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The Impact and Importance of Patient Education

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Editorial Board Member

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Anyone who has worked in health care for 6 months or longer knows the goal is to get the patient out of the hospital as quickly as possible, while diagnosing the cause of hospitalization and beginning treatment. In today's healthcare environment, just starting the treatment in the hospital is enough, with plans for continued treatment at home, at a skilled nursing facility, or in the ambulatory care setting. We know reimbursements force patients to discharge sooner, but this article is not about reimbursements. It is about effective patient education.

Empowering patients with knowledge and understanding of their conditions, treatments, and overall health can be transformative, not only for their care experience but also for their long-term well-being. Effective patient education is multifaceted, beginning with a learning assessment and choice of patient-appropriate teaching methods, among other factors. Patient education should not be a one-time event. Effective education is an ongoing process that involves reinforcing key information, answering questions, and providing emotional support (Flanders, 2018). Nurses must adapt their teaching methods to the patient's learning style, whether through visual aids, hands-on demonstrations, or verbal explanations.

Despite its importance, patient education in nursing faces several challenges. One of the most substantial barriers is time. Nurses often juggle competing priorities and may struggle to dedicate adequate time for patient teaching. In fast-paced hospital settings, it is easy for patient education to take a backseat to other priorities.

Another challenge is patient literacy and health literacy. Many patients, particularly in underserved populations, may have difficulty understanding medical terms or the implications of their health status. Language barriers, cognitive impairment, and low literacy can complicate efforts to educate patients effectively (Hendel et al., 2024). Additionally, cultural differences may affect how patients perceive health information and the healthcare system itself (Romain, 2025). Nurses must be attuned to these challenges and take necessary steps to overcome them, such as using interpreters or simplified materials.

Multimedia products have made their way into patient education as in all other aspects of health care. Digital platforms, videos, apps, and online resources provide an innovative way to supplement traditional teaching methods. For example, patients can use mobile apps to track their medication schedules, monitor symptoms, or access instructional videos on wound care. Interactive tools can enhance understanding by allowing patients to learn at their own pace and revisit materials as needed. It is important to remember technology should complement, not replace, personal interactions. While digital tools can enhance education, the compassionate human element provided by nurses is irreplaceable.

As nurses, we should not overlook the benefits of patient education that extend beyond the boundaries of the hospital. Educated patients are more likely to adhere to treatment plans, engage in preventive care,

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Journal Mission Statement

MEDSURG Nursing is a scholarly, peer-reviewed journal dedicated to advancing evidence-based medical-surgical nursing practice, clinical research, and professional development. The journal's goal is to enhance the knowledge and skills of medical-surgical nurses to promote health, prevent and manage disease, alleviate suffering, and improve health outcomes across medical-surgical populations.

Editorial

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and manage chronic conditions effectively (Barton et al., 2018). This leads to fewer hospital readmissions, a reduction in healthcare costs, and an overall improvement in patient satisfaction (Rice et al., 2018).

Patient education is not, nor should it be, just a task for nurses. It is a fundamental aspect of nursing practice that significantly impacts patient outcomes (Barton et al., 2018). Nurses can empower and engage patients by providing the knowledge and tools to manage their health. As nurses, we must continue to advocate for effective patient education as a cornerstone of nursing care, ensuring all patients receive the personalized, informed care they deserve. MSN

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Evidence-Based Practice

Improving Congestive Heart Failure Acute Care Readmission Rates

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Congestive heart failure (CHF) is among the top five 30-day post-hospital discharge readmission diagnoses, with a substantial economic burden. Literature supports education and interprofessional efforts to mitigate rehospitalization metrics from skilled nursing and long-term care settings. This project implemented processes to address gaps in education and interprofessional participation in CHF management.

Keywords: congestive heart failure, rehospitalization, 30-day readmission, nursing home, discharge education, interprofessional

Learning Outcome: After completing this education activity, the learner will be able to discuss the use of a multimodal education plan to decrease heart failure-related hospital readmissions.

Congestive heart failure (CHF) is a chronic disease associated with high mortality, decreased quality of life, and frequent hospitalizations. There are 6.2 million patients with CHF in the United States, with an additional 400,000 people diagnosed annually (Kamalinezhad et al., 2022). CHF diagnoses claimed $10.2 billion in healthcare expenditures in 2013, while readmissions claimed $2.7 billion (Zohrabian et al., 2018). Urbich and co-authors (2020) confirmed the rising economic burden, with the total cost of CHF care in 2020 estimated at $43.6 billion.

The Joint Commission and the Centers for Medicare and Medicaid Services measure best clinical practice by tracking hospital readmission rates for a core set of diagnoses, one of which is CHF. The Hospital Readmission Reduction Program is a Medicare initiative that reduces insurance reimbursement to hospitals for increased CHF readmissions. Any hospital readmission within 30 days of discharge is considered a potentially preventable adverse outcome. Approximately 20% of Medicare beneficiaries are readmitted within 30 days, and nursing homes follow this trend at 20%-25% (Lachar et al., 2023). As a result, efforts have been made to decrease Medicare healthcare costs and accommodate enrollments by aging persons (Cubanski & Newman, 2023). Managing patients with CHF is a challenge due to the complexity of coordinating multiple disciplines, and patients' often advanced age and associated comorbidities. Bring and co-authors (2020) expressed concern that a lack of effective patient education, discharge planning, and follow-up in the post-hospital phase result in a return to hospital (RTH).

Project Site and Reason for Change

The county population for the project site in July 2023 was 332,390, with 24% age 65 or older (United States Census Bureau,

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Clinical Question

For older adults in a skilled nursing facility (P), how does implementation of multimodal educational tools regarding heart failure exacerbation (I) compared to current state of no multimodal educational tools (C) affect rehospitalization metrics (O)?

EBP Model

Johns Hopkins Evidence-Based Practice Model (Dang et al., 2022)

Patient Outcomes

Using a multimodal education plan for symptom tracking at discharge from the hospital improved patient outcomes clinically, reducing overall hospital readmissions by greater than 30% and congestive heart failure (CHF) readmissions by 100%. The multimodal educational plan used the American Heart Association (2024) Self-Care Management Intervention in Heart Failure (SMART-HF) educational algorithm and the Symptom Tracker Diary for Heart Failure (STD-HF) tools (Heart Failure Association of the European Society of Cardiology, 2021). The skilled nursing facility nursing staff assisted or administered the process.

Search Strategy and Results

PubMed was searched for 2019-2023, and more than 45 articles addressing CHF rehospitalizations were identified. The 13 articles used for this project focused on the effect of diagnosis literacy on transitional care efforts in mitigating rehospitalizations. Search terms included *CHF+ re-hospitalization*, *30-day readmission*, *nursing home*, *healthcare costs*, *patient discharge*, *economics*, *discharge education, transitional care*, *follow-up*, and *health literacy*. No grey literature was considered.

Databases

PubMed via The University of Alabama's online library services

Clinical Setting/Patient Population/Average Daily Census

566-bed acute care hospital facility in the Florida Panhandle and participating 90-bed skilled nursing facility; average daily census of each facility was not requested or provided at the time of the project.

n.d.). The geographic locality in which this project was implemented houses three major medical centers that treat CHF, with one of these participating in this project. The 675-square mile county has 44 long-term care (LTC) facilities, two inpatient rehabilitation facilities (IRFs) and seven skilled nursing facilities (SNFs); one SNF participated in the project. The local hospitals rely on the IRFs, SNFs, and LTC facilities to provide high-quality care that decreases need for readmissions for acute illness. However, only one CHF specialty clinic operated in the surrounding area at the time of project implementation, resulting in limited access for patients in the region. Algorithm educational tools intended to help affected persons manage heart failure, such as the Symptom Tracker Diary for Heart Failure (STD-HF) and the Self-Care Management Intervention in Heart Failure (SMART-HF) tools, were not in use at the participating acute care hospital or the participating SNF before project implementation in 2023.

Florida's 30-day CHF readmission rate for the first quarter of 2023 was 22.8%; the local rate was 20.9% (S. Richards, personal communication, September 15, 2023). The SNF 90-day readmission rate was 32.7%, and the peer benchmark was 18.8% (S. Richards, personal communication, October 13, 2022). Approximately 23% of patients with heart failure are readmitted to the hospital within 30 days of discharge. The highest CHF readmission episodes occur between days 8 and 60 after discharge, with 21%-23% of readmissions coming from the SNF due to CHF exacerbation (S. Richards, personal communication, October 13, 2022). This disparity ignited concern from the joint body readmission committee formed by the hospital and the local secondary facilities.

Approval from The University of Alabama Institutional Review Board was obtained before initiating the project. All participants were protected by the Health Insurance Portability and Accountability Act of 1996.

Summary of Literature Search

The primary focus of the literature review was methods to reduce RTH. Bring and colleagues (2020) expressed concern that the lack of effective patient education, discharge planning, and follow-up in the post-hospital phase may have impacted RTH. Their randomized controlled trial was conducted to determine if a medical respite program focused on homeless persons would reduce

RTH. Authors found a statistically significant reduction in healthcare costs at 6 months (p<0.04) and 12 months (p<0.03).

In a qualitative study of eight patients with CHF or chronic obstructive pulmonary disease and their family members, Griffiths and co-authors (2021) addressed perceived value of the primary care provider (PCP) in transitional care. Four main themes were identified from analysis of semi-structured interviews:

1. The patient discounts the value of PCP follow-up.
2. The patient does not link readmission with omitted PCP follow-up.
3. The patient values the relationship with the PCP.
4. The patient understands the role of the PCP in coordinating care.

Many patients wished to delay follow-up; they often did not correlate outpatient follow-up with readmission prevention. Griffiths and colleagues (2021) suggested close primary care follow-up is crucial to a successful outpatient experience, preserving quality of life and reducing RTH. While patients initially did not associate outpatient follow-up with preventing readmissions, evidence suggests effective transitional care, inclusive of outpatient follow-up, can reduce heart failure-specific readmissions significantly.

Li and colleagues (2021) reviewed 25 randomized controlled trials published January 2000-June 2020 representing over 8400 patients. Readmission data from a nurse-led transitional care intervention for patients with CHF (intervention group) were compared to a control group. These nurse-led transitional care interventions used nurses as educators and facilitators to assist the family or caregiver with a comfort level for early CHF decompensation recognition and intervention in the outpatient setting while leveraging the primary providers to minimize RTH. Authors concluded the transitional care interventions decreased heart failure-specific readmission and reduced acute care length of stay. In these cases, including caregivers in the discharge planning reduced the risk of return to acute care.

Nutbeam and co-authors (2018) focused on these perceived deficiencies and performed an extensive literature review to address health literacy. They concluded addressing health illiteracy as a pre-existing condition, specifically to improve quality outcomes, will facilitate successful patient engagement and management through education to mitigate the risk associated with long-term, complex conditions. The three core elements of function, interaction, and literacy skills allow learners to understand and use the information to make decisions and actions that will direct healthcare choices.

