Improving Patient Safety and Continuity of Care by Educating Nurses about Standardized Handoffs in the Post-Anesthesia Care Unit: A Quality Improvement Project

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Improving Patient Safety and Continuity of Care by Educating Nurses about Standardized Handoffs in the Post-Anesthesia Care Unit: A Quality Improvement Project

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NURS 958: Clinical Nurse Leader Capstone

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July 26, 2024
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Abstract

**Background:** Effective communication during patient handoffs is crucial for ensuring patient safety and continuity of care. The I-PASS handoff tool has been identified as an effective method to standardize communication and reduce errors during these critical transitions.

**Local Problem:** In the Post-Anesthesia Care Unit (PACU) of a hospital in New England, the lack of standardized procedures for nurse handoffs posed a risk to patient safety and care quality.

**Methods:** A quality improvement project was conducted using the Plan-Do-Study-Act (PDSA) cycle to implement and evaluate an educational intervention aimed at improving PACU nurses' proficiency with the I-PASS handoff tool. Pre- and post-intervention surveys measured changes in nurses' perceptions and confidence.

**Results:** Post-intervention results indicated an increase in familiarity with I-PASS from 67% to 83% among nurses, and confidence in its application reached 100%. However, engagement was lower than expected, with only 6 out of 14 nurses completing both surveys.

**Conclusion:** The educational intervention significantly improved PACU nurses' familiarity and confidence with the I-PASS handoff tool, highlighting its potential to enhance handoff practices across healthcare settings. To sustain and spread these benefits, future initiatives should focus on integrating the training into ongoing professional development and addressing barriers to engagement. Further research is recommended to quantify the impact of improved handoff practices on patient outcomes.

**Keywords:** I-PASS Handoff Tool, PACU, Quality Improvement, Patient Safety, Communication, Standardization, Healthcare Education, PDSA Cycle.
Introduction

Problem Description

The post anesthesia care unit (PACU) is a robust unit with many strengths such as high nurse satisfaction, comprehensive patient assessment protocols, and an extensive interdisciplinary team (PRH Report, 2024). Despite its numerous strengths, internal reports (2024) stated that there is a need for standardized nurse handoffs when transferring patients between units. Patients in the PACU are typically transferred to two units within the hospital: Same Day Care (SDC) or Intensive Care Unit (ICU). However, patients can also be transferred to any of the various medical-surgical or step-down units, referred to as inpatient rooms. Each of these three unit-types (SDC, ICU, or inpatient rooms) require a different handoff document dependent on the destination (PRH Report, 2024). The importance of standardized handoffs in healthcare is crucial for effectively communicating vital patient data (Streelman & Staffileno, 2021). By implementing a standardized handoff document in the PACU, patient safety is improved and ensures the continuity of high-quality patient care.

The Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver (I-PASS) handoff tool was recently proposed as a new policy by this macrosystem’s nurse leaders in March 2024. In this meeting, it was proposed to implement I-PASS for transfers between every unit within the hospital. Currently in this macrosystem, I-PASS is only used for transfers from the emergency department (ED) to any of the inpatient rooms. However, clinical nursing leaders plan on introducing it throughout the hospital within the next several months (PRH Report, 2024). I-PASS follows a situation, assessment, background, and recommendation (SBAR) framework that includes an additional step where the receiving clinician synthesizes the patient information relayed to them and
restates critical items (Blazin et al., 2020). The implementation of I-PASS allows for all members of the patient’s healthcare team to have a comprehensive understanding of their patient and enables them to make decisions in the patient’s best interest (Blazin et al., 2020).

The current state in the PACU falls short of the hospital's strategic goals and priorities, putting patient care at potential risk of miscommunication errors. Unstandardized handoff documentation in the PACU can lead to compromised patient safety and negative impacts on the hospital's reputation and financial sustainability (Aronson et al., 2021). Addressing this issue is crucial not only for improving patient outcomes and experiences but also for aligning with the hospital's strategic goals of delivering safe, efficient, and compassionate care to all patients.

Available Knowledge

Healthcare professionals hold a unique position of responsibility where patients entrust them with their lives and well-being. Among these professionals, nurses form the largest percentage of the healthcare workforce, placing them in a pivotal role within patient care and the ability to significantly impact patient outcomes (Alanazi et al., 2022). Effective communication among the interprofessional healthcare team is a cornerstone of high-quality healthcare delivery and crucial for ensuring patient safety. Along the critical points of communication, nurse handoffs play an essential role particularly in settings like PACU, where patients transition from one phase of care to another. The “handoff” is a transfer of care accompanied by the transfer of authority and responsibility for the patient from one clinician to another, which further emphasizes the importance of practicing effective and accurate communication (da Silva dos Santos et al., 2018).

Unfortunately, communication failures in healthcare are a leading cause of sentinel events within healthcare organizations and affecting the lives of 250,000 individuals each year.
Sentinel events are negative patient outcomes directly resulting from a gap or error in healthcare delivery, such as injury or death, which can be used to highlight systemic issues and derive improvements in safety protocols. Miscommunication leading to sentinel events can be attributed to several factors. Reported factors that contribute to miscommunication in handoffs include one-sided dictation from the outgoing staff to the incoming staff without opportunity for questions or information synthesis, as well as time constraints, lack of staff training, disconnection between electronic medical record (EMR) and handoff tools, and lack of standardized handoff procedures (Aronson et al., 2021; Starmer et al., 2014). Specifically, the variability in handoff practices and communication protocols presents significant challenges, potentially compromising patient safety and the continuity of care.

Effective patient handoffs are characterized broadly by communication and coordination, both contributing to improved quality of care and patient safety (Abraham et al., 2014). It is essential that the continuity of high-quality care be shared in an organized and timely structure to minimize potential harm (Streelman & Staffileno, 2021). The concepts of organization and structure help to lay the foundation for the standardized handoff—a systematic format for communication that can be used by any healthcare practitioner to communicate every pertinent piece of patient information. In a landmark publication by the Joint Commission (2017), Sentinel Event Alert, the authors recommend standardizing handoffs between healthcare professionals. Wagner et al. (2017) further state that standardization of patient handoffs reduces the risk of vital information omissions and contributes to patient safety. In another study by Starmer et al. (2014), the Accreditation Council for Graduate Medical Education (ACGME) mandated that all hospital residents undergo formal handoff training to include communication education, faculty
development, and the implementation of standardized oral and written handoffs. This initiative resulted in a 23 percent relative reduction in adverse patient outcomes in the participating residency programs (Starmer et al., 2014).

The researchers in the ACGME study attributed their intervention’s success to the implementation of the I-PASS handoff tool (Starmer et al., 2014). Furthermore, Blazin et al. (2020) studied the implementation of I-PASS across different settings, notably in inpatient nursing, and found that it resulted in reductions in handoff-related communication errors. While the I-PASS mnemonic is one example of a standardized handoff tool, these studies highlight how the standardization of patient handoffs should be a priority among healthcare organizations.

The purpose of this literature review was to examine the current evidence on patient handoffs and the impact of its standardization on patient safety. Further, the project lead explored if standardized handoffs can be a viable tool to be used in the PACU. The evidence was critically appraised, and an educational initiative was implemented, thereby enhancing the efficiency and effectiveness of nurse handoffs, improving patient outcomes, and enhancing overall healthcare delivery in the PACU.

**Search Methods**

A comprehensive search of the literature was conducted in March through April 2024 using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) methodology. The literature search was guided by the formulation of a Population, Intervention, Comparison, and Outcome (PICO) question, which is stated as follows: in PACU nurses (P), how does education on a standardized handoff tool, such as I-PASS (I), compared with no education (C), affect their competence in delivering a thorough patient handoff using a standardized tool (O)? To answer this question, the project lead developed a search strategy
focused on the implementation of standardized handoffs among various clinicians (e.g., nurses, residents, attendings, etc.) in the hospital setting by utilizing Boolean phrases.

