. Threats to the project encompassed the overlapping volume of in-person health fair activities staff were mandated to attend and the non-mandatory nature of the microlearning intervention. Unrestricted access to perioperative staff was not permitted. Any type of review regarding staff workflow, staff routines, checklist tracking of task completion was also not allowed. Restricted minimized access to patient charts during data collection presented challenges for this project. In addition, this non-mandatory microlearning education project gave perioperative staff access to the survey material for one week. Whereas perioperative staff typically have multiple months to complete their continuing education modules. This project intertwined the knowledge creation phase intended on determining what level of education would prompt action in attempt to illustrate how the Knowledge to Action framework consists of two distinct inter-dependent cycles designed to lead lasting change.

Conversely, the second layer of utilizing perioperative staff scores to validate the effectiveness of the microlearning proved to be an encumbrance of the project. The non-mandatory nature of the microlearning made it difficult to ensure full participation concerning the microlearning survey aspects of the project. In retrospect any particular score of a subset population may not adequately gauge the effectiveness of the microlearning intervention and thus suggests that a more standardized approach may be warranted with regard to validating effectiveness of microlearning and outcomes generated after the fact.

Employing a scientific method infused with academic intrigue, the project determined the significance of hypothermia at the project site and the requisite level of learning to influence patient outcomes. The use of a standardized survey instrument ensured consistent data collection and facilitated a clear analysis of this quality improvement project. There were 9.3% more patients that experienced coldness after the microlearning versus prior to the microlearning. These findings not only support the necessity for future research but also align with existing literature indicating patients' increasing experience of coldness during surgery. Microlearning has user-appeal due to aspects of convenience and autonomy. The efforts and outcome surrounding the utilizing perioperative staff substantiated the global need to move beyond determining if learning was completed and shift toward assessing knowledge application.

The implications for clinical practice are profound: preventive measures against hypothermia vastly outweigh corrective actions, and hypothermia incidences are indeed prevalent. Given the demanding nature of healthcare where caregivers must absorb vast amounts of information in short periods, it becomes crucial to maintain active and frequent utilization of information and skills. Thus, having readily available resources tailored to required skill sets for on-demand review, refreshment, and retention becomes imperative.

Conclusion

The clinical challenge manifests as patient discomfort due to experiencing coldness during surgery. The clinical problem is the volume of information healthcare workers must digest, retain, and then ultimately perform such skills that often require ongoing routine practice to remain proficient. Bear in mind that not all skill sets are utilized on a daily basis across all healthcare settings and every person may learn differently. Microlearning and on-demand small-batch applications are poised to drive the next frontier in healthcare, offering a solution to the challenges of knowledge retention and accessibility in the fast-paced medical landscape.

Recent literature suggests that more patients are experiencing hypothermia during surgery which also aligns with data obtained at this quality improvement project site. The scope of this project was to determine the impact of microlearning on staff action using surgical patients' temperature as a gauge to determine magnitude of action created among staff. User accessibility and convenience are attractive factors for microlearning platforms. Accessibility and convenience should not outweigh confirmation and standardized validation effort. There is a metric that must be applied so that each person can receive confirmation to have received the microlearning, completed the intervention as well as transformed knowledge into adopted action.

Awareness of a topic as a metric being measured may create change. Lasting change is attained through trial and error which ultimately leads to insight. This project served as an academic learning experience. The data discovered conducting this quality improvement project highlighted the importance of perioperative thermoregulation, revealed recent evidenced based materials and emphasized opportunities to improve patient outcomes at the project site.