Also addressing health literacy, Sahlin and colleagues (2022) initiated a study using the SMART-HF CHF symptom-tracking algorithm tool in a multicenter randomized controlled trial at five primary care centers and two hospitals in southern Sweden. The study aimed to reduce rehospitalization through education and wellness ownership. After 240 days, the intervention group's self-care behaviors improved by 21% (p=0.014) and hospital stays dropped by 52% (p≤0.0001).

Bring and colleagues (2020) suggested disease-specific clinical monitoring guidelines for CHF exacerbation, combined with specialized nurse and family educational training as well as accessible patient education and support, enable patients to engage actively in self-wellness and thus improve RTH outcomes. Similarly, Griffiths and co-authors (2021) emphasized nurse-led transitional care interventions could offer potential economic benefits to insurers and healthcare facilities. However, Kast and colleagues (2021) conducted a 26-year literature review across six databases and concluded no scientific evidence supports the cost-effectiveness of the transitional care model. They suggested it in fact may result in negative financial impacts for hospitals.

While research highlights the importance of integrating functional, interactive, and literacy skills to enable patients to understand and apply health information, a gap remains in exploring how these skills specifically influence patient decision making and health outcomes in the context of transitional care interventions. Existing studies generally have focused on broad outcomes without examining the nuanced impact of these skills during critical transition phases in health care, when patients are particularly vulnerable.

Answer to the EBP Question

Findings from the literature review suggested developing an evidence-based practice improvement project that addresses potential gaps in hospital, transitional, and post-discharge care could impact clinical quality outcomes positively. The problem was addressed through a plan to decrease CHF RTH by using evidence-based educational tools to facilitate early identification of fluid management needs. Detailed attention to subtle changes in clinical presentation is necessary to improve quality disease management, decrease RTH, and subsequently improve quality of life. The reported DNP scholarly project evaluated readmission

TABLE 1.
Data Summary

ID Number	BIMS	Days in SNF	EF	PCP Appointment	CHF Rehabilitation Appointment	Family Support	Persons Receptive to Teaching/ Participation
28	15	29	58	No	No	No	Yes
5	0	26	64	No	No	No	No
4	5	12	71	No	No	No	No
19	8	15	10	No	No	No	No
1	15	18	70	No	No	Yes	Yes
9	13	19	40	No	No	Yes	Yes
7	10	55	N/A	No	No	No	No
6	15	21	45	No	No	Yes	Yes
26	14	23	N/A	No	No	Yes	Yes
8	15	35	45	No	No	Yes	Yes
3	15	33	45	No	No	Yes	Yes
2	3	27	67	No	No	No	No

BIMS=Brief Interview for Mental Status, CHF=congestive heart failure, EF=ejection fraction, PCP=primary care provider, SNF=skilled nursing facility

rates for patients with CHF before and after implementation of a multimodal education plan, which included the evidence-based SMART-HF and STD-HF symptom tracking algorithms.

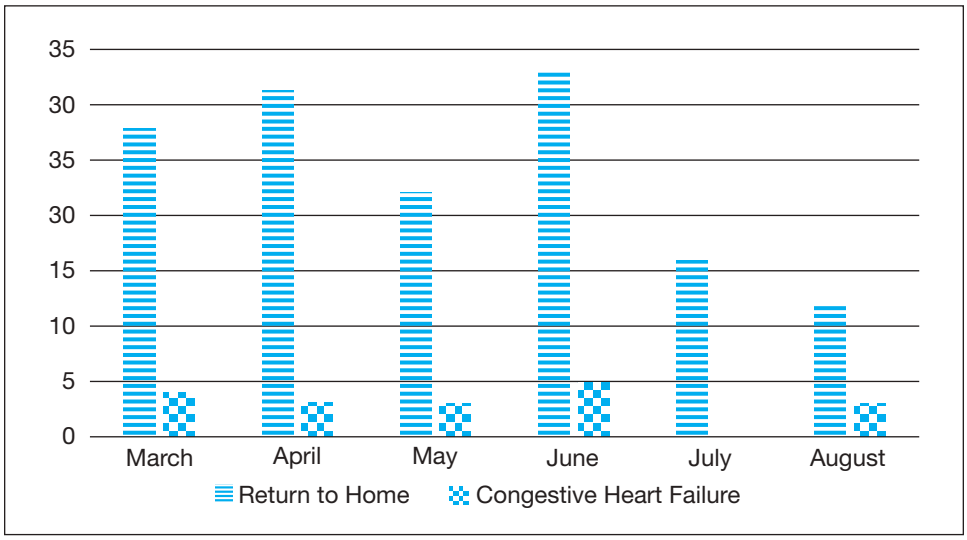
Implementation of the Change in Practice

Project leaders were a master's-prepared nurse practitioner (NP) and the hospital utilization management physician advisor (UM-MD). Additional facilitators included the CHF coordinator, SNF Director of Nursing (DON), transitional care nurses, and the care excellence program manager for population health. Project leaders evaluated the narrative education handouts provided to patients on hospital discharge and found the materials to be too complex for patients with a sixth grade reading level or lower. They were non-engaging, lacking illustrations. DeSai and colleagues (2021) implemented a project to provide complete, concise information by summarizing detailed patient instructions into a single, easy-to-read page. Comparable to the SMART-HF tool, the page used simple language and pictographs, and highlighted key points for clarity. Similarly, the goal of this project was to improve the readability of discharge instructions while ensuring all necessary information was included. Based on the authors' literature review, the premise behind the project was that simplifying discharge instructions into a one-page, easily accessed, understandable resource would prove statistically impactful in addressing readmissions.

The SNF DON and three unit managers were educated on proper use and interpretation of the SMART-HF and STD-HF tools, with teach-back to confirm understanding to assist in project implementation. SNF unit managers received education on signs and symptoms of CHF decompensation and how these symptoms coordinate with the SMART-HF tool. Training also addressed use of the multimodal educational tools, which included the SMART-HF and the STD-HF tools. Fidelity was maintained by providing prefabricated multimodal educational tool packets to be distributed by trained staff. This ensured all project participants were provided the same information, guidance, and materials.

Inclusion criteria were patients diagnosed with CHF who were over age 60 and discharged to a local SNF. The hospital CHF coordinator identified patients meeting these criteria. Consent was waived due to the data collection nature of this quality improvement project per direction of the institutional review board at the project site. After they were identified, project patients were assisted in completing the SMART-HF tool. They also received the STD-HF and were educated on its use. Additional written information explained the action and importance of prescribed medications. The teaching intervention for

FIGURE 1.
Skilled Nursing Facility Readmission Metrics
(June 8-August 18, 2023)



Vertical lines bar=all 30-day return to hospital from skilled nursing facility
Checkers bar=congestive heart failure 30-day return to hospital from skilled nursing facility

SMART-HF and STD-HF use and implementation also was provided to the SNF staff, which included the DON and three unit managers.

Participants received weekly SMART-HF reviews, and diet and weight discussions. Arranging follow-up appointments with the PCP was facilitated, and any appointment information was provided to the patient before discharge from the SNF. Program participation continued for each patient through the first 30 days after hospital discharge. The project implementation phase was followed by a 30-day transitional tracking window to determine if CHF readmission rates from the SNF improved.

Evaluation of the Initiative

Twelve participants completed the initiative (ages 68-91). Of these, 75% (*n*=9) were male. A Brief Interview for Mental Status (BIMS) evaluation found 50% of participants were cognitively impaired (see Table 1). Families of the cognitively impaired patients had no interest in participating, so these patients had the assistance of assigned and trained registered nurse caretakers in completing the project; this process proved to be accurate and effective as evidenced by rehospitalization reduction metrics.

Hospital readmission rates were tracked. Educational progress was quantified through SMART-HF and STD-HF tools administered weekly at the SNF after each patient's hospital discharge. The NP compiled these data, which were analyzed jointly by the NP and UM-MD. The BIMS score, which is embedded in the LTC facility resident assessment instrument mandated for all residents, also was tracked. An interrupted time series analysis approach was used consistent with procedures for gathering data for quality improvement initiatives (Hategeka et al., 2020).

Ejection fraction (EF) for patients ranged from 10% to 71% (see Table 1). The mean age of participants was 82.4, with a mean EF of 51.5%. Data analysis revealed a decrease in SNF rehospitalization rates from 33.1% to 12% during the project period, including a 100% reduction in CHF readmissions during the primary study month of the SNF stay. Only one participant was readmitted after discharge from the SNF. Data showed none of the subjects could get a PCP appointment before being discharged home.

Results and Limitations

The project noted the patient's cognitive capacity is a factor in successfully using multimodal educational tools; however, this was not a significant limitation for caregivers who acted as the patient proxy through observation and symptom reporting.

After reviewing 203 patient

records, the final sample contained 12 patients due to age exclusion criteria. Participants with a BIMS score of 13 or higher had positive project outcomes, exhibiting the ability to participate in use of intervention modalities and having no 30-day readmissions. Cognitively impaired participants required the assistance of trained facility caretakers to complete the SMART-HF and STD-HF tools, limiting patient input and relying more heavily on caregiver objective observations.

BIMS scores collected through this project suggested moderate-to-severe cognitive impairment (0-12) is correlated with weight fluctuations without documented associated symptoms in the STD-HF, even with caretaker assistance. This supports the importance of heightened awareness for insidious symptoms of early fluid retention identification.

STD-HF and SMART-HF tools were 100% used with associated interventions in participants with BIMS scores of 13-15. Participants with a BIMS score less than 13 also benefited by way of caregiver symptom identification and facilitation of associated proper intervention, with a resultant reduction in RTH. In addition, the SNF DON noted improvement in heart failure management with reduced RTH in project patients vs. similar non-participants in the same SNF (see Figure 1). CHF readmission metric analysis supported the DON observations, shown graphically as a drop to 16% RTH overall and 0% CHF readmissions. Implementing this project gave patients and caregivers the knowledge needed to be active in their health and wellness, and confidence to be proactive in facilitating early intervention.

Limitations of this project included the small sample, short time for data collection, and access barriers to establishing PCP follow-up appointments. Although the sample was small, the project provided relevant information in answering the PICO question. Use of multimodal educational tools compared to no multimodal educational tools reduced rehospitalization metrics. Project duration was 70 days, encompassing the 30-day participation period for all participants. A longer project would have allowed additional participants but may not have affected the outcome. For future projects of the same caliber, adding the PCP clinic as part of the project and allowing a longer time frame for participant selection could provide broader outcome analysis.

Lessons Learned/ Nursing Implications

Surprisingly, regardless of EF, CHF continues to be one of the leading causes of hospital readmissions. Due to PCP office policies, appointment scheduling with the PCP was unsuccessful. Closing the PCP access gap may enhance quality of care, decrease patient burden and anxiety, and reduce Emergency Department visits not only in the 30 days post-discharge but also into the subsequent 30-60 days. Barriers to PCP access must be addressed on a grassroots level to help facilitate change.