The databases utilized in this literature review included PubMed, MEDLINE, and Cumulated Index to Nursing and Allied Health Literature (CINAHL). The following Boolean phrases were used: ((“patient safety”) AND (“handoff” OR “hand-off” OR “I-PASS”) AND (“standardized” OR “standardization”) AND (“systematic review” OR “meta-analysis”)).

Inclusion criteria included peer-reviewed literature published in English over the past ten years. Additionally, the full-text must be available. In accordance with the Joanna Briggs Institute (JBI) Levels of Evidence (2013), articles were selected for review if they were categorized as level one evidence to include systematic reviews, meta-analyses of randomized control trials (RCTs), and clinical practice guidelines. Furthermore, articles were only included if the implementation of a standardized handoff tool between healthcare clinicians was the primary focus, or if the article identified the need for handoff standardization as a key finding. Lastly, the study setting was noted as inpatient and not outpatient or home care settings.

Exclusion criteria included non-peer reviewed articles such as conference abstracts, editorials, and opinion pieces were excluded from this review. Articles unavailable in English were also excluded. JBI level two, three, four, five, six, and seven articles (e.g., RCTs, controlled trials, cohort studies, case-control studies, expert opinions, etc.) were excluded from the literature review.

The literature search strategy yielded 55 articles from the databases. These articles were screened for duplicates and 2 were removed. Subsequently, article titles and abstracts were screened for the remaining 53 citations and another 27 were excluded as irrelevant. This resulted in 26 remaining articles qualifying for full-text review. Following full-text review, another 21
articles were excluded due to irrelevance to the PICO question. 5 articles were included for the literature review based on the project lead’s search criteria.

Critical Appraisal of the Evidence

**Rosenthal et al., 2018.** Rosenthal and colleagues conducted a systematic review on the impact of standardized handoff interventions on patient outcomes (2018). The review measured patient outcomes such as complications, medical errors, length of stay, adverse events, patient satisfaction, and quality of care. The authors searched multiple databases and identified 1,810 citations. After screening and removing duplicates, they included 14 studies in their review. These studies examined standardized handoffs among various clinicians, including attendings, fellows, anesthesia providers, residents, nurse practitioners, nurses, physician assistants, advanced practice nurses, surgeons, case managers, and interns. The types of handoffs in the studies included operating room (OR) to ICU, ICU to floor, shift changes, and transfers from outside the hospital to ICUs. Rosenthal et al. (2018) identified three types of standardized interventions: checklists, scripts/templates, and mnemonics.

The review by Rosenthal et al. (2018) revealed varied results depending on the patient-related outcome that was measured. Outcomes by Rosenthal and colleagues included mortality, length of stay, processes of care, adverse events and errors, and family satisfaction and perception of care (2018). While only three studies examined mortality rates as an outcome, all three demonstrated that the use of standardized handoff tools do not affect mortality. In contrast, of the four studies that examined adverse events and medical errors, only two found that standardized handoffs significantly improved these outcomes, with notable mention of the I-PASS mnemonic. Regarding processes of care (e.g., early extubation, catheter removal, compliance with airways), all six studies examining this aspect found significant improvements
following standardization, irrespective of the specific tool used. While Rosenthal and colleagues (2018) did not identify a superior standardized handoff tool (e.g., checklist, script/template, or mnemonic), they concluded that the implementation of standardized tools generally led to improved patient-related outcomes.

One strength of the systematic review conducted by Rosenthal and colleagues (2018) is its comprehensive nature. The review encompassed a wide range of studies examining standardized handoff interventions across various clinician types and handoff scenarios. This wide breadth allows for a robust analysis of the impact of standardized handoffs on patient outcomes, providing valuable insights for healthcare practitioners. However, a limitation identified by the authors is that most studies used bundled handoff interventions, which could potentially limit the ability to determine the effectiveness of individual components. Notably, one of the most common supplementations to the bundled handoff interventions found in their review was the integration of handoffs using the EMR. Rosenthal et al. (2018) hypothesize that EMR-integrated handoffs should be a topic that garners further investigation. Lastly, the heterogeneity of the studies included in the review limited the ability to conduct a meta-analysis, which may have provided more precise estimates of the impact of standardized handoffs on patient outcomes. Nonetheless, despite these limitations, Rosenthal et al. (2018) offers important implications for improving patient care through standardized handoff practices.

**Lazzari, 2024.** Lazzari (2024) conducted a systematic review of the literature to assess the current state of patient handoffs, particularly the utilization of the Introduction, Situation, Background, Assessment, and Recommendation (ISBAR) framework. ISBAR is a standardized mnemonic and the most popular framework for conducting handoffs (Lazzari, 2024). However, Lazzari (2024) stated that incomplete handoffs between healthcare practitioners continue to
occur despite this tool, leading to adverse patient outcomes. Lazzari and the research team searched multiple databases and identified 34,879 citations. After screening and removing duplicates, they included 50 studies in their review. The settings that were included in these studies were medical and pharmacy schools, hospitals, nursing schools, and specific units within hospitals. Lazzari (2024) identified five primary outcomes stemming from the application of the ISBAR model: 1) improved communication, handoffs, and quality of handoffs; 2) improved confidence and preparedness in those who utilized the tool; 3) improved interprofessional communication; 4) registered nurses utilize ISBAR most; and 5) increased patient safety.

Lazzari (2024) confirmed that the value of implementing a standardized handoff tool, such as ISBAR, resulted in improved outcomes across all clinical settings. These handoffs not only enhance interprofessional teamwork but also mitigate communication barriers when sharing essential clinical information. Moreover, training and implementation of standardized handoffs bolster nurses’ self-efficacy, reduces information gaps, and lowers the likelihood of adverse clinical events in patient care (Lazzari, 2024). Overall, the use of ISBAR improves practice, quality and safety of care, and boosts the self-esteem of healthcare practitioners involved in patient care. Lazzari (2024) states that their findings are supported by contemporary literature, although there is a scarcity of long-term studies and RCTs on the effects of standardized handoff training and its application.

Several strengths emerge from the review conducted by Lazzari (2024). First, the systematic review included a thorough search of multiple databases, resulting in many included studies, which enhances the impact of the findings. Including studies from various settings adds to the scope of the review, providing a broader perspective of the ISBAR framework’s application across diverse clinical settings. Lazzari (2024) identified five primary outcomes
related to the application of the ISBAR model, providing a clear understanding of the benefits of using standardized handoff tools in clinical practice. A limitation to this review is the lack of long-term studies and RCTs on the effects of standardized handoff training and its application. Moving forward, Lazzari (2024) recommends investigating how to integrate ISBAR into the EMR to further improve patient outcomes. The integration of this standardized tool into the EMR can make patient information available to all staff wherever they are, further enhancing the efficiency of patient care. Overall, the systematic review by Lazzari (2024) provides valuable insights into the benefits of using the ISBAR framework for patient handoffs.

**Rose & Newman, 2016.** Rose and Newman (2016) conducted a scoping review on key factors affecting patient safety during postoperative handoffs in the context of anesthesia providers to both the PACU and ICU. The authors searched multiple databases and identified 199 citations. After screening and removing duplicates, 23 studies were identified for inclusion. The included studies examined handoffs between anesthesiologists, anesthesia residents, and certified registered nurse anesthetists, to PACU and ICU nurses. Rose (2016) identified organizational policy, referring to the utilization of a standardized handoff tool, as a key factor in improving high-quality care and decreasing sentinel events.

In studies utilizing standardized handoff tools, Rose and Newman (2016) observed that handoffs were more streamlined, leading to higher quality postoperative care. For instance, one study using a standardized checklist reported a reduction in postoperative complications from 27.3% to 16.7%, however, unfortunately the authors did not note a p-value (Rose & Newman, 2016). Another study noted that implementing a standardized handoff protocol reduced information omission, task errors, and distractions, while improving information sharing and provider satisfaction. Rose and Newman (2016) advocate for the implementation of
standardization protocols, viewing it as an achievable goal. However, implementing standardization may face challenges such as resistance to change, lack of personalization, and adding complexity to an already intricate process. Furthermore, context-specific handoffs, such as those between anesthesia and PACU, may require different standardization approaches than handoffs between PACU and surgical units.