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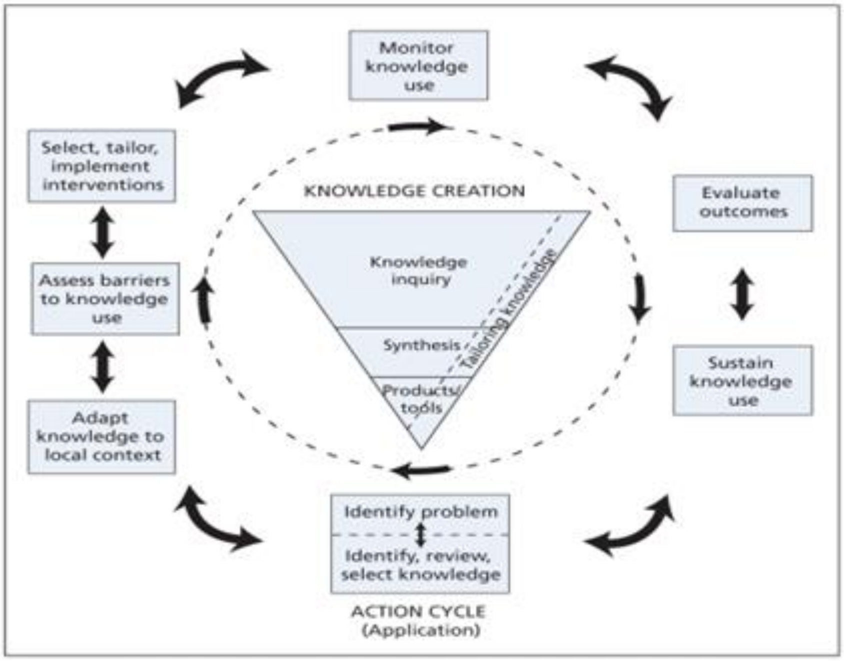
Appendix A: SWOT

Strengths	Convenient Sample Active Benchmarked Metric Micro Learning Applied Management Approval Academic Motivation
Weakness	Time Period Zero Fiscal Budget Restrictive Access Perioperative 2nd Layer
Opportunity	Data Genesis Discovery Tool Optimized Thermoregulation Improved Patient Outcomes
Threats	Participation Not Mandatory Staff Autonomy Staff Task Volume Lack of Incentive Human Error

Appendix B: KTA Cycle



Appendix C: Qualtrics Pre/Post Knowledge Survey Questions with Informed Consent

Informed Consent

By clicking "Next," you consent to voluntarily participate in this quality improvement project. This activity includes a 10-item survey before and after a brief educational offering. Participation or non-participation will not impact your employment status. No identifiable information will be collected. Results will not be provided. The estimated time to complete this project is 15 minutes.

😌 Thank You for Your Time & Efforts 😌

Q1: Do you consider surgical thermoregulation a critical factor contributing to patient outcomes?

- Yes
- No
- I am not sure

Q2: Perioperative hypothermia is generally considered to be any temperature less than ____.

- 98º F (36.7º C)
- 97º F (36.1º C)
- **96º F (35.6º C)**
- 95º F (35.0º C)
- none of the above
- I am not sure

Q3: ___ is the "sweet spot" body temperature for adults throughout the perioperative process.

- 95.9° F to 97.7° F (35.5° C to 36.5° C)
- 95.9° F to 99.5° F (35.5° C to 37.5° C)
- **97.7° F to 99.5° F (36.5° C to 37.5° C)**
- 97.7° F to 101.3° F (36.5° C to 38.5° C)
- None of the above
- I am not sure

Q4: Which of the following examples reflect active body surface warming interventions to optimize thermoregulation for surgical patients?

select all that apply

- Track patient temperatures before, during, and after surgery.
- **Provide warm cotton blankets before surgery in the preoperative area.**
- **Apply active body surface warming devices intraoperatively prior to induction.**
- Limit patient skin exposure
- **Warm irrigation fluids**
- None of the above
- I am not sure

Q5: Which of the following is most responsible for heat loss ?

- Head
- Peripheral Arms and Legs
- **Skin**
- Groin, Armpits and Neck
- None of the above
- I am not sure

Appendix C: - cont'd: Qualtrics Pre/Post Knowledge Survey Questions with Informed Consent

Q6: Which of the following are possible consequences of unintentional hypothermia?

select all that apply

- **Infection**
- **Poor Wound Healing**
- **Increased Blood Loss**
- **Increased Pain**
- **Increased Length of Stay**
- None of the above

Q7: How does surgery affect patients' ability to regulate their temperature ?