Additionally, further evaluation of the adequacy of the educational handouts available in the acute care discharge setting is recommended. Specifically, this CHF project result replicates the finding of Sahlin and colleagues (2022) that SMART-HF and STD-HF tools were effective, easily accessible, and user-friendly. These tools would be an economical guideline for clinical practice education opportunities ranging from inpatient discharge to outpatient, home health care, or clinic settings. Integrating these tools into medical-surgical nursing practice guidelines related to CHF would assist nurses in becoming effective patient educators while enhancing clinical assessment focus for the CHF disease process, resulting in the ability to recognize and mitigate decompensation early.

Conclusion

The goal to reduce heart failure hospital readmissions by 25% in a 4-week time frame was met. Using a multimodal educational plan for symptom tracking after hospital discharge improved patient outcomes clinically and reduced readmissions. Reduction in hospital readmissions secondary to CHF supports the efficacy of the education plan for the post-discharge patient or caretaker. This outcome has potential positive financial implications and clinically improves patients' quality of life. MSN

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Susan K. MacArthur
Lyndall Propst
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Savannah Chapman
Amanda Cothran
Tracy Ferguson
Jennifer Hardy
Lauren Long
Jackie Miles
Canaan Watkins

The U.S. healthcare system is changing rapidly in efforts to deliver quality care, improve overall population health, and provide cost savings while delivering care to individuals with higher rates of chronic disease and comorbidities (Chen et al., 2021; Galanis et al., 2019). More registered nurses (RNs) are needed as health care advances and expands to improve quality of life. Nurses are the largest segment of the healthcare workforce, with nearly 60% working in hospitals. Compared to other hospital roles, nurses spend the most time with patients (Monti, 2024; National Academies of Sciences, Engineering, and Medicine [NASEM], 2021).

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A longitudinal study was conducted on the effect of planned interventions during a nurse residency program on resilience and self-care behaviors of newly licensed nurses. Results indicated no statistical difference in resilience before and after intervention. Examination of self-care behaviors provides direction to employers to involve nurses in developing best practices to support the time and resources for engagement in these behaviors.

Keywords: resilience, self-care, burnout, newly licensed nurses, nurse residency program

Learning Outcome: After completing this education activity, the learner will be able to describe the effect of planned interventions during a nurse residency program on the resilience and self-care behaviors of newly licensed nurses.

The pressure of healthcare advancements, higher acuity, and the pace of change in health care, especially during the COVID-19 pandemic, has caused many nurses to experience burnout (Chen et al., 2021; Galanis et al., 2019). Over 68% of nurses experienced burnout during the pandemic, characterized by a high degree of emotional exhaustion, high depersonalization, and a low

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Background

Resilience and self-care behaviors of newly licensed nurses (NLNs) transitioning to professional practice have not been studied extensively. This study measured NLNs' resilience and identified the type of self-care activities they used.

Aim

Determine the effect of a staged intervention on resilience and self-care during an NLN residency program.

Methods

Quasi-experimental longitudinal study with pretest/posttest design

Results

Baseline mean score for Emotional Thriving was 4.0; mean for Emotional Recovery was 3.9. Overall mean score was 4.0. After 11 months, mean score on Emotional Thriving was 4.1; mean for Emotional Recovery remained 3.9, and the overall mean score was unchanged. Paired t-tests found no significant difference between baseline and 11-month scores ($p>0.05$]. Participants identified the same top five self-care activities at baseline and post-intervention.

Limitations and Implications

This study was conducted in one setting during the worldwide COVID-19 pandemic of 2019-2021. Effect of the intervention on resilience could not be determined, and additional research is recommended. Implications do exist to ensure self-care is fostered in NLNs.

Conclusion

Institutional leaders should solicit nurse involvement to recommend and structure realistic self-care activities valued by NLNs and other staff. Sharing among organizations and publication of these best practices for self-care promotion are needed to enhance the nurse work environment.

sense of personal accomplishment from work (French et al., 2022). Early and consistent research suggests burnout is an independent factor affecting a decrease in quality of care, contributing to medical errors, and even impacting an increase in healthcare-associated infections (Dyrbye et al., 2017; The Joint Commission, 2019; Sexton & Adair, 2019; Zixin et al., 2024).

Newly licensed nurses (NLNs) are particularly vulnerable to stressors in the acute care environment. Stressors, such as inadequate staffing, heavy workloads, time constraints, constantly changing patient conditions, a complex communication system, and challenging family dynamics, can lead quickly to burnout (Bruyneel et al., 2021; Leng et al., 2020). Combined with NLNs' limited clinical experience, these stressors can lead to a desire to leave nursing (Concilio et al., 2019; Urban et al., 2022). The taxing work environment and demands of caring for acutely ill patients also create constant strain on NLNs to maintain their compassion, caring attitude, and personal emotional health (Nantsupawat et al., 2024; Urban et al., 2022; Welden et al., 2021).

Resilience can be a protective factor to combat fatigue and burnout in healthcare professionals (Rehder et al., 2021). The American Psychological Association (n.d.) defined resilience as "the process and outcome of successfully adapting to difficult or challenging life experiences, especially through mental, emotional, and behavioral flexibility and adjustment to external and internal demands" (para. 1). Developing strategies for nurse resilience is a patient safety measure, a financial savings method, and a human resource approach for organizations to consider (Zixin et al., 2024).

The Joint Commission (2019) presented a national safety bulletin focused on developing resilience to combat nurse burnout. Key elements of resilience include positive emotions, regulation of emotions, coping style, social support, cognitive flexibility, spirituality, moral code, having a purpose and meaning, and positive role models to learn the skill (Rehder et al., 2021). Leng and colleagues (2020) found the nurse's age combined with years working as a nurse had a significant influence on resilience. Nurses older than 45 who worked in the hospital more than 20 years had the highest resilience scores. This finding reveals the need to focus on resilience training, self-care, and the prevention of burnout in nurses at the beginning of their careers, including when in nursing school.

Purpose

The purpose of this study was to determine the effect of a staged educational intervention focused on building resilience in an 11-

TABLE 1.
Definition of Terms

Term	Definition
Resilience	Ability of the individual in the face of adverse situations to thrive and recover emotionally, maintaining the ability for self-care (Kester & Wei, 2018; Meyer & Shatto, 2018).
Newly licensed nurse (NLN)	Graduate of an accredited school of nursing licensed as an RN in the last 12 months; has not worked more than 10 months as an RN and is enrolled in the medical center RN residency program.
Emotional thriving	Feeling an individual is able to use personal strengths to make a meaningful difference at work; this often includes an element of enjoyment and flourishing in the workplace (B. Sexton, personal communication, 2018; Rehder et al., 2021).
Emotional recovery	Ability to overcome, or emotionally bounce back from adversity, setbacks, and difficult events (B. Sexton, personal communication, 2018; Rehder et al., 2021).
Self-care habits	Wide range of knowledge, skills, and attitudes, including self-reflection and self-awareness, recognition of burnout in self and others, use of appropriate professional boundaries, and self-care planning (Rehder et al., 2021)

month NLN RN residency program. The intervention comprised a series of short classes presenting strategies to build resilience and self-care in NLNs in their first year of acute care nursing practice. See Table 1 for definition of relevant terms.

Review of the Literature

A literature search of English language peer-reviewed publications for 2017-2024 was conducted using electronic databases CINAHL and ProQuest. This timeframe was used because the initial work on the proposal was started in 2016; communication with the first author of the study instrument (Sexton & Adair, 2019) occurred in 2018. Keywords used were *resilience*, *burnout*, *self-care*, *newly licensed nurses*, and *RN residency programs*. Additionally, the reference lists of the articles sourced also were reviewed to locate additional relevant articles for inclusion.

In the scoping review by Baharum and colleagues (2023), an analysis of 23 primary research studies found factors for successful adaptation of an NLN consists of three factors that influence adaptation to practice: workplace culture/support, individual personal traits (positive attitude, proactivity, self-confidence), and training provided by the academic institution on the knowledge, skills, and confidence of the nurse when a student. Authors noted programs have been created that address workplace and academic factors for successful adaptation. A lack of research exists, however, concerning how to enhance an NLN's individual personality traits to build resilience. These results were reinforced in a review of literature on work engagement by Porter and Wang (2022) examining which personal resources affect nurses' work engagement. They found resilience, self-efficacy, optimism, meaning, mattering, hardiness, and grit to be individual personal factors that influence nurse work engagement. Research gaps exist in how to develop each of these factors and measure their longitudinal improvement.

A qualitative meta-synthesis by Randall and co-authors (2023) on the experiences of newly graduated nurses indicated resilience can be developed and improved over time. They identified a need for studies using longitudinal measures of resilience during the newly graduated nurse transition period and after to provide insight into how to maintain and build resilience in nurses. A systematic review and meta-analysis by Han and Yeun (2024) to define the effect of psychological interventions on nurses' resilience found psychological interventions were effective in improving nurses' resilience immediately after the interventions and for a period of more than 12 weeks. In a review of peer-reviewed articles related to healthcare worker burnout, Rehder and co-authors (2021) noted a similar effect on long-term positive emotions was seen with use of the Three Good Things exercise. When this exercise was completed every day for 15 days, a gain in emotional exhaustion, emotional recovery, and happiness, and a decrease in depressive symptoms and problems with work balance persisted 6 and 12 months later.

Hans and Yeun (2024) also identified important factors to consider in applying psychological interventions to promote resilience, as well as the time frame and methods to be used to mirror the preference of the nursing group. Using sound bites of information and short sessions allows the application of preferred interventions. Because resilience

comprises multiple factors, program content and interventions need to be designed based on which factor of resilience is targeted for improvement. Individual studies on resilience training have shown the positive influence of mindfulness and the use of intervention-based training (Blackburn et al., 2020; Clark & Gorton, 2019; Melnyk et al., 2024; Sampson et al., 2019). Research also suggests teaching skills focused on self-care and the importance of self-care to build resilience (Blackburn et al., 2020; Hackett & Bigott, 2024).

To promote NLN resilience, decrease NLN anxiety, and improve patient safety, a structured NLN residency program with well-prepared preceptors and peer support has been suggested (Brown et al., 2022; Concilio et al., 2019; Leonard et al., 2022; Miller et al., 2023; Sampson et al., 2019). Resilience and self-care training using a strength-based preventive approach can support individuals and help overcome workplace adversities. A resilience program can be one source for addressing the impact of workplace stressors on the mental health of NLNs. Incorporating NLN resilience training can improve nurses' self-efficacy, promote nurse well-being, and mitigate compassion fatigue/burnout (Concilio et al., 2019; Sampson et al., 2019; Welden et al., 2021).

In an examination of personal characteristics, high self-confidence and proactivity were seen to increase nursing students' and NLNs' resilience and support their ability to adjust to a demanding work environment (Baharum et al., 2023). Educational and work leaders thus are encouraged to provide structured support, mentored clinical experiences, intensive training, interventions, and education to foster these positive characteristics in NLNs (Baharum et al., 2023; Pillai et al., 2023). As demonstrated in the meta-synthesis of the literature involving resilience in newly graduated nurses by Randall and co-authors (2023), resilience can be developed in NLNs over time with training and support. This is an important concept in the future development of new graduate nurses. A study by Connelly and colleagues (2024) had nursing students report the frequency of their engagement in self-care strategies using the Self-Care Assessment Worksheet. Results demonstrated a positive correlation between self-care and retention.