Rose and Newman (2016) conducted a thorough scoping review, systematically searching multiple databases and identifying many relevant studies. The focus on organizational policy as a key factor in improving care quality and reducing sentinel events provides valuable insights for healthcare organizations to improve their handoff practices. While Rose and Newman (2016) provide compelling evidence for the benefits of standardized handoff tools, the review may be limited by the quality and heterogeneity of the included studies. The studies may vary in their methodologies, sample sizes, and outcome measures, which could affect the application of their findings. Rose and Newman (2016) noted that key limitations were the lack of RCTs included in the review and small sample sizes. Additionally, the review’s focus on postoperative handoffs in the context of anesthesia providers to PACU or ICU nurses may limit its applicability to other healthcare settings or handoff scenarios. Further research should aim to address these limitations to provide a more comprehensive understanding of the impact of standardized handoff tools on patient safety and care quality.

Pokojová & Bártlová, 2018. Pokojová and Bártlová (2018) conducted a descriptive summarizing study on current knowledge on improving patient safety and continuity of care during clinical handoffs, focusing on the implementation of standardized handoff procedures. They searched multiple databases and identified 1,432 citations. After screening and removing duplicates, they included 28 articles in their review. These studies spanned various clinical
settings, including ICUs, ORs, standard inpatient units, emergency departments, surgical units, obstetrics, nursing homes, neurology units, orthopedic units, and pediatric units, and examined handoffs among doctors and nurses. The authors noted that the Situation, Background, Assessment, and Recommendation (SBAR) mnemonic was the most common standardized tool, followed by the I-PASS mnemonic.

Pokojová and Bártlová (2018) observed that SBAR was suitable for most handoffs, such as between shifts or transfers between units, ensuring continuity of care and patient safety. They noted that I-PASS, conversely, could be used for more complex cases requiring in-depth information and context. The I-PASS Handoff Bundle, described in the literature as a standardization technique, includes a component of staff training in communication skills, didactic workshops, simulation training, and computer learning, leading to significant reductions in adverse events as documented by Starmer et al. (2014). The authors also suggested that I-PASS could be modified to better suit specific contexts and their unique needs. They identified that integrating electronic patient handoffs into the EMR could aid in sharing patient information and continuity of care, but some evidence suggests that EMR integration may complicate handoffs and would be time-consuming.

The review by Pokojová and Bártlová (2018) has several strengths, including its comprehensive search strategy, which involved searching multiple databases and many citations screened. The inclusion of various clinical settings and examination of handoffs among different healthcare professionals adds to the value of their findings. The authors’ focus on standardized handoff procedures, particularly the SBAR and I-PASS mnemonics, addresses a critical need in healthcare for standardized communication tools. However, the review also has limitations. The reliance on existing literature means their findings depend on the quality and scope of the studies
included in the review. Furthermore, while the integration of electronic patient handoffs was discussed as a potential solution, the evidence on its effectiveness was not conclusive, highlighting the need for further research in this area. Additionally, the study did not address potential barriers to the implementation of standardized handoff procedures, such as resistance to change or lack of institutional support, which could impact the feasibility and success of these interventions in real-world settings.

Lazzara et al., 2022. Lazzara and colleagues (2022) conducted a meta-analysis on the standardization of postoperative handoffs and the effect on provider, patient, organization, and handoff outcomes. The authors searched multiple databases and identified 1,940 citations. After screening and removing duplicates, they included 41 studies in their analysis. The handoffs included occurred between attending physicians, fellows, nurse practitioners, PACU nurses, respiratory therapists, certified registered nurse anesthetists, anesthesia teams, and surgical teams. Provider outcome variables included survey responses and attendance during handoffs. Patient outcome variables included post-procedure health, post-procedure complications, positive condition changes, and mortality. Organization outcome variables included culture surveys and reported equipment problems. Lastly, handoff related variables included transfer of specific information, patient details, procedure details, post-operative details, accuracy of handoff information, and interruptions.

The meta-analysis by Lazzara et al. (2022) revealed positive trends in all measured outcomes (provider, patient, organization, and handoff). Of the 20 studies reporting on provider-related outcomes, a significant shift towards positive outcomes was observed (p < .001), indicating that standardized handoffs favored provider outcomes. Similarly, 10 studies focusing on patient-related outcomes showed a significant positive shift (p < .001) with standardized
handoffs. Two studies on organizational outcomes and 31 studies on handoff-related outcomes also exhibited significant positive shifts ($p < .001$) favoring standardized handoffs. However, despite these findings, Lazzara et al. (2022) cautioned that standardization might not always be beneficial. They noted that while standardization promotes compliance, it may also lead to a decrease in quality and intentional variability for unique cases. Additionally, standardization could introduce irrelevant information that detracts from more critical items. Therefore, understanding the relationship between standardization and relevant outcomes is crucial, as standardization is not a one-size-fits-all solution for all patients.

Strengths of the meta-analysis by Lazzara and colleagues (2022) include its comprehensive analysis of many studies, encompassing various healthcare settings and professions involved in handoffs. The inclusion of multiple outcome variables, such as provider, patient, organizational, and handoff-related outcomes, provides a holistic view of the impact of standardized handoffs. Additionally, the significant positive shifts observed in all measured outcomes suggest a strong beneficial effect of standardized handoffs across different contexts. However, the study also has limitations. One limitation is the focus on postoperative handoffs, with limited investigation into pre-operative and intraoperative handoff protocols. While a meta-analysis needs homogeneity to conduct the statistical analysis, this narrow focus may limit the application of their findings to other phases of care. Furthermore, the lack of commonly agreed-upon metrics in anesthesia handoff research makes it challenging to compare and interpret results across studies. Additionally, the authors of the meta-analysis acknowledge the need for further research to understand not only what changes occurred due to standardization but also why these changes occurred, which could provide valuable insights into the effectiveness of standardized handoffs (Lazzara et al., 2022).
**Evidence Synthesis**

**Thesis.** The implementation of standardized handoff interventions has shown positive effects on patient outcomes, communication, and the continuity of care across various healthcare settings. The overall impact of standardized handoffs on patient safety and care quality is well-supported by the literature. From the evidence provided, several themes emerge regarding standardized handoff interventions and their impact on patient outcomes.

**Effectiveness of Standardized Handoff Tools.** The studies consistently demonstrated that standardized handoff tools, such as checklists, mnemonics (e.g., I-PASS, ISBAR, SBAR), and protocols, are effective in improving communication, reducing errors, and enhancing patient safety and care quality (Rosenthal et al., 2018; Lazzari, 2024; Rose, 2016; Pokojová & Bártlová, 2018; Lazzara et al., 2022). These tools standardize the transfer of patient information, ensuring essential details are not overlooked during handoffs. For example, the I-PASS mnemonic has been shown to improve the completeness and accuracy of information exchanged during handoffs (Rosenthal et al., 2018). By standardizing the handoff process, the continuity of patient care can be ensured.

**Context-Specific Challenges and Considerations.** The effectiveness of standardization efforts can be influenced by the type of handoff, the healthcare professionals involved, and the specific clinical setting (Rosenthal et al., 2018; Lazzari, 2024; Rose, 2016; Pokojová & Bártlová, 2018; Lazzara et al., 2022). For example, the context of postoperative handoffs in anesthesia to PACU and ICU nurses required different approaches than handoffs between shifts or between units. Factors such as the urgency of care, complexity of patient conditions, and involvement of different healthcare professionals influenced the effectiveness of standardized handoff tools in these contexts. Healthcare organizations should tailor their approach to standardization to
address these specific challenges potentially requiring different tools or protocols for different types of handoffs.