- Surgical procedures do not hinder a patient's natural ability to self-regulate temperature.
- During surgery, patients are able to sense temperature change and physiologically adjust.
- **Medications used in surgery hinder a patient's natural ability to respond to external influences such as surgery, pain, blood loss, injury, exposure or cold.**
- All of the above
- None of the above
- I am not sure

Q8: According to Facility Perioperative Policy 660-76, patient temperature should be assessed__

- Preoperatively, before the patient heads back to surgery
- Intraoperatively, during surgery
- Postoperatively, after surgery
- **Throughout the perioperative process**
- None of the above
- I am not sure

Q9: According to Facility Perioperative Policy 660-76, The minimum patient temperature that should be maintained throughout the operative process is _____.

- 95.0º F
- **96.0º F**
- 97.0º F
- 98.0º F
- 98.6º F
- None of the above
- I am not sure

Q10: According to facility Perioperative Policy 660-76, for patients undergoing general anesthesia, forced-air warming should be _________

select all that apply

- **used throughout the operative period.**
- **adjusted to achieve desired therapeutic goals.**
- when the patient temperature is below 98º F.
- for procedures more than 30 minutes in length.
- for procedures involving an open cavity
- for procedures involving bilateral extremities.
- none of the above

Appendix D: Pre / Post Microlearning Data Collection Template: example data

Surgery Type: General	Preop Temp: 98.4	Intraop Temp: 98.1	Postop Temp: 98.9
Maximum: 100	Average: 99.1	# < 96.0º F: 4	Overall Maximum
Minimum: 94.0	Mode: 97.2	% cases < 96.0º F: 12	Overall Minimum
Max Change: Urology	Minimum Change: Neuro		
Perioperative Staff Data			
	Maximum Score: 30	Minimum Score: 10	Average Score: 27

Appendix E: Descriptive Statistics

Pre-Microlearning Regression Analysis

Column1		*Column2*		*Column3*
Mean	98.093	Mean	97.989	Mean
Standard Error	0.145	Standard Error	0.182	Standard Error
Median	98.000	Median	98.000	Median
Mode	98.100	Mode	97.000	Mode
Standard Deviation	0.767	Standard Deviation	0.964	Standard Deviation
Sample Variance	0.589	Sample Variance	0.930	Sample Variance
Skewness	0.678	Skewness	0.657	Skewness
Minimum	96.900	Minimum	95.900	Minimum
Maximum	99.800	Maximum	100.900	Maximum
Sum	2746.600	Sum	2743.700	Sum
Count	28.000	Count	28.000	Count
Largest(1)	99.800	Largest(1)	100.900	Largest(1)
Smallest(1)	96.900	Smallest(1)	95.900	Smallest(1)
Confidence Level (95.0%)	0.298	Confidence Level (95.0%)	0.374	Confidence Level (95.0%)

Post Microlearning Regression Analysis

Column1		*Column2*		*Column3*
Mean	97.913	Mean	97.419	Mean
Standard Error	0.199	Standard Error	0.212	Standard Error
Median	98.000	Median	97.300	Median
Mode	98.000	Mode	96.400	Mode
Standard Deviation	1.108	Standard Deviation	1.182	Standard Deviation
Sample Variance	1.228	Sample Variance	1.396	Sample Variance
Skewness	-0.650	Skewness	0.637	Skewness
Minimum	94.700	Minimum	95.400	Minimum
Maximum	100.000	Maximum	100.000	Maximum
Sum	3035.300	Sum	3020.000	Sum
Count	31.000	Count	31.000	Count
Largest(1)	100.000	Largest(1)	100.000	Largest(1)
Smallest(1)	94.700	Smallest(1)	95.400	Smallest(1)
Confidence Level (95.0%)	0.407	Confidence Level (95.0%)	0.433	Confidence Level (95.0%)