The current study attempted to address the gap in the literature with longitudinal data after a program focused on interventions to build personal resilience and self-care in NLNs.

Ethics

The institutional review board at the study site reviewed and approved this quantitative study. Informed consent was obtained from participants by one of the investigators in the first RN residency program meeting. Demographic and participant characteristic data were collected, including age, sex, completed educational level, and prior experience in health care. Each participant's information was given a unique identification number to maintain subject confidentiality and anonymity. All data and completed forms were kept secure in a locked file in the principal investigator's office until results were aggregated.

Sample Selection and Sample Description

A convenience sample of three groups of NLNs hired January 2019-March 2021 was approached to participate in the study, with 54 consenting to participate. Participants had to be age 21 or older and able to speak and understand English. All NLNs were participating in an 11-month American Nurses Credentialing Center-accredited RN residency program at a regional medical center in Middle Tennessee. Excluded were new hires who had worked over 10 months as RNs. NLNs also were excluded from data analysis if they attended less than 80% of the RN residency resilience sessions.

Participant age ranged from 21 to 45, with 52% of participants ages 21-25, 24% ages 26-35, and 26% ages 36-45. The majority (n=47) were female. The group was split evenly between associate degree and baccalaureate prepared graduates. Over three-quarters of participants (n=42) had some work experience in health care before entering their nursing programs: licensed practical nurse (n=5), nursing assistant or nurse technician (n=31), or support position (unit secretary, office clerk; n=6). The RN residency program includes new nurses hired for the following inpatient clinical areas: medical-surgical, stepdown, critical care, and the Emergency Department. Women's service areas, outpatient areas, and surgical services are not included in the residency program. In the study group, 35 were employed in medical-surgical units, seven each in stepdown and critical care units, and five in the Emergency Department.

Study Design and Method

A quasi-experimental design with a pretest/posttest design was used. The sample of NLNs was surveyed twice: pre-intervention and at the completion of the 11-month RN residency program. The outcome variables measured were the difference in the pre- and

post-program scores on total resilience, emotional thriving, and emotional recovery and identified self-care habits for each time period surveyed.

Overall resilience was measured using the Emotional Thriving and Recovery Resilience scale developed by Sexton and Adair (2019), which had not been used previously with NLNs. The scale combines two measurements: one quantifying emotional thriving and the other emotional recovery to calculate the overall resilience. Cronbach's alpha for the overall scale (eight items) is 0.867; for the Emotional Thriving Subscale (four items), the score is 0.827. Cronbach's alpha for the Emotional Recovery Subscale (four items) is 0.821. A separate tool to identify baseline and changes in self-care habits was created and used. The self-care tool was reviewed for face validity by a group of eight expert nurses with an average of 10 years of acute care experience to ensure it was relevant to the study population. Face validity was confirmed by a group of NLNs who recently had completed the RN residency program.

Consented participants completed a demographics form at the start of the study. The Emotional Thriving and Recovery Resilience Scale and the self-care behaviors scale were completed before the intervention and at the end of the RN residency program (11 months). All completed surveys were placed in a sealed envelope by the participant before being given to the investigator.

Intervention

The intervention consisted of a 20-25-minute presentation with a group discussion on content related to resilience and self-care during 10 of the RN residency classes. Classes were held once per month for 4-8 hours depending on the content. The curriculum outline (see Table 2) for the resilience and self-care presentation was developed after a review of the literature on resilience, compassion fatigue, and self-care by the director of nursing professional development and the hospital chaplain. The curriculum also was reviewed by the RN residency coordinator and program faculty for content applicability.

TABLE 2.
Curriculum Outline

Class Number	Content
I	Importance of Self-Care and Resilience Personal Reflection Journaling Three Good Things Technique
II	Profile of a Healthy Person Managing One's Resources Journal Sharing
III	The Personal "Why" of Nursing Journal Sharing
IV	Restorative Practice ROMUH – Humor Journal Sharing
V	Restorative Practice Storytelling: Significance and Structure Journal Sharing
VI	Restorative Practice Forgiveness – Self and Others Journal Sharing
VII	Cultivating a Positive Choice/Response Building Empathy Journal Sharing
VIII	Resist – Bad Habits and Rebuild – After a Crisis Journal Sharing
IX	Reward – Self-Care Journal Sharing
X	Reproduce – Investing in Oneself and Others Journal Sharing

In the first class for resilience and self-care, all participants were presented with a journal seeded with inspirational quotations to articulate their experiences and thoughts on transition into practice. They were encouraged to use the journal for reflection on their experiences in the clinical area, their concerns, and their feelings about nursing. The journal could serve as a tool to track their professional growth. At the end of each session on resilience, participants were invited to share entries from their journals with the group.

During the first class, participants also were introduced to the practice of Three Good Things. This intervention was based on the work of Seligman and coauthors (2005). The technique of recounting Three Good Things is intended to retrain participants' brains to remember the good things and their role in creating

TABLE 3.
Average Resilience Scores

	Emotional Thriving Range 1-5	Emotional Thriving Range 1-5	Emotional Thriving Range 1-5
Baseline	4.0+0.1	4.0+0.1	4.0+0.1
11 months	4.1+0.8*	4.1+0.8*	4.1+0.8*

*Not significant $p>0.05$

them. This technique done consistently for at least 2 weeks has been studied to be as effective as medications for relief of anxiety (Cline et al., 2022). Participants were encouraged to write the Three Good Things in their journal or other form of note-keeping or enroll in the developer's website. This intervention was used to build a long-lasting effect of positive memories and gratitude to enhance their resilience.

Data Analysis

Descriptive statistics were used to summarize data. Scores for overall emotional thriving and recovery resilience were compared pre- and post-intervention. The sub-scores for emotional thriving and emotional recovery were compared for change pre- and post-intervention. Paired students' t-tests were used to compare mean scores pre-intervention and end-of-intervention (11 months). The level of significance for all tests was set at $p<0.05$. Self-care behaviors were listed and examined for changes in the number of habits over each time and frequency of the behavior.

Findings

Results of the Emotional Thriving and Recovery Resilience Scale are reported in Table 3. Paired t-tests found no significant difference between baseline and 11-month scores.

Participants identified a wide range of self-care activities during the baseline period. The most common activities used either daily or weekly were time with family and friends (n=49), watching movies or television (n=49), prayer (n=46), physical exercise (n=28), and reading (n=25). At the end of the residency program, the same top five activities were identified. Chi-square analysis found no significant differences between identified activities in the baseline period and 11 months later. Paired t-tests found no significant difference in the frequency of activity use between the baseline and 11-month follow-up periods, nor among the three groups.

Discussion

Baseline resilience scores for NLNs were high, with no significant change 11 months after implementation of the resilience sessions intervention. In examination of results, baseline resilience scores of NLNs were high on both Emotional Thriving Scale (4.0 ± 0.1) and Recovery Resilience Scale (3.9 ± 0.7), with a total score of 4.0 ± 0.6. Emotional Thriving scores were slightly higher at 11 months but not significantly so. Emotional Recovery scores remained the same at baseline and post-intervention. Questions used to measure Emotional Thriving are related to the respondent's job and include job growth, thriving at the job, making a meaningful difference, and looking forward to the job. NLNs showed a positive change in their emotional thriving related to job growth. It could not be determined if this was due to the RN residency program, the resilience interventions, or their combined effects, or their clinical growth in the role of a registered nurse. Emotional Recovery questions are geared to measure recovery after setbacks, adaptation to events, and maintaining a positive outlook despite what occurs. Emotional Recovery measures individual factors beyond the job setting. It could not be determined if there was an effect on emotional recovery from the interventions. The high resilience scores in new graduate nurses also were found in other studies and correlated with low-stress scores (Lin et al., 2023; Urban et al., 2022).

Resilience scores in this study of NLNs were high to start and did not decline over 11 months despite working during a very stressful period in the hospital during the pandemic. Resilience interventions in the RN residency program may have provided a focus and emphasis for NLNs to understand the importance of resilience and of maintaining self-care activities, and strategies to build personal resilience. Research supports the importance of teaching and learning resilience as a strategy to prevent burnout and increase work performance (Shen et al., 2024).

The COVID pandemic presented a unique clinical situation across the globe with heightened transmission and mortality. These effects complicated the transition of NLNs and created the need for enhanced clinical and personal support for new nurses (Glynn et al., 2022). Healthcare workers were being recognized as heroes across the world. This worldwide sentiment may have influenced NLNs

to overestimate their ratings on emotional thriving and recovery.

NLNs used a variety of self-care activities during the study period, with the most common being time with family and friends, watching movies or television, and prayer. The number and frequency of self-care activities used by staff were statistically similar before and 11 months after the resilience sessions. A review of the literature identified no studies that described the type of self-care activities used by NLNs. Taking time for self-care is a major component of work-life balance leading to increased life happiness, job satisfaction, and retention (Connelly et al., 2024).

To support NLNs' self-care activities, organizational leaders should provide a work setting and services or programs that promote time for being with family and friends, doing relaxing activities like watching television, and/or using prayer as these were listed as beneficial and commonly used. Time off work for simple relaxing activities with the NLN's social support network was described commonly. Having time with a social support network is crucial to resilience (Rehder et al., 2021). Organizations need to examine how they can strategically support and plan time off for NLNs and all nursing staff. Organizations that limit shift rotation and the number of work hours in a week, offer flexible scheduling, and have policies that prohibit mandatory overtime support work-life balance. Spiritual support for NLNs from the organization can be provided by having chaplains available to patients and staff, conducting on-site prayer services, using trained peers, and having a chapel for quiet reflective individual use. Organizational leaders need to obtain information from their NLN staff on how to operationalize self-care activities, what resources staff will use, and what actions can be taken to encourage staff to use organizational resources. For the healthcare organization, staff self-care is important to prevent compassion fatigue and burnout, which can lead to patient errors, staff dissatisfaction, and staff resignation (NASEM, 2021).

Limitations

The study occurred at a single, mid-size non-profit acute care hospital in the southeastern United States; results may not be generalizable to other types of facilities in other regions of the country. Two of the resilience sessions with staff were disrupted by the pandemic in March 2020, delaying the first resilience session for one group of staff by a month. Over 60% of resilience sessions were provided in a live web-based format versus an in-person classroom setting during the pandemic due to social distancing restrictions. This may have limited the ability of participants to engage with the material, interact, and ask questions.

Tools used for measurement of resilience (emotional thriving and recovery resilience) may not be the most appropriate tools for the NLN audience. In particular, the emotional thriving section measures the ability to make a meaningful difference in the workplace using personal strengths. During pre-intervention, NLNs rated their emotional thriving very high. However, they had not yet been on their assigned units and had not been oriented to their roles to experience how they could make a difference at work. The post-intervention measurements were collected during the last RN residency session at 11 months. This time frame may be too short to see the effect of the program's interventions. The tool used requires additional testing as only face validity was determined for this study.