**Need for Further Research and Integration with EMRs.** Despite the positive findings regarding the effectiveness of standardized handoff interventions, there was a recognized need for further research to better understand their long-term effects. Current literature provides valuable insights into the immediate benefits of standardized handoff tools, such as improved communication, reduced errors, and enhanced patient safety (Lazzari, 2024; Pokojová & Bártlová, 2018; Lazzara et al., 2022). However, more research is needed to assess the sustained impact of these interventions on patient outcomes over time and a cost-benefit analysis for healthcare organizations as this intervention requires education and training.

Another area that requires further exploration is the integration of standardized handoff tools with EMRs. While EMRs can streamline information sharing and improve the efficiency of patient care, their integration with standardized handoff tools is not without challenges. For example, Pokojová and Bártlová (2018) noted that while electronic patient handoffs could enhance continuity of care by making information readily accessible to all staff, there was also evidence suggesting that EMRs may complicate handoff processes and contribute to information overload. Therefore, it is essential to investigate how best to integrate standardized handoff tools with EMRs to maximize their benefits and minimize potential drawbacks. Furthermore, the integration of standardized handoff tools with EMRs could have broader implications for healthcare delivery. For instance, Lazzara et al. (2022) highlighted the potential for EMRs to improve provider, patient, organizational, and handoff-related outcomes. By facilitating a swift exchange of critical information between healthcare providers, EMRs could further enhance care coordination, reduce medical errors, and improve patient outcomes. However, achieving these
benefits requires careful consideration of how to effectively integrate standardized handoff tools into existing EMR systems.

**Implications for a Quality Improvement Project**

The findings from this literature review emphasized the critical role that effective communication plays in patient safety and care quality, particularly during transitions of care that occur regularly in the PACU. The evidence highlighted the positive impact of standardized handoff tools, such as checklists, mnemonics, and protocols, in improving communication, reducing errors, and enhancing patient outcomes. The utilization of a standardized handoff tool may also include the added benefit of increasing nurses’ self-esteem and safety culture, as documented by Lazzari (2024).

**Rationale**

The Plan-Do-Study-ACT (PDSA) model was utilized for this quality improvement project. The PDSA model provides a structured approach to implementing and evaluating change (Katowa-Mukwato et al., 2021). In the Plan stage, the project lead developed pre/post-implementation Likert surveys to assess PACU nurses’ perception of the I-PASS mnemonic. In the Do stage, the project lead conducted an educational program about I-PASS to nurses in the PACU. In the Study stage, the project lead analyzed the results of post-implementation Likert surveys to evaluate nurses’ perception of I-PASS. Lastly, in the Act stage, areas for improvement were identified and refined for future PDSA cycles.

**Global Aim**

This quality improvement project’s global aim was to improve the patient handoff process in the PACU. The process began with patients being admitted to the PACU and ended with patients being discharged from the PACU.
Specific Aim

The specific aim of this quality improvement project was to improve PACU nurses' perception in utilizing the I-PASS handoff tool, achieving a 20% increase in perception of I-PASS among PACU nurses by July 15, 2024.

Methods

Context

This quality improvement project took place in the PACU microsystem at a hospital in New Hampshire. The macrosystem is a 234-bed trauma II facility that serves the Seacoast region of New Hampshire, Massachusetts, and Maine. The PACU is a 10-bed specialized unit within the hospital where patients recover from anesthesia after a variety of surgeries. The patients admitted to the PACU are of all ages, genders, and races/ethnicities. Except for open-heart surgeries and other unique special circumstances, the PACU receives patients from orthopedic, neurological, gastrointestinal, genitourinary, gynecological, cardiovascular, vascular, respiratory, and trauma cases. The diverse caseload requires efficient collaboration, teamwork, and communication among an interdisciplinary team of healthcare professionals.

The macrosystem is guided by a mission to prioritize human life and a vision to deliver exceptional patient experiences, principles that inform the operations of all hospital units, including the PACU. This exceptional patient experience is impacted by the medications that they may receive in the perioperative area. Anesthesia drugs have a profound impact on various physiological functions, including respiratory and heart systems, musculoskeletal activity, thermoregulation, neurocognition, and hemodynamic stability (Dahlberg et al., 2021). As essential members of the perioperative care team, PACU nurses monitor patients to ensure their physiological functions stabilize and postoperative complications are minimized. This
commitment to vigilant monitoring and care in the PACU aligns with the macrosystem’s mission and vision, ultimately optimizing patient safety and surgical outcomes.

The average length of stay in the PACU varies by patient and is dependent upon the post anesthesia recovery (PAR) score. The PAR scoring system includes five categories, each scored on a scale of 0 to 2: activity, respiration, circulation, consciousness, and oxygenation (Ding & Ishag, 2024). To meet discharge criteria to phase II, which is to Same Day Care (SDC) and the final step before returning home, patients must achieve a PAR score of 9 or greater. To be transferred to an inpatient unit, a PAR score of 8 or greater is required. As part of the transitional nature of the PACU, the nurses in this unit are constantly receiving and handing off patients. On average, the PACU admits and discharges 20-30 patients per day, mostly adults.

The PACU’s interdisciplinary team is composed of registered nurses who make up most of the staff. Currently, there are six full-time nurses, four part-time nurses, and four per diem nurses. The interdisciplinary team in the PACU also includes the anesthesiology department, which consists of anesthesiologists and certified registered nurse anesthetists (CRNAs). Additionally, various surgeons and their respective physician assistants (PAs) and nurse practitioners (NPs) also function within the PACU. Surgeons encompass a wide range of specialties, including orthopedic, general/trauma, plastic, gastrointestinal, electrophysiology, vascular, neurology, gynecology, urology, EENT, dental, and oncology specialists. Coordination among these professionals is crucial in ensuring patient safety and enhancing surgical outcomes.

A major process in the PACU is the receiving and giving of patient handoff reports. Handoff reports are crucial for ensuring the continuity of care, with two reports typically given per patient. The first handoff report is provided by the OR nurse to the PACU nurse upon the patient’s arrival to the PACU, while the second handoff is given by the PACU nurse when
transferring the patient to either SDC or their respective inpatient unit. Currently, patient handoffs given by PACU nurses are unstructured marked by inconsistencies regarding what patient information is shared with the receiving unit’s nurse (SDC or inpatient) upon patient transfer. Unstructured handoffs can lead to the omission of pertinent patient information, resulting in negative patient outcomes. The I-PASS handoff tool was recently proposed as a useful tool to improve patient outcomes by the macrosystem’s nurse leaders, with a goal to implement I-PASS for transfers between every unit within the hospital by the end of the year.

To address this challenge, a quality improvement initiative focused on educating PACU nurses about I-PASS was implemented. Successful implementation of this handoff tool was dependent on PACU nurses’ ability to utilize it effectively and accurately. It was essential to develop an understanding of nurses’ perceptions of standardized handoffs and identify barriers to introducing this change. Implementing this education would improve nurse handoffs and patient outcomes and align with the hospital’s strategic goals of providing high-quality, patient-centered care.

**Cost Benefit Analysis**

The direct financial cost of this quality improvement project was low, as it primarily required an investment of time rather than money for the implementation of standardized handoff education to PACU nurses. The project lead was not an employee of the macrosystem and the time for implementation was a graduate program requirement without cost to the organization. However, there were indirect costs associated with the project, including the time invested by the clinical unit coordinator of the PACU, who was part of the implementation team, and the participation of PACU nurses, who were encouraged to dedicate a portion of their workday to receive education and respond to pre/post-implementation surveys. Despite these costs, the
project lead considered them negligible compared to the benefits of standardized handoffs, which were well-supported by the literature. Miscommunication failures in healthcare, a primary issue standardized handoff aim to address, are a leading cause of sentinel events with an estimated annual cost of $1.7 billion (Aronson et al., 2021). The opportunity cost of this quality improvement initiative sought to benefit the PACU and the macrosystem at large with little risk of detrimental hospital costs.

**Intervention**

The intervention for this quality improvement project involved educating PACU nurses about standardized handoffs, focusing on training them in the use of the I-PASS mnemonic. The intervention spanned one week, during which an educational handout about I-PASS, accompanied by a Quick Response (QR) code with a virtual copy of the handout, was prominently displayed in the nurse station. Prior to the educational component, an Evidence-Based Practice Beliefs Scale (EBPB) Likert-type Scale survey using Qualtrics© was administered to assess nurses’ perception of implementing evidence-based practice (EBP) tools, such as I-PASS and standardized handoff tools. The EBPB survey measured healthcare workers’ beliefs about EBP and their ability to use it in practice (Melnyk et al., 2008).

The project lead developed the educational materials, and the clinical unit coordinator of the PACU provided support and encouraged nurse participation. Nurses were encouraged to read the handout and actively participate in the survey. Following the educational period, the same EBPB survey was distributed to evaluate the effectiveness of the education and assess changes in the nurses' perceptions of using EBP (e.g., I-PASS) within their own clinical practice. Ideally, PACU nurses would demonstrate accurate use of I-PASS during patient transfer once this quality improvement project was completed. The goal of this intervention was to improve the quality of
patient handoffs in the PACU by educating nurses about the value of standardizing the handoff process using the I-PASS mnemonic.

**Study of Intervention**

Several methods were employed to measure the impact of this intervention. Firstly, the pre/post-educational EBPB surveys were analyzed to determine changes in nurses' perceptions and knowledge of using I-PASS and standardized handoff tools. Due to time constraints, it was impractical to assess the quality of every patient handoff through direct observation. However, feedback was collected from PACU nurses through individual semi-structured interviews. This qualitative data provided insights into the perceived benefits and challenges of implementing the standardized handoff process using the I-PASS mnemonic. Overall, a mixed-methods approach combining quantitative survey data and qualitative feedback provided a full assessment of the intervention’s impact on the quality of patient handoffs in the PACU.

**Measures**

The primary instrument to measure this quality improvement project was the 16-question EBPB survey. The EBPB survey was administered before and after the educational component to evaluate nurses’ perceptions and knowledge of using EBP tools such as I-PASS and standardized handoff tools. Likert Scale surveys are commonly used to assess attitudes, perceptions, and beliefs, and the assumption is that nurses will be familiar with this format of questions. This would provide a structured framework for PACU nurses to indicate their agreement or disagreement with statements related to their perception of the effectiveness and utility of EBP. Operational definitions of the EBPB survey consisted of statements related to the steps of implementing EBP with example questions to include: “I am sure that I can implement EBP in a time efficient way”, “I am sure that I can implement EBP”, and “I am confident about my ability
to implement EBP where I work”, etc. (Melynk et al., 2008). Responses were measured on a 5-point scale ranging from “Strongly Disagree” to “Strongly Agree”, with higher scores indicating more positive perceptions. Cronbach’s alpha has been used to assess the internal consistency and reliability of the survey items within the EBPB survey with consistent reliability above 0.85 (Melnyk et al., 2008). Cronbach’s alpha works by measuring if all items within a test measure the same concept (e.g., PACU nurse perceptions of EBP) (Tavakol & Dennick, 2011). The reliability of the EBPB survey made it an effective measure for this quality improvement project. Additionally, qualitative data was collected through individual interviews with PACU nurses to gain insights into the perceived benefits and challenges of implementing the standardized handoff process.

**Analysis**

The data collected from the EBPB surveys was analyzed to assess the impact of the educational intervention on nurses' perceptions and knowledge of using I-PASS and standardized handoff tools. The survey results were compared using descriptive statistics to identify any significant shifts in attitudes or beliefs regarding the effectiveness and utility of the I-PASS mnemonic. Qualitative data from the interviews were analyzed thematically to identify common themes and insights into the perceived benefits and challenges of implementing the standardized handoff process.

**Ethical Considerations**

This quality improvement project was submitted to the University of New Hampshire Department of Nursing Quality Review Committee to ensure that participants' rights and confidentiality are protected throughout the project, guaranteeing anonymity. The project was conducted in a non-coercive and respectful manner, and the project lead had no financial or
personal investment in its success, ensuring impartiality. Based on these ethical considerations, the project lead believed that this quality improvement project is exempt from full Institutional Review Board (IRB) review.

**Results**

**Initial Steps of the Intervention**

The quality improvement project aimed to improve patient handoff processes in the PACU through the implementation of the I-PASS mnemonic. The data collection and intervention phase of the quality improvement project was conducted over a four-week period. The EBPB survey, which was part of the initial project proposal, was modified to specifically assess nurses' perceptions and readiness regarding the use of I-PASS in handoff procedures. As part of the first step, this modified survey was distributed directly to PACU nurses via email. Informal discussions were held with each nurse during distribution to provide context and encourage participation with the survey. Following the pre-intervention survey (Table 1), an educational pamphlet was distributed, and then followed by a post-intervention survey (Table 2). Over the course of the quality improvement project, 6 PACU nurses responded to the surveys resulting in a 43% response rate.

The decision to distribute the survey via email was made collaboratively with the clinical unit coordinator, recognizing that direct dissemination would facilitate greater accessibility and potentially higher response rates compared to QR codes displayed in the nursing station. This approach allowed nurses to complete the survey at their convenience, minimizing disruption to patient care responsibilities while ensuring comprehensive feedback on perceptions of the I-PASS intervention. The thirteen-question pre- and post-intervention survey was created using
Qualtrics and survey results were expressed as a percentage of PACU nurses selecting a degree of agreement out of the total number of nurses participating in the survey.

Process Measures and Outcomes

The primary process measure for this quality improvement project involved assessing the perceptions and confidence levels of PACU nurses regarding the I-PASS handoff tool through pre- and post-implementation surveys. The survey was designed to measure various aspects of the nurses’ familiarity, confidence, and perceived efficacy of the I-PASS tool, which is essential for ensuring effective and standardized patient handoffs.

The pre-implementation survey measured initial attitudes and knowledge about the I-PASS tool among the nurses. Questions addressed their familiarity with the tool, confidence in implementing it, perceived ability to overcome barriers, and belief in the tool’s impact on patient care. These measures provided a baseline understanding of the nurses' readiness and potential obstacles to implementing I-PASS. After the educational intervention, a post-implementation survey was conducted to evaluate changes in these attitudes and perceptions. This survey aimed to determine if the educational component effectively increased familiarity, confidence, and the perceived usefulness of the I-PASS tool.

The key process measure was the comparison between the pre- and post-implementation survey responses. By comparing these responses, the effectiveness of the educational intervention could be assessed, highlighting improvements or persistent challenges in implementing the I-PASS tool. The surveys' results provide critical insights into how educational interventions can influence nurses' readiness and ability to adopt standardized handoff procedures, ultimately aiming to enhance patient care quality in the PACU. This comparison of pre- and post-intervention data was essential for identifying the success of the quality
improvement project, as it directly reflects the nurses' growth in knowledge and confidence regarding I-PASS, as well as their perceived ability to integrate this tool into their daily practice effectively.