Recommendations for Further Research

Development of individual personal resilience is crucial for nurses. Further research into maintaining NLN resilience and promoting self-care is required to support the long-term health of the professional nurse workforce. There is a need for longitudinal research on how to foster individual resilience during nursing school to lessen the impact of the stress of transition into professional practice. Sharing and publication of these best practices are needed to enhance transition programs and the nursing work environment. Orientation strategies should build on academic preparation to strengthen resilience and retention (Gierach et al., 2024).

Of equal importance, organizational leaders should design wellness programs to support resilience and coping for staff in managing workplace stress. Healthcare systems must evolve constantly to meet the impact of the environment, technological advances, and unforeseen challenges. Further research on the effectiveness of remote technology in improving resilience is needed. Longitudinal research is needed on the impact of organization-wide programs to increase organizational resilience and the effect on staff wellness, patient quality of care, and the organization's financial performance.

Nursing Implications

NLNs need the opportunity to discuss and examine the concept of resilience as they make their transition to professional practice. Resilience program interventions

should focus on the personal characteristics of resilience to help provide long-lasting change. This allows NLNs to build on their strengths and develop new skills in adaptation.

Staff require time at work and away from work to use self-care for regeneration of their coping skills. Leveraging the use of remote technology by Zoom or smartphone to deliver behavioral based therapy can provide positive results and convenience for staff (Han & Yeun, 2024). The best way to conduct resilience training for NLNs in the work setting is through a comprehensive formal program during a nurse residency program (Concilio et al., 2021; Lin et al., 2023). Teaching an exercise such as the Three Good Things to all nursing staff is a simple intervention that has long-lasting positive effects on increasing resilience and decreasing burnout (Cline et al., 2022).

Organizations need to work jointly with staff on how to manage staffing patterns for nurses to have time for self-care. To maximize effectiveness, programs created in work organizations and academia need to be paired to start personal resilience training early in nursing school and support nursing students through the continuum of education and transition to NLNs. An important element in any resilience training is tailoring the program focus and methods to attendees. Building resilience is not completed in the NLN transition but is an ongoing process of adaptation that occurs throughout nurses' careers with education and support. Nurse leaders have a responsibility to ensure an environment that fosters the compassion and dedication of staff. A healing and caring culture for patients and staff will lead to joy at work, which builds resilience and reduces burnout (NASEM, 2021; Zixin et al., 2024).

Conclusion

NLNs were found to have high resilience scores at the beginning of their acute care hospital employment, with no change in those scores after enrollment in an RN residency program with a planned curriculum to build resilience and self-care over 11 months. The effect of a staged resilience intervention could not be determined. However, effective evidence-based strategies to build resilience and enhance self-care need to be developed. RN residency programs with resilience training for NLNs may promote positive emotional thriving in the RN role. Self-care, wellness, and resilience skills should be taught beginning in undergraduate nursing curricula as part of the skills needed for successful transition to practice by NLNs. MSN

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A Systematic Review of Medicaid Healthcare Utilization by Adults with Serious Mental Illness

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Statement of Clinical Problem

Up to 14.2 million U.S. adults are living with a serious mental illness (SMI, e.g., schizophrenia, psychosis, bipolar disorder, major depressive disorder). The quality of health care they receive varies significantly based on insurance payer type (McConnell et al., 2020; Mongelli et al., 2020). Up to 50% of Medicaid-insured persons with SMI reported not receiving needed health care in 2018; when care is offered, studies suggest patients are less likely to receive guideline-concordant care than their commercially insured counterparts (Gross et al., 2022; Medicaid and CHIP Payment and Access Commission, 2021). For example, persons living with SMI have higher rates of diabetes and cardiovascular risk factors but are less likely to receive recommended screenings and interventions. These disparities are even more pronounced among patients with SMI who are insured by Medicaid (Hall et al., 2019; Hwong et al., 2022). A systematic review by Ronaldson and co-authors (2020) found these patients also are more likely to experience an increase in healthcare resource utilization (HRU) without any increase in the quality of the health care they receive.

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Medicaid-insured patients with serious mental illness experience higher healthcare costs and service utilization, including increased rates of inpatient hospitalizations, emergency department visits, outpatient visits, and 30-day readmissions. The current review addresses healthcare utilization outcomes among this population.

Keywords: serious mental illness, Medicaid, healthcare resource utilization

Patterns of HRU among Medicaid patients with SMI are likely multifactorial, linked to factors operating at the level of the individual, providers, and healthcare systems (Recchia et al., 2022) The relationship between Medicaid insurance and welfare has resulted in significant social stigma, stringent eligibility requirements that

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discourage enrollment, and lower standards of care for the Medicaid-insured (Singletary & Chin, 2023). Low-income status itself is associated with challenges in accessing care (McMaughan et al., 2020). In 2023, many states set eligibility at 138% of the federal poverty level, which translated to an annual income of about $20,120 for an individual and $41,400 for a family of four (Kaiser Family Foundation, 2023).

As one of the primary drivers of health disparities and a well-established social determinant of health, economic disadvantage has been associated with difficulties accessing transportation, concerns over medical co-pay, low health literacy, and distrust of healthcare providers (Brom et al., 2022). Persons with low income, including those insured by Medicaid, also have expressed experiences of discrimination when accessing healthcare services (Alcala et al., 2020; Nong et al., 2020). These experiences may be heightened given people of color are insured disproportionately by Medicaid (Hill et al., 2025; Snowden & Graaf, 2019). According to American Community Survey coverage data for 2008-2021 reported by the Kaiser Family Foundation (2023), Hispanic Americans, African Americans, and American Indian/Alaska Native Americans accounted for 31.3%, 34.5% and 38.1% of Medicaid enrollees, respectively.

Objectives of the Review

This systematic review addresses healthcare utilization outcomes among Medicaid-insured patients with SMI. The review summarizes and appraises the quality of literature related to disparities in healthcare utilization and outcomes for Medicaid-insured patients with SMI, identifies factors that help to explain disparate outcomes, and assesses how nursing care may be tailored to meet the needs of these patients at risk for inequitable health outcomes.

Relevant Literature

Disparities in HRU patterns and access to healthcare services are common among Medicaid-insured patients, but it remains unclear how healthcare providers and staff might influence these disparate outcomes (Gandhi et al., 2021; Rajeswaren et al., 2024). Nurses in particular use important knowledge skillsets, such as assessment, diagnosis, and treatment, to provide mental and physical health care to patients with SMI in acute, post-acute, and outpatient settings (van Dusseldorp et al., 2023; Yalcin et al., 2019).

The National Academies of Sciences, Engineering, and Medicine (NASEM, 2021) Committee on the Future of Nursing 2020-2030 called for all nurses at all levels and in all healthcare settings to embrace their role in achieving true health equity by working with other healthcare professionals and sectors to address underlying social determinants of health that lead to health disparities for vulnerable populations. However, it is unclear if the role of nurses is considered in current literature related to disparities among low-income Medicaid-insured patients with SMI and if there are implications across existing studies for nursing care practice.

High-quality nursing care and nurse-led interventions such as increased screening for social needs among at risk patients have been shown to mediate healthcare disparities in other vulnerable populations (American Nurses Association, 2018; Brooks Carthon et al., 2021; NASEM, 2021). Despite the evidence pointing to the pivotal role of nursing care in the health outcomes of patients with SMI, there is a noticeable lack of literature focused on developing targeted, efficacious nursing interventions specifically for Medicaid-insured patients with SMI.

Methods for Conducting the Review

Conduct and reporting of this systematic review were guided by the standards of Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) Statement (Page et al., 2021). First, a systematic review was conducted using key search terms to identify relevant studies. Selected studies then were evaluated against inclusion criteria. Quality of included studies was appraised critically, and a narrative synthesis of reported results of these studies was conducted.

A search of peer-reviewed literature published January 2017-July 2022 was conducted in CINAHL, PubMed, SCOPUS, and Psych INFO. Search terms were developed in consultation with an experienced librarian and included combinations of key terms related to SMI and HRU measures. The search was conducted by the lead reviewer and then validated independently by the three co-authors.

Selection Criteria

Studies were included if they represented primary research of Medicaid-insured patients published in English January 2017-July 2022. They focused on adults age 18 and older, and were consistent with previous studies of Medicaid-insured patients with SMI (Pesa et al., 2015). Included studies were composed of patients with at least one SMI diagnosis (defined as major depressive disorder, bipolar disorder, schizo-

phrenia, and psychotic disorders) consistent with the National Institute of Mental Health (2024). Articles that addressed non-SMI mental illness such as anxiety in addition to SMI also were included. All articles evaluating measures of healthcare utilization were included (e.g., articles examining only a single metric of utilization such as 30-day readmissions). Systematic reviews and meta-analyses were excluded.

Quality Appraisal

Included studies were appraised critically by the lead reviewer using the National Institute of Health Quality Appraisal Tool for Observational Cohort and Cross-Sectional Studies (National Heart, Lung, and Blood Institute, 2021). Appraisal decisions were reviewed by co-authors for consistency. A study with a "Good" quality rating had a clearly stated objective and a uniform, pre-specified study population. All "Good" studies justified their sample size and effect estimates, used valid and reliable measures, and included confounding variable adjustment in their final analysis. A data extraction tool (see Table 1) was designed by the lead reviewer and extracted data were cross-checked by the co-reviewers.

Results

The search yielded 508 unique studies. Of these, 498 studies did not meet inclusion criteria, resulting in a sample of 10 studies (see Figure 1). All studies received a "Good" quality rating and were included in the final analysis. The included studies used large databases such as the Truven MarketScan Databases (Broder et al., 2018; Shrestha et al., 2020) and IBM MarketScan Commercial & Medicare Supplemental Databases (Zhdanava et al., 2022). One study used Transformed Medicaid Statistical Information System Files (Patel et al., 2022), another used MarketScan Medicaid Multi-State Database (Cook et al., 2020), and two studies used Kaiser Permanente Northern California, a large healthcare system databank (Banerjee et al., 2021; Geissler et al., 2021).

Insurance Payer Types and SMIs

Five studies included only Medicaid data (Banerjee et al., 2021; Becker et al., 2017; Cook et al., 2020; Patel et al., 2022; Pilon et al., 2019). Two included Medicaid and commercial payers (Geissler et al., 2021; Marcus et al., 2017), and the remaining three studies included all three payer types (Broder et al., 2018; Shrestha et al., 2020; Zhdanava et al, 2022). All four SMIs were represented in this review. Three articles included all four SMIs (Becker et al., 2017; Cook et al., 2020; Geissler et al., 2021). Two articles included schizophrenia and bipolar disorder only (Broder et al., 2018; Marcus et al., 2017), and one article focused only on major depression, bipolar disorder, and schizophrenia (Banerjee et al., 2021). Of the remaining four studies, one focused exclusively on schizophrenia (Patel et al., 2022) and three focused solely on types of major depression including treatment-resistant depression and major depression with suicidal ideation (Pilon et al., 2019; Shrestha et al., 2020; Zhdanava et al., 2022).

Distribution of HRU

The distribution of HRU metrics ranged from one study focused on healthcare costs (Banerjee et al., 2021) to five articles focused on hospitalizations, and emergency department (ED) and outpatient visits (Broder et al., 2018; Patel et al., 2022; Pilon et al., 2019; Shrestha et al., 2020; Zhdanava et al., 2022). Two studies focused on 30-day readmissions (Becker et al., 2017; Cook et al., 2020); three included rates of follow-up visits (Geissler et al., 2021; Marcus et al., 2017; Patel et al., 2022) and two included rates of pharmacotherapy and psychotherapy usage (Patel et al., 2022; Pilon et al., 2019).

Healthcare Costs

To identify medical diagnoses associated with persistent high HRU, Banerjee and co-authors (2021) isolated a high-utilizer cohort comprised of more than 1,400 Medicaid-insured adults who were the top 5% spenders in terms of inpatient and outpatient healthcare costs during their first year of Medicaid managed care enrollment. Medicaid spending for patients with SMI was four times higher than for those without it. Compared to patients with depression and bipolar disorder, only patients diagnosed with schizophrenia had a higher risk (1.5, 95% CI, 1.20-1.86) of having persistently high HRU going into the second year of Medicaid managed care enrollment.

Hospitalizations, ED Visits, and Outpatient Visits

Patel and co-authors (2022) conducted a nationwide cross-sectional analysis of HRU among 688,437 Medicaid-insured patients with schizophrenia (including 387,844 non-dual eligible patients). Findings indicated a national average of 34% of this group of patients had one or more inpatient admissions, 45% had one or more ED visits, and 86% had one or more outpatient visits during the study period. In a similar smaller multi-state study investigating HRU among 63,725 Medicaid-insured patients with schizophrenia and bipolar disorder, Broder and col-

TABLE 1.
Evidence Extraction Tool

Author, Year	Insurance Type	Sample	Study Design	Healthcare Resource Utilization (HRU) Outcomes	Serious Mental Illness (SMI)	Results
Pilon et al., 2019	Only Medicaid	26.6 million persons age ≥18	Retrospective longitudinal-matched cohort	Hospitalizations, ED visits, outpatient visits, pharmacotherapy psychotherapy usage	Major depression	Higher rates of all-cause HRU, higher PPPY healthcare costs
Cook et al., 2020	Only Medicaid	Ages 18-64, not dual Medicare-Medicaid	Retrospective cohort	30-day readmission	Major depression, schizophrenia, psychotic disorder, bipolar disorder	Higher readmission rates for patients with SMI
Patel et al., 2022	Only Medicaid	Patients with dual eligibility; claims not submitted to Medicaid not observed	Cross-sectional ecological	Hospitalizations, ED visits, outpatient visits, follow-up visits, pharmacotherapy/ psychotherapy usage	Schizophrenia	22% of patients had outpatient visit within 30-days of discharge.
Becker et al., 2017	Only Medicaid	Age ≥18 with at least one inpatient hospital episode for non-behavioral health condition before and following index hospitalization episode	Retrospective cohort	30-day readmission	Major depression, schizophrenia, psychotic disorder, bipolar disorder	Participants with SMI at higher risk of early rehospitalization
Zhdanava et al., 2022	All payers	Adult patients with one diagnosis for specific SMI	Retrospective observational matched cohort	Hospitalizations, ED visits, outpatient visits	Bipolar disorder, dementia, schizophrenia and schizoaffective disorder, substance-induced mood disorders	MDD cohort with suicidal ideation had 67.2 times more inpatient admissions, 8.9 times more ED visits, and 2.9 times more outpatient visits than the non-MDD cohort.
Shrestha et al., 2020	All payers	Age ≥18 with major depressive disorder diagnosis	Retrospective observational	Hospitalizations, ED visits, outpatient visits	Treatment-resistant depression	Patients with treatment-resistant depression had higher HRU, costs.

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TABLE 1. (CONTINUED)
Evidence Extraction Tool

Author, Year	Insurance Type	Sample	Study Design	Healthcare Resource Utilization (HRU) Outcomes	Serious Mental Illness (SMI)	Results
Geissler at al., 2021	All payers	Ages 21-64	Retrospective observational	Follow-up visits	Major depression, schizophrenia, psychotic disorder, bipolar disorder	Medicaid patients less likely to receive follow-up visits; visits were less effective in reducing ED visits/readmissions.
Marcus et al., 2017	Medicaid and commercial	Ages 18-64	Retrospective observational cohort	Follow-up visits	Schizophrenia, bipolar disorder	Medicaid patients less likely to receive follow-up visits; those who received follow-up visits had only slightly lower odds of readmission.
Broder et al., 2018	Medicaid and Medicare	Age ≥18 on index date with continuous health plan enrollment for 1 year	Retrospective observational cohort	Hospitalizations, ED visits, outpatient visits	Schizophrenia, bipolar disorder	Higher HRU and healthcare costs in patients with a diagnosis of both compared with patients with either diagnosis alone.
Banerjee et al., 2021	Only Medicaid	Ages 18-64 newly enrolled	Retrospective cohort	Healthcare costs	Major depression, bipolar disorder, schizophrenia	Persons with schizophrenia had higher risk of being persistent high utilizers.

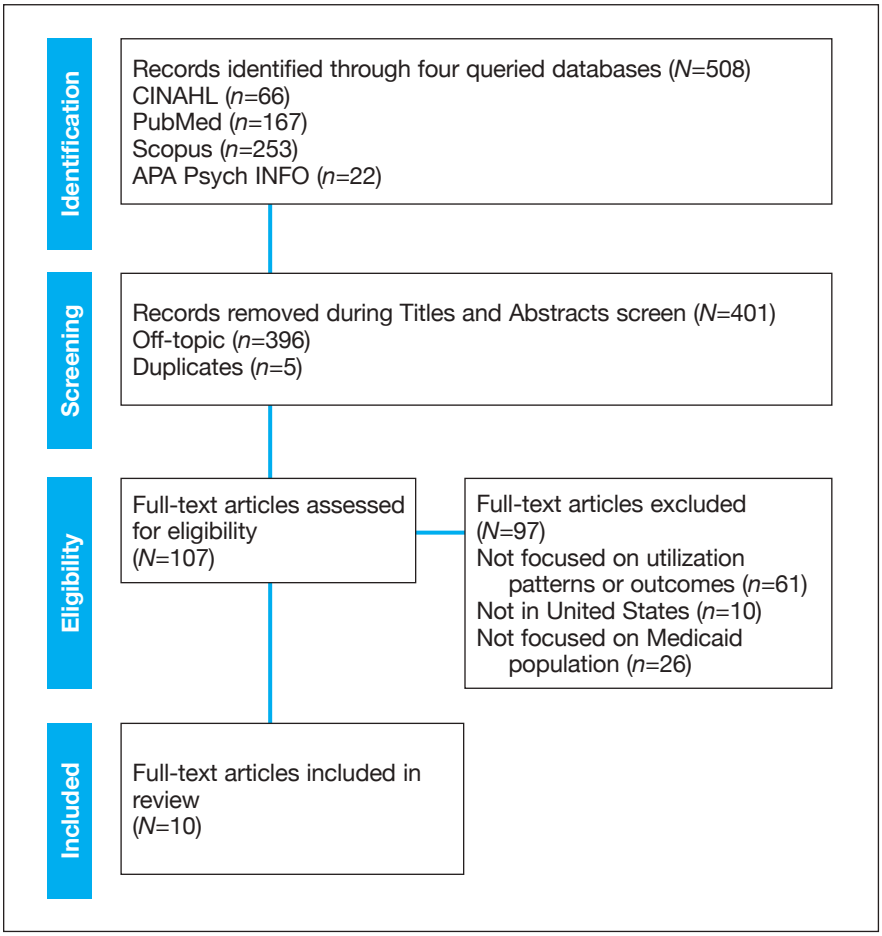
ED=emergency department, MDD=major depressive disorder, PPPY=per patient per year

leagues (2018) found 67.4% of Medicaid-insured individuals diagnosed with both disorders had an inpatient admission, along with 39.5% of patients with schizophrenia alone and 33.7% of patients with bipolar disorder alone. Patients with both conditions also had an average of 3.44 ED visits per year; those with schizophrenia alone had an average of 1.39 visits and those with bipolar disorder alone had an average of 1.29 visits. Zhdanava and co-authors (2022), Pilon and colleagues (2019), and Shrestha and co-authors (2020) reported elevated rates of inpatient, ED, and outpatient visits in Medicaid-insured patients with major depressive disorder, as well as populations with suicidal ideation and treatment-resistant depression.

30-Day Readmissions

In a study using claims data from 43,817 Medicaid-insured patients, Cook and co-authors (2020) found Medicaid-insured persons diagnosed with schizophrenia, bipolar disorder, or depression had a significantly greater risk of an unplanned 30-day readmission than those without SMI. Schizophrenia carried the greatest risk of 30-day readmission with an adjusted odds ratio of 1.46, followed by bipolar disorder at 1.25 and major depression at 1.18. Similarly, in a study using 1,956,169 hospitalization episodes spanning 8 years (2003-2011), Becker and colleagues (2017) found Medicaid patients diagnosed with bipolar disorder,

FIGURE 1.
PRISMA Diagram



psychotic disorder, and major depression had a 6%, 10%, and 17% higher risk, respectively, of being readmitted within 30 days of an index hospitalization compared to Medicaid patients without these disorders.

Post-Acute Follow-Up Visits

In their analysis over a calendar year, Patel and colleagues (2022) found only 22% of Medicaid-insured adults with schizophrenia had any outpatient visits (including primary care and behavioral health visits) within 30 days post-discharge, with percentages ranging from 58% in Washington, DC, to 8% in Colorado. Geissler and colleagues (2021) looked specifically at the relationships between receiving follow-up care and early readmission among Medicaid-insured patients with SMI and noted 33% received a post-acute follow-up visit. Marcus and co-authors (2017) conducted their analysis among Medicaid- and commercial-insured patients with schizophrenia and bipolar disorder to isolate risk factors associated with not receiving a mental health follow-up visit within 30 days after discharge. They found participation in a mental health follow-up visit was associated with being commercially insured, having longer inpatient stays, and more recent visits to a mental healthcare professional for both schizophrenia and bipolar patients.

Pharmacotherapy and Psychotherapy Usage

Medicaid-insured patients with SMI had low incidence of psychotherapy and pharmacotherapy utilization (Patel et al., 2022; Zhdanava et al., 2022). Similar to results in Patel and colleagues' (2022) study of 219,726 commercial- and Medicaid-insured patients living with major depression with suicidal ideation, Zhdanava and co-authors (2022) reported almost 50% of patients had no claims for antidepressants and 75% had no claims for psychotherapy visits. Concerns related to stigma, trust, and affordability were identified as potential barriers to accessing psychotherapy and pharmacotherapy services for Medicaid-insured patients with SMI.