**Table 1**

*I-PASS Handoff Tool Pre-Implementation Survey Results*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am familiar with the I-PASS handoff tool.</td>
<td>0%</td>
<td>17%</td>
<td>0%</td>
<td>17%</td>
<td>67%</td>
</tr>
<tr>
<td>I am sure that I can implement I-PASS in a timely manner.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>I am sure that I can implement I-PASS.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>I am confident about my ability to implement I-PASS where I work.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>I believe that I can overcome barriers in implementing I-PASS.</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>67%</td>
<td>17%</td>
</tr>
<tr>
<td>I know how to implement I-PASS sufficiently enough to make practice changes.</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>67%</td>
<td>17%</td>
</tr>
<tr>
<td>I am sure that implementing I-PASS will improve the care I deliver to my patients.</td>
<td>0%</td>
<td>17%</td>
<td>33%</td>
<td>0%</td>
<td>50%</td>
</tr>
<tr>
<td>I believe that synthesizing patient information is an important step in the I-PASS handoff process.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>I am clear about the steps of I-PASS.</td>
<td>0%</td>
<td>17%</td>
<td>0%</td>
<td>17%</td>
<td>67%</td>
</tr>
<tr>
<td>I am sure that I-PASS can improve clinical care.</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>33%</td>
<td>50%</td>
</tr>
<tr>
<td>I believe that utilizing I-PASS results in the</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>
best clinical care for patients.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that I-PASS is difficult</td>
<td>83%</td>
<td>0%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I believe that I-PASS takes too much time.</td>
<td>50%</td>
<td>33%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 2

*I-PASS Handoff Tool Post-Implementation Survey Results*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am familiar with the I-PASS handoff tool.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>I am sure that I can implement I-PASS in a timely manner.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>I am sure that I can implement I-PASS.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>I am confident about my ability to implement I-PASS where I work.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>I believe that I can overcome barriers in implementing I-PASS</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>I know how to implement I-PASS sufficiently enough to make practice changes.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>I am sure that implementing I-PASS will improve the care I deliver to my patients.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>I believe that synthesizing patient information is an important step in the I-PASS handoff process.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>I am clear about the steps of I-PASS.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>I am sure that I-PASS can improve clinical care.</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>83%</td>
</tr>
</tbody>
</table>
I believe that utilizing I-PASS results in the best clinical care for patients. | 0% | 0% | 0% | 33% | 67%
---|---|---|---|---|---
I believe that I-PASS is difficult | 67% | 33% | 0% | 0% | 0%
I believe that IPASS takes too much time. | 50% | 50% | 0% | 0% | 0%

**Contextual Elements**

Several contextual elements interacted with the intervention throughout the quality improvement project aimed at educating PACU nurses about the I-PASS handoff tool. These elements played a significant role in shaping the implementation and outcomes of the intervention. The involvement and support of the clinical unit coordinator were crucial. The coordinator facilitated the dissemination of the survey and educational materials and encouraged nurses, which helped increase participation rates. This support ensured that the intervention was integrated smoothly into the existing workflow of the PACU.

Nurse engagement was another critical contextual element. While there was a good level of participation, the engagement did not reach the expected levels, as highlighted by the fact that only 6 out of the 14 nurses on the unit responded to the surveys. Despite direct communication and encouragement, not all nurses were able or willing to participate, which may have been influenced by various factors such as workload and availability. The decision to disseminate the survey and educational materials via email, rather than relying solely on a poster in the nurse station, was a key contextual adaptation. This approach ensured that each nurse received the information directly, allowing them to complete the survey and review the educational content at their convenience. Follow-up conversations reinforced the importance of the survey and the educational component, further encouraging participation.
Time constraints within the PACU environment may have also played a significant role. The PACU is a fast-paced environment where nurses may have limited time to participate in additional activities. Acknowledging this, the educational materials were designed to be concise and accessible, ensuring that nurses could engage with the content without significant disruption to their workflow. The use of email to distribute the educational pamphlet allowed nurses to access the information conveniently from their mobile devices or computers. This technological approach helped overcome potential barriers related to physical access to educational materials and ensured that the information was readily available.

The comparison between the pre- and post-implementation survey responses, as depicted in Table 1 and Table 2, reveals significant improvements in the perceptions and attitudes of PACU nurses towards the I-PASS handoff tool following the educational intervention. In the pre-implementation survey (Table 1), only 67% of nurses were strongly familiar with the I-PASS handoff tool. Post-implementation (Table 2), this increased to 83%, indicating a higher level of awareness and understanding of the tool among the nurses after the educational intervention.

Confidence in implementing I-PASS also saw notable improvement. Pre-intervention, 83% of the respondents felt they could implement I-PASS in a timely manner, and 100% felt sure they could implement it overall. Post-intervention, these figures rose to 100% for both timely implementation and overall confidence, reflecting a significant boost in the nurses' confidence levels due to the training provided.

Furthermore, the belief in overcoming barriers to implementing I-PASS showed a marked improvement. Initially, only 17% strongly believed they could overcome these barriers, with a notable 17% strongly disagreeing. After the intervention, 50% strongly believed they could
overcome barriers, and no respondents strongly disagreed, suggesting that the educational intervention effectively addressed many of the perceived obstacles.

Nurses’ perceptions of the impact of I-PASS on patient care also improved. Pre-intervention, only 50% strongly agreed that I-PASS would improve patient care, and 33% were neutral. Post-intervention, 67% strongly agreed with the positive impact of I-PASS, and the neutral responses dropped to 0%, indicating a stronger consensus on the benefits of I-PASS for patient care.

The clarity of the I-PASS steps saw an increase as well. Initially, 67% of respondents strongly agreed that they were clear about the steps of I-PASS, while post-intervention, this number rose to 83%. This suggests that the educational materials effectively clarified the process for the nurses.

Lastly, the perception of I-PASS being difficult decreased significantly. Pre-intervention, 83% of respondents strongly disagreed with the statement that I-PASS is difficult. Post-intervention, this increased to 100%, indicating that the educational intervention made the process seem easier and more manageable.

Overall, these associations highlight the positive impact of the educational intervention on nurses’ perceptions and confidence in using the I-PASS handoff tool. The improvements observed in the post-implementation survey responses suggest that the intervention was effective in enhancing the quality of patient handoffs in the PACU. This success highlights the value of standardized handoff tools and the importance of educational interventions in promoting their effective use.
**Unintended Consequences**

While the educational intervention on the I-PASS handoff tool achieved many of its intended outcomes, there were several unintended consequences that emerged during the project. One of the primary issues was the lack of staff engagement, which was less than anticipated. Despite efforts to encourage participation through emails and personal follow-ups, only 6 out of the 14 nurses completed both the pre- and post-implementation surveys. This lower engagement rate might reflect the high workload and scheduling conflicts prevalent in the PACU environment, which could limit nurses' availability and willingness to engage in additional educational activities outside their immediate clinical responsibilities.

Another unintended consequence was related to the academic time constraint of the quality improvement project. The timelines for implementing the intervention and gathering data were constrained by the academic schedule, which did not always align with the operational dynamics of the PACU. This misalignment may have pressured the project implementation, potentially affecting the depth and thoroughness of engagement with the nurses and the overall quality of the feedback collected.

These unintended consequences highlight the complexities of implementing quality improvement projects within clinical settings and the need for flexible, responsive project planning that accommodates the realities of healthcare work environments. Addressing these issues in future iterations could enhance engagement and effectiveness, leading to more robust and sustained improvements in practice.

**Missing Data**

The analysis of this quality improvement project was impacted by missing data due to lower-than-expected nurse engagement. Out of 14 nurses in the PACU, only 6 completed both
the pre- and post-implementation surveys. This limited participation could affect the 
generalizability of the findings. The primary reasons for missing data include the demanding 
schedules in the PACU and the voluntary nature of the survey, which may not have been 
prioritized over immediate clinical duties. To address this in future projects, implementing more 
flexible survey timings, offering incentives, and better integration of educational components 
into daily workflows could help improve engagement and data completeness. Recognizing and 
mitigating participation barriers is essential for improving future interventions’ effectiveness.

Summary

Key Findings

The quality improvement project focused on enhancing PACU nurses' perceptions and 
utilization of the I-PASS handoff tool, resulting in significant improvements. Notably, post-
implementation survey results indicated an increase in familiarity with I-PASS from 67% to 83% 
among nurses. Confidence in effectively using I-PASS also reached 100% post-intervention. 
Additionally, the perception of I-PASS as a difficult tool decreased significantly, demonstrating 
the effectiveness of the educational intervention. However, engagement was lower than 
anticipated, with only 6 out of 14 nurses completing both surveys, highlighting an area for 
 improvement in future engagement strategies.