Discussion and Implications for Practice, Education, and Research

This review identified disparate patterns in HRU among Medicaid patients with SMI. These patients experienced higher healthcare costs and HRU, including increased rates of inpatient hospitalizations, ED visits, outpatient visits, and 30-day readmissions. However, they had decreased rates of guideline-recommended care, such as 30-day follow-up visits, psychotherapy visits, and pharmacotherapy usage.

High healthcare costs are a potential indicator of a high disease burden and may be partly explained by the high prevalence of comorbid physical illnesses among patients with SMI (Wittbrodt et al., 2020). These patients have higher rates of chronic illnesses, such as hypertension, heart disease, obesity, diabetes, gastrointestinal disorders, and respiratory disorders (Pizzol et al., 2023). They also experience greater barriers to self-

management (Balogun-Katung et al., 2021). Symptoms associated with mental illness, such as avolition, alogia, delusions, psychosis, and psychomotor retardation, also affect patients' ability to engage in healthcare maintenance and prevention behaviors (Coventry et al., 2021).

Similarly, while an increase in outpatient visits may be associated with a high burden of illness, high rates of hospitalization and ED visits are explained most likely by a lack of continuity of care among patients with SMI and the disjointed manner in which their complex mental, physical, and social needs are addressed. In an observational cohort study of 19,324 patients and 215 practices, increased continuity of care was associated with 23%-27% lower risk of unplanned hospitalization and 8%-11% lower risk of ED presentation for patients with SMI (Ride et al., 2019). This study demonstrated the collective need for well-coordinated mental, physical, and social health services to improve physical health outcomes and reduce hospitalizations among Medicaid-insured patients with SMI. In addition to higher rates of hospitalizations, these patients also had high rates of 30-day readmissions and post-acute ED visits; both are important indicators of the quality of care received by Medicaid patients with SMI in acute care settings.

Lower rates of 30-day readmission rates historically have been linked to better nurse staffing and work environments (Kutney-Lee et al., 2015). A high rate of 30-day readmission also might signal unmet healthcare needs (Exuzides et al., 2022). Patients with SMI who received follow-up visits had increased healthcare costs and a higher chance of being rehospitalized, but a decreased probability of having a post-acute ED visit (Geissler et al., 2021). Patients who received follow-up visits were evaluated and referred to appropriate healthcare resources to meet their needs, including planned rehospitalization if necessary (Coleman et al., 2020). Post-hospital follow-up visits allow providers and patients to review reasons for hospitalization, discuss any unresolved or ongoing health issues, and identify any signs indicating a need for rehospitalization.

Two studies noted only marginal benefits for reducing hospitalization and ED visits for Medicaid patients with SMI who received a post-acute follow-up visit (Geissler et al., 2021; Marcus et al., 2017). While unexpected, this evidence suggests follow-up care received by Medicaid patients with SMI may be of lower quality or not as effective for these patients compared to SMI patients with commercial insurance (Geissler et al., 2021; Marcus et al., 2017). Medicaid patients with SMI also had lower rates of psychotherapy and pharmacotherapy usage (Patel et al., 2022; Pilon et al., 2019). These disparities signal greater socioeconomic barriers in accessing and receiving psychotherapy and pharmacotherapy for these patients. Growing evidence suggests a strong relationship between social determinants of health and medication usage among this population (Li et al., 2022). Socioeconomic disadvantage also is associated with decreased access to psychotherapy treatment (Niemeyer & Knaevelsrud, 2023). Medicaid patients face socioeconomic difficulties with scheduling and getting to their appointments, including challenges with timing, transportation, and childcare, as well as concerns about copayments (Jensen et al., 2020; Tambling et al., 2022).

None of the included articles highlighted the pivotal roles nurses play in improving health outcomes for Medicaid patients with SMI. However, findings clearly indicate a need for nursing interventions, such as enhanced discharge planning, transitional care planning, improved coordination of care, non-pharmaceutical behavioral support, and assistance with accessing pharmacotherapy and psychotherapy. Registered nurses in the medical-surgical setting are positioned uniquely to meet comprehensive care needs of Medicaid-insured patients with SMI, yet it is unclear if their training provides them with necessary skills to engage with and provide physical and mental health care to patients with mental illness (Avery et al., 2020).

Given the critical role medical-surgical nurses play in addressing unique needs of Medicaid-insured patients with SMI, they should receive thorough training and sufficient organizational resources. Nurse educators must ensure hospital nurses are well-prepared to interact with and treat patients with mental illness (Gu et al., 2021). Evidence shows nursing education programs incorporating mental health clinical placements increase student nurses' confidence in caring for individuals with mental illness (Stuhlmiller & Tolchard, 2019). Importantly, community mental health placements were shown to foster positive attitudinal changes toward patients with mental illness. In addition to training, medical-surgical nurses must be supported by robust organizational resources, including adequate staffing, an emphasis on baccalaureate nursing education, and a supportive work environment (Lake et al., 2022). High-quality organizational nursing resources are vital for nurses to deliver optimal patient care, including individualized care plans, effective discharge and transitional care planning, coordinated care with

interprofessional teams, behavioral support advocacy, and communication facilitation between patients and other healthcare providers (Kowalski et al., 2020; Lasater et al., 2021).

Nurse-led case management programs also have been shown to be effective in increasing rates of pharmacotherapy and psychotherapy usage in persons with SMI (Boyle & Schwinck, 2022; Liu et al., 2024). Nurse-led interventions, such as patient care management, medication management, and targeted patient education, were proven to be effective in increasing medication usage among patients with SMI (Balikai et al., 2022; Ghatwal et al., 2024; Liu et al., 2024). By providing targeted patient teaching around antipsychotic medications and increased post-discharge monitoring, nurses significantly increase the rates of pharmacotherapy use (Sieben et al., 2019). Nurse practitioners (NPs) also play an important role in improving access to quality physical and mental care for patients with SMI through implementing integrated care models and advanced case management interventions (Shepherd-Banigan et al., 2022). Effective coordination between psychiatric mental health NPs and primary care NPs in particular can increase access to and engagement in primary care for patients with SMI (Grove et al., 2021).

Limitations

Limitations inherent in design of systematic reviews include biases transferred from the original authors' work and potential publication bias based on the available literature surrounding the topic of healthcare utilization patterns of patients with SMI (Ayorinde et al., 2020). Data on important outcomes such as how many Medicaid-insured patients with SMI see a therapist regularly and how many receive prescriptions for antipsychotic medication, especially compared to commercially insured patients, was sparse in this current review. Limited data were available on racial or ethnic inequities in HRU patterns among Medicaid-insured patients with SMI. Some articles included other psychological illnesses that are not the focus of the current review, such as anxiety, dementia, substance use disorder, and alcohol use disorder.

Finally, authors did not address how having both an SMI and a substance use disorder can affect HRU patterns among Medicaid-insured patients. Future work should focus on the relationship between comorbid substance use disorder and HRU patterns among Medicaid-insured patients with SMI. Further investigation into health disparities among Medicaid-insured patients with SMI in acute and community settings is also necessary to ascertain how nurses might tailor interventions to address their unique healthcare needs.

Conclusion

Medicaid-insured patients with SMI face higher healthcare costs, increased hospitalizations, ED visits, outpatient visits, and 30-day readmissions while experiencing lower rates of psychotherapy and pharmacotherapy. Addressing these disparities requires coordinated, tailored care that considers social determinants of health and high-quality nursing interventions critical in reducing hospitalizations and ED visits. Improved nurse education, supportive practice environments, and enhanced coordination between psychiatric mental health and primary care NPs in community settings can help improve health outcomes for these patients. MSN

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Evidence-Based Practice

Nurse-Led Initiative to Reduce Hypoglycemia When Treating Hyperkalemia

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Use of insulin to treat hyperkalemia may result in hypoglycemia. As part of a nurse-led interprofessional project, a newly developed electronic tool was implemented to help in reducing hypoglycemic episodes during treatment of patients with hyperkalemia.

Keywords: hyperkalemia, hypoglycemia, interprofessional

Learning Outcome: After completing this education activity, the learner will be able to describe the impact of a nurse-led intervention on the incidence of hypoglycemia in patients being treated with insulin and dextrose for hyperkalemia.

Hyperkalemia, which occurs when potassium is greater than 5 mEq/L, can cause cardiac dysrhythmias, heart blocks, symptomatic bradycardia, other cardiac conduction abnormalities, muscle weakness, paralysis, respiratory depression, vomiting, diarrhea, cardiac arrest, or death (Gupta et al., 2022; Scott et al., 2019). Immediate treatment is essential. Treatment options include administration of insulin, sodium bicarbonate, calcium, sodium polystyrene (Kayexalate®), or albuterol (Salbutamol®), or completion of hemodialysis (Dépret et al., 2019; Emektar, 2023). Treatment may vary if the patient has diabetes (Brož et al., 2019). Treatment with intravenous (IV) insulin drives potassium into the cells, thus lowering serum potassium. One of the common side effects of administration of insulin is hypoglycemia, with hospital incidence rates of 6%-75% (Boughton et al., 2019). Detrimental effects of hypoglycemia may include cognitive impairment, behavior abnormalities, seizure, and death (Scott et al., 2019).

Project Site and Reason for Change

Clinical staff and unit leaders identified patient hypoglycemia was occurring with increased frequency after treatment for hyperkalemia. The goal of this evidence-based practice project was to reduce the number of hypoglycemic events at both system hospitals. Pre-intervention data were used to assess safety and efficacy of the current insulin administration process. Clinical nurses found electrocardiograms (EKGs) were not performed in all patients who came in for hyperkalemia. Anecdotal reports from nurses suggested order sets were confusing and sometimes not followed, especially rechecking capillary blood glucose (CBG) on subsequent hours. In the original order set, glucose results were to be checked immediately before, and 1 hour and 3 hours after administration of dextrose and insulin.

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Clinical Question

For patients hospitalized with hyperkalemia (P), how does using an electronic nurse checklist for treatment with regular insulin (I) compared to current state of no checklist (C) affect hypoglycemic episodes (O) in 6 months (T)?

EBP Model

Iowa Model of Evidence-Based Practice (Buckwalter et al., 2017).

Patient Outcomes

Reduce incidence of capillary blood glucose less than 70mg/dl; increase number of electrocardiograms performed.

Search Strategy and Results

Search terms included *hyperkalemia, hypoglycemia, acute care, intensive care, IV insulin, glucose*, and *management*. Articles were excluded if they addressed pediatric patients and were not written in English. Evidence-based and research articles were considered. Initially, publication dates 2014-2020 were searched; a second search was completed to include articles for 2021-2023 to provide newest evidence to support this sustained project. Of 29 articles reviewed, 13 articles were used to support development of the improved hyperkalemia protocol and electronic nurse checklist, and change nursing practice to ensure project sustainability.