Relevance to the Quality Improvement Model

This project effectively utilized the PDSA cycle, essential for implementing change in 
healthcare settings. During the Plan stage, pre/post-implementation Likert surveys were 
designed to assess nurses' initial perceptions of the I-PASS mnemonic. In the Do stage, the 
educational program about I-PASS was tailored and conducted, with the content distributed via 
email after discussions with the clinical unit coordinator identified this method as the most
efficient for dissemination. The **Study** stage involved analyzing the results of the post-implementation surveys to evaluate changes in nurses' perceptions. The **Act** stage was focused on identifying areas for improvement and refining the intervention for future PDSA cycles, aiming for more effective implementation based on the study's findings.

**Relevance to Specific Aim**

The specific aim of this project was to improve PACU nurses' perceptions of the I-PASS handoff tool, with a target of a 20% increase in positive perceptions by July 15, 2024. Although the aim of increasing positive perception by 20% was partially met, the interventions led to significant improvements in nurses’ confidence and understanding of how to utilize the I-PASS tool effectively. However, the limited response rate suggests a need for reevaluating engagement strategies to ensure broader participation and more comprehensive data collection in future cycles.

**Strengths**

The project's strengths include its strategic use of the PDSA cycle, which provided a structured and iterative framework for implementing and evaluating change. This approach allowed for responsive adaptations based on real-time feedback. Furthermore, the decision to distribute educational materials via email was a strategic modification made after consulting with the clinical unit coordinator, ensuring efficient access to the information for all nurses. This method proved effective in disseminating the information but also highlighted the challenge of ensuring high engagement through this medium. The direct involvement of the clinical unit coordinator and the tailored approach to communication were crucial to the initiative, ensuring the project was well-integrated within the existing workflow of the PACU and receptive to the nurses' daily challenges. These strategies led to observed improvements in the utilization and
perception of the I-PASS tool, aligning well with the overall goals of enhancing patient handoff processes in the PACU.

**Interpretation**

*Nature of the Association Between the Intervention and Outcomes*

The educational intervention targeting PACU nurses' proficiency with the I-PASS handoff tool showcased a robust association between structured training and improved handoff practices. Following the intervention, there was a notable increase in both familiarity and confidence among nurses in using the I-PASS protocol. This change was measured through pre- and post-intervention surveys, which revealed that familiarity with I-PASS increased from 67% to 83%, and confidence in its application reached nearly 100%. These results suggest that even a brief but focused educational initiative can significantly impact nurses' ability to understand and apply standardized handoff tools. The intervention effectively bridged the gap between theoretical knowledge and practical application, equipping nurses with the necessary skills to enhance patient handovers, a critical point of care that hinges on accuracy and completeness of information.

This positive outcome reflects the critical role of educational programs in healthcare settings where the accuracy of information transfer directly impacts patient outcomes. It highlights the potential of targeted interventions to significantly enhance procedural knowledge and competence in clinical practices, particularly in settings as dynamic and fast-paced as the PACU. By improving understanding and confidence, the intervention not only enhances individual nurse performance but also contributes to the overall safety and efficiency of patient care processes.
Comparison of the Results

The findings of this quality improvement project emphasize the effectiveness of educational interventions in teaching PACU nurses to proficiently use the I-PASS handoff tool. This aligns with broader research that emphasizes the importance of education in implementing standardized handoff protocols. Similar studies, such as those by Starmer et al. (2014), have demonstrated that comprehensive training on handoff tools like I-PASS leads to significant reductions in medical errors and preventable adverse events in various healthcare settings. This project specifically highlights how targeted education can increase familiarity and confidence among nurses, even without directly measuring the subsequent impact on patient safety.

Moreover, research published by the Joint Commission and other scholarly sources frequently supports the notion that improved handoff processes, facilitated through education, are crucial for enhancing patient outcomes. These sources argue that better-educated nursing staff are more likely to perform handoffs that reduce information omissions, thereby potentially decreasing patient risks. Although this project did not directly observe the effects on patient safety, the improvement in nurses’ understanding and execution of I-PASS suggests that similar benefits could be expected.

Furthermore, the literature highlights the challenge of integrating new protocols within active clinical settings. This project’s method of integrating I-PASS training via accessible, efficient channels such as email exemplifies a successful strategy for embedding new practices with minimal disruption. This approach reflects findings from studies like those by Blazin et al. (2020), which indicated that successful implementations are those that are seamlessly integrated into clinicians’ routines, thus enhancing learning without significant operational interference.
In essence, this project's outcomes contribute to the accumulating evidence that educational interventions are pivotal in enhancing handoff practices. While direct observations on patient safety improvements were outside the scope of this project, the established link between well-implemented handoff protocols and safer patient outcomes in existing literature provides a strong basis to infer that similar improvements are likely. The project thus not only reinforces the efficacy of educational strategies in promoting the adoption of standardized handoffs but also suggests potential pathways for future research to directly link these educational gains to patient safety metrics.

**Impact of the Project**

The impact of this quality improvement project on both the personnel involved and the operational systems within the PACU was significant and multifaceted. For the PACU nurses, the educational intervention provided a structured approach to learning and utilizing the I-PASS handoff tool, leading to increased competence and confidence in their handoff practices. This improvement in skill and knowledge likely contributed to enhanced job satisfaction and reduced stress, as nurses felt better equipped to manage the critical task of patient handoffs, which are pivotal moments in patient care that demand accuracy and thoroughness.

Systemically, the implementation of a standardized handoff protocol through the I-PASS tool potentially streamlined communication processes between the PACU and other units within the hospital. By standardizing the method and content of handoffs, the project likely reduced variability in the quality of information transmitted during these exchanges. This standardization helps in minimizing the chances of information loss or miscommunication, thereby enhancing the overall efficiency of patient transfers. The smoother transition process not only aids in
improving the quality of care but also optimizes the use of hospital resources, which can lead to decreased wait times and enhanced patient experiences.

Moreover, this project aligns with the broader strategic goals of the hospital. The successful implementation and positive outcomes within the PACU serve as a model for the hospital's vision to implement I-PASS across all units by the end of the year. By demonstrating the effectiveness of the I-PASS training and its positive impact on handoff quality in one of the most critical areas of the hospital, the project provides a blueprint for broader institutional change. This alignment with the hospital's strategic goals not only highlights the project's relevance but also enhances its potential for scalability and sustainability across the entire organization.

The educational component of the project also served to foster a culture of continuous improvement and learning within the PACU. By engaging nurses in this process and demonstrating the benefits of standardized handoffs, the project may have increased openness to adopting other evidence-based practices and innovations. This cultural shift towards embracing structured communication and ongoing education can further solidify the resilience and adaptability of the healthcare workforce, preparing them to handle the complexities of modern healthcare environments more effectively.

**Differences Between Observed and Anticipated Outcomes**

While the quality improvement project achieved significant improvements in the PACU nurses' familiarity and confidence with the I-PASS handoff tool, the engagement levels observed during the project were lower than anticipated. One of the main reasons for this discrepancy was the lower-than-expected survey completion rate. Despite proactive measures such as emails and direct follow-ups, only 6 out of 14 nurses completed both the pre- and post-implementation
surveys. This reduced engagement could be attributed to the high workload and time constraints faced by PACU nurses, who often prioritize patient care over additional tasks, including training and feedback surveys. Furthermore, the choice of email as the primary method for disseminating educational materials, while efficient, may not have been engaging enough to capture and sustain nurses’ attention amidst their busy schedules.

The educational intervention was primarily delivered via email, which was chosen for its efficiency and ease of access. However, this method may have limited the depth of interaction and engagement with the material. Alternative approaches that include more interactive or face-to-face components might have resulted in higher engagement and more robust feedback, allowing for a more comprehensive assessment of the intervention’s impact. The culture of the PACU and the broader institutional environment may also have played a role in the lower engagement levels. In high-pressure environments where urgent care is the priority, initiatives that are perceived as non-urgent may receive less attention. Additionally, if the institutional culture is not strongly oriented towards continuous education and quality improvement, initiatives like this one might not be prioritized by the staff.