Databases

PubMed, CINAHL, Scopus, Google Scholar

Clinical Setting/Patient Population/Average Daily Census

Two Magnet-designated sites in the same health system: 671-bed academic medical center and 201-bed community hospital

Summary of Literature Search

When insulin is required to treat hyperkalemia, several things are done to prevent hypoglycemia. CBG is checked immediately before administration of insulin and dextrose. If CBG is less than 70mg/dL, hypoglycemia is treated before initiating insulin treatment. IV or oral glucose (dextrose) is always administered with insulin. Insulin dosage depends on the patient's health conditions. If a patient has a history of renal disease or currently has acute kidney injury, for example, they receive 5 units of insulin (rather than 10 units for patients with normal renal function) (Garcia et al., 2020; Moussavi et al., 2019). Dextrose is administered 1 hour after giving insulin/dextrose, and CBG is rechecked every hour for 3 hours (Lemoine et al., 2021; Tran et al., 2020). No literature was identified related to use of a nurse checklist when treating patients with hyperkalemia. EKGs are recommended when patients have hyperkalemia; if EKG changes are associated with hyperkalemia, calcium is given to prevent arrhythmias (Emektar, 2023).

Answer to the EBP Question

Findings from literature support checking CBG every 1-3 hours (Lemoine et al., 2021; Tran et al., 2020) and performing an EKG on each patient with hyperkalemia (Emektar, 2023). However, no protocol or procedure was in place at the project site for nurses to use in caring for patients with hyperkalemia. An adult hyperkalemia order set was available, but it did not include all the steps nurses should follow when caring for affected patients. The following information was not included in the order set: when insulin should be given or avoided; order for a 2-hour blood glucose test after administration of insulin/dextrose; order for a STAT EKG before initiating the hyperkalemia order set; use of continuous cardiac monitoring until potassium normalized; and order for a serum potassium 3 hours after insulin administration. An interprofessional team of clinical nurses, pharmacist, and physicians determined there was sufficient evidence to support implementation of a nursing practice change with results monitored as a quality improvement activity. To conform with institutional regulatory processes, this project was reviewed by the institutional review board and deemed not research.

Implementation of the Change in Practice

An evidence-based quality improvement bundle was developed with interprofessional support from staff in pharmacy, nephrology, and the department of medicine at both institutions. The bundle included a new order set for providers and a new nursing clinical resource (see Table 1). The newly created nursing clinical

TABLE 1.
Nursing Checklist for Treatment of Hyperkalemia Using Regular Insulin

Treatment per MD/APP order	
Time 0	1. Initiate cardiac monitoring 2. POC blood glucose 3. Administer 30g glucose oral gel (2 tubes) PO STAT – or – Administer 25g/50mL dextrose syringe IV push STAT 4. Administer regular insulin IV push NOW
1 hour after insulin	1. POC blood glucose 2. Administer 30g glucose oral gel (2 tubes) PO ONCE – or – Administer 25g/50mL dextrose syringe IV push ONCE
2 hours after insulin	1. POC blood glucose 2. If blood glucose <70: Administer 30g glucose oral gel (2 tubes) PO ONCE PRN – or – Administer 25g/50mL dextrose syringe IV push ONCE PRN
3 hours after insulin	1. POC blood glucose 2. If blood glucose <70: Administer 30g glucose oral gel (2 tubes) PO ONCE PRN – or – Administer 25g/50mL dextrose syringe IV push ONCE PRN 3. Draw follow-up serum K^+

K^+=potassium, PO=by mouth, POC=point of care, PRN=as needed

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resource for hyperkalemia is a visual aid that incorporates all the steps needed for nurses to care for patients with hyperkalemia. As part of institutional policy, hypoglycemia has been defined as CBG less than 70 mg/dL. Insulin bundle orders are based on the patient's kidney function. Patients with impaired kidney function receive 5 units of insulin; persons with normal kidney function receive 10 units of insulin (Garcia et al., 2020; Moussavi et al., 2019). Checking CBG 2 hours after administration of dextrose and insulin was added to identify hypoglycemic episodes that can occur between hour 1 and hour 3 (Lemoine et al., 2021). The new nursing clinical resource provided a timeline for interventions needed each hour. This just-in-time resource accompanied the patient when transferring between units, which helped communicate the patient's progress in the hyperkalemia protocol.

A team of nurses developed education on the improved hyperkalemia protocol. A formal literature search was completed with the assistance of a librarian and was used to create a unit-based educational PowerPoint® to review care for patients with hyperkalemia and the new nursing clinical resource. In-services were presented at change of shift over 2 months, with nurses signing in to attest their receipt of the pertinent education.

The new hyperkalemia protocol was emailed to nurses and reviewed at unit huddles. Staff at both hospitals worked together to roll out the same education systemwide. Clinical nurse leaders and clinical nurse specialists assisted with distribution of education. The academic medical center implemented the new bundle on November 27, 2017, with the community-based hospital following on February 14, 2018.

Evaluation of the Initiative

Retrospective chart reviews were conducted of patients who received IV push regular insulin to treat hyperkalemia. Pre-intervention data were collected for May 1-July 31, 2017, at both sites. Post-intervention data were collected for 3 months beginning 2 weeks after each site's implementation date (December 12, 2017, for academic medical center; March 1, 2018, for community hospital). Five administrations were excluded from eligibility because the patients expired before the treatment bundle could be completed. Pre-intervention and post-intervention data (see Table 2) were compared to analyze the effect of the evidence-based quality improvement project.

Results and Limitations

Data were collected on 84 patients before intervention and 79 patients after project implementation. Instance of hypoglycemia pre-intervention was 29.76% (*n*=25) and 11.39% (*n*=9) post-intervention (see Table 3). Monitoring adherence was 57.12% (*n*=48) pre-intervention and 34.17% (*n*=27) post-intervention.

TABLE 2.
Pre- and Post-Implementation Data Collection

- Diagnosis of diabetes
- Pretreatment serum potassium
- Was pre-insulin GFR<15?
- Serum blood glucose/CBG pre-insulin dose, 1 hour post-insulin dose, 2 hours post-insulin dose (only post data), and 3 hours post-insulin dose
- Incidents of serum blood glucose/CBG >240 mg/dL prior to insulin dose
- Was EKG performed? If yes, were EKG changes noted?
- Which route of glucose support was ordered: PO or IV push?
- Was calcium gluconate administered?
- Did hypoglycemia occur? If yes, within which range: 60-69 mg/dL or <60 mg/dL
- Time (minutes) from insulin dose to hypoglycemia identification
- Did glucose support treatment cause serum blood glucose/CBG >240 mg/dL?
- Did the patient have working hemodialysis access?
- Was blood glucose monitoring order set followed?
- Was glucose/dextrose support ordered and followed?

CBG=capillary blood glucose, EKG=electrocardiogram, GFR=glomerular filtration rate, IV=intravenous, PO=by mouth

Medication order adherence was 50% (*n*=42) pre-intervention and 65.82% (*n*=52) post-intervention. There was an increase in monitoring CBG after the initial insulin and glucose medication were given. Glucose could be administered orally or intravenously. Pre-intervention, glucose was administered orally in 48% (*n*=41) of cases and intravenously in 51.2% (*n*=43). Post-intervention, glucose was administered orally in 41.77% (*n*=33) of cases and intravenously in 58.23% (*n*=46) of cases.

EKGs were performed for 72.62% (*n*=61) of patients pre-intervention, increasing to 96.2% (*n*=76) post-intervention. In the revised orders, an EKG was at the top of the order set so it was prominent when initiating the hyperkalemia order set. Continuous cardiac monitoring was not a pre-selected option in the order set before project implementation, but was pre-selected for the project so patients were always monitored when experiencing hyperkalemia.

Due to time constraints and staff limitations, data collection was limited at the academic medical center to the first 20 administrations of IV insulin each month (60 total administrations), while data from all cases at the community hospital were used. Data points are presented in Table 3 for each insulin administration. Although data were collected if patients had hemodialysis access, no data were collected if patients received emergent hemodialysis due to hyperkalemia. No data were collected on post-insulin treatment serum potassium.

Lesson Learned/ Nursing Implications

The improved hyperkalemia order set decreased episodes of hypoglycemia throughout the organization for patients being treated with insulin and dextrose for hyperkalemia. The nursing clinical resource continues to keep nurses aware of interventions that need to be done for 3 hours after administering insulin and dextrose. An important consideration for nurses was their ability to write on the resource sheet and send it with the patient on transfer to another unit.

Inclusion of EKGs and continuous cardiac monitoring on the revised order set helped providers decide if they wanted to order calcium gluconate. Calcium stabilizes the cardiac membrane, thus preventing life-threatening cardiac arrhythmias (Emektar, 2023). Continuing to include insulin dose variability based on patients' kidney function in this bundle also was important; this was part of the previous order set for patients with hyperkalemia. Research indicated giving 5 units or 0.1 units/kg of insulin may be as effective as 10 units insulin in lowering incidence of hypoglycemia and reducing hyperkalemia (Boughton et al., 2019; Garcia et al., 2020; Moussavi et al., 2019).

Use of the revised order set contributed to decreased occurrences of hypoglycemia and thus helped decrease side effects of hypoglycemia, such as cognitive impairment, behavior abnormalities, seizure, and death (Scott et al., 2019). The clinical resource also helped nurses remain aware of when specific interventions should be performed, making it easier to provide care before a hypoglycemic episode occurred. The hyperkalemia clinical resource and improved order set assisted nurses to provide best-practice care in this low-volume, high-risk patient group, especially when there is a lack of nursing literature on hypoglycemia related to hyperkalemia on medical-surgical units. Other nurses are encouraged to publish their clinical work in this area.

Education on the updated order set and nursing clinical resource subsequently improved medication order adherence.

TABLE 3.
Pre- and Post-Hyperkalemia Results

	Pre Data	Post Data
Total Patients	84	79
Patients with diabetes diagnosis	34 (40.48%)	33 (41.77%)
Pre-insulin potassium level	6.46 mmol/L	6.29 mmol/L
Pre-insulin GFR<15	43 (51.19%)	27 (34.18%)
Blood glucose >240 mg/dL before insulin treatment	13 (15.48%)	13 (16.46%)
EKG performed	61 (72.62%)	76 (96.20%)
EKG changes	19 (22.63%)	22 (27.85%)
Glucose administration route	PO: 41 (48.80%) IV: 43 (51.20%)	PO: 33 (41.77%) IV: 46 (58.23%)
Calcium gluconate administered	27 (32.14%)	30 (37.97%)
Incidents of serum blood glucose/CBG <70mg/dL during insulin treatment	25 (29.76%)	9 (11.39%)
Average time patient became hypoglycemic (serum blood glucose/CBG <70mg/dL)	88.18 minutes	70.66 minutes
Incidents of serum blood glucose/CBG >240 mg/dL after insulin treatment	3 (3.57%)	10 (12.66%)
Patients with HD access	26 (28.57%)	24 (30.38%)
Monitoring adherence*	48 (57.12%)	27 (34.17%)
Medication order adherence**	42 (50.00%)	52 (65.82%)

*Glucose checked before insulin dose and every hour after for 3 hours
**Dextrose and insulin administered initially and then dextrose 1 hour post insulin dose

CBG=capillary blood glucose, EKG=electrocardiogram, GFR=glomerular filtration rate, HD=hemodialysis, IV=intravenous, PO=by mouth