The timing of the intervention might have coincided with particularly busy periods in the PACU, further hindering participation. Strategic scheduling of educational interventions during less busy times or incorporating them into mandatory training sessions could potentially improve engagement. Addressing these issues in future iterations could involve reassessing the engagement strategies, considering alternative educational delivery methods, and fostering an institutional culture that more actively supports continuous professional development and quality improvement initiatives.
Costs and Strategic Trade-Offs

The implementation of the I-PASS handoff tool in the PACU involved notable time commitments from the project lead and nurses, with minimal direct financial costs. The primary investment was in developing and disseminating educational materials, while the main trade-off was the potential diversion of nurses' time from patient care to training. Despite these costs, the anticipated improvements in patient safety and communication efficiency justify the investment. Future initiatives might focus on integrating training more seamlessly into regular workflows to minimize disruption and enhance engagement.

Limitations

Generalizability

One of the primary limitations of this quality improvement project is its limited generalizability, stemming from its execution within a specific clinical setting—a single PACU in a hospital located in New England. The study involved only a small cohort of 14 nurses, with merely 6 completing both the pre- and post-intervention surveys. Such a limited sample size and setting may not reflect the diversity and operational variances present across different hospitals or geographical locations. This restricts the ability to broadly extrapolate the findings to other healthcare environments which may vary significantly not only in staff composition and patient demographics but also in institutional policies, resources, and the prevailing healthcare practices. Each of these factors can influence the effectiveness and reception of similar interventions. Therefore, while the results are promising within the context of this particular PACU, caution must be exercised when applying these results to different settings without considering contextual adaptations to accommodate varying operational and cultural environments. Future studies aiming to enhance generalizability might include multiple departments or hospitals in
diverse locations to capture a broader range of healthcare contexts and validate the findings across a wider spectrum.

**Internal Validity**

Several factors potentially compromised the internal validity of this quality improvement project. The dynamic nature of the hospital environment means that concurrent initiatives or changes in PACU protocols during the study could have confounded the results attributed to the I-PASS training. Such confounding variables make it challenging to isolate the effects of the educational intervention from other simultaneous changes.

Additionally, the reliance on self-reported survey data introduces the risk of response bias, where nurses might report more favorable perceptions of their competence and confidence, either to conform to perceived expectations or due to a desire to appear compliant with the new protocols. Furthermore, the low response rate, with only 6 out of 14 nurses completing the surveys, raises concerns about non-response bias. This bias suggests that the views of those who did not participate might systematically differ from those who did, potentially skewing the results and affecting the representativeness of the findings.

Efforts to minimize these biases included designing neutral survey questions and monitoring external changes within the PACU. However, future projects could enhance internal validity by incorporating control groups, using blinding techniques where applicable, and employing multiple data collection methods such as observations and interviews to provide a more comprehensive understanding of the intervention’s impact. These measures would help in more accurately assessing the effectiveness of the I-PASS training and mitigating the influence of confounding factors.
Addressing Limitations

During the quality improvement project, several strategies were implemented to address inherent limitations and enhance the study's validity. Recognizing the challenges of generalizability and internal validity, the project was meticulously documented to aid future adaptation and utilized neutral, non-leading survey questions to minimize response bias. Efforts to increase engagement and reduce non-response bias included proactive follow-up communications with PACU nurses, emphasizing the importance of their participation. These actions were aimed at boosting response rates and ensuring more reliable and applicable findings, thus enhancing the robustness and impact of the research on improving handoff practices in the PACU.

Conclusion

Usefulness of the Work

This quality improvement project has proven the effectiveness of targeted educational interventions in enhancing PACU nurses' proficiency with the I-PASS handoff tool, thus facilitating more reliable and standardized patient handoffs. By significantly improving nurses' understanding and confidence in using the tool, the project has shown that well-designed educational efforts can directly impact the quality of clinical communication. The improved familiarity with the I-PASS protocol among nurses suggests better patient data transfer and potentially enhanced patient safety, aligning with the broader goals of healthcare quality and safety standards. The results provide actionable insights for healthcare administrators and educators seeking to bolster communication protocols in critical care settings. Overall, the project highlights the critical link between effective training programs and the practical improvement of healthcare delivery processes.
**Sustainability**

The sustainability of the improvements achieved through this quality improvement project hinges on continued institutional commitment and support for the standardized handoff protocols. For these improvements to remain effective and become ingrained in the daily routines of PACU nurses, it is essential to integrate the I-PASS training into the ongoing educational curriculum and staff development initiatives. Regular refresher courses, combined with performance feedback mechanisms, can help reinforce the skills and principles taught, ensuring that the knowledge remains current and practices do not revert. Additionally, incorporating these standards into the onboarding process for new staff will help maintain consistency in handoff practices as personnel changes occur. Ultimately, fostering an organizational culture that prioritizes and continually supports standardized communication practices is crucial for the long-term sustainability of these improvements.

**Potential for Spread to Other Contexts**

The insights gained from this quality improvement project, focusing on enhancing PACU nurses’ perceptions and understanding of the I-PASS handoff tool through educational interventions, highlight its potential applicability across different healthcare contexts. Given the positive changes in perception and confidence among PACU nurses, similar educational interventions could be effectively tailored and implemented in other departments such as emergency departments, intensive care units, and surgical units. These settings, where precise and efficient communication is crucial for patient safety, could benefit significantly from improved handoff practices. By adopting this educational model, other units can foster a deeper understanding and consistent use of standardized handoff tools like I-PASS, potentially leading to broader institutional changes in handoff procedures. Extending this approach would not only
enhance the quality of care across various departments but also strengthen the overall communication framework within healthcare institutions.

**Implications for Practice and Further Study**

This quality improvement project has significant implications for both clinical practice and ongoing research within the healthcare field. For clinical practice, the project highlights the importance of structured education in improving the understanding and effective use of handoff tools like I-PASS. Healthcare facilities should consider integrating such educational interventions into regular training programs to ensure all clinical staff are proficient in best practices for patient handoffs. This is particularly crucial in high-stakes environments like the PACU, where the accuracy of information transfer can directly impact patient outcomes.

For further study, this project lays the groundwork for investigating the direct impacts of improved handoff training on patient safety and clinical efficiency. Future research could focus on quantitatively measuring how changes in nurse perceptions about handoff tools affect patient outcomes, such as error rates, patient satisfaction, and overall care continuity. Additionally, exploring barriers to effective implementation and the sustainability of training effects over time will provide deeper insights into how to optimize handoff practices across various healthcare settings. Researchers might also consider cross-disciplinary studies to compare the effectiveness of different handoff tools and training methods, enhancing the generalizability and applicability of the findings to broader healthcare contexts.

**Suggested Next Steps**

To build on the success of this quality improvement project, several key steps are recommended: First, expand the educational intervention to other units within the hospital to assess its adaptability and effectiveness across different clinical settings. This could help identify
necessary modifications for diverse specialties. Second, initiate a longitudinal study to evaluate the long-term sustainability of the training’s impact on handoff practices, including periodic assessments to track continuity and efficacy. Third, incorporate quantitative measures of patient outcomes, such as error rates and patient satisfaction, to directly link improvements in handoff practices to enhancements in patient safety and care quality. Additionally, conducting a detailed analysis of barriers to effective adoption can provide insights to refine and tailor future interventions more effectively. Finally, integrating the I-PASS handoff training into the onboarding process for new staff will ensure consistent handoff standards are upheld from the start of their tenure, fostering a uniform standard of care throughout the hospital. These steps will help extend the reach and deepen the impact of improved handoff practices, enhancing patient care across the healthcare system.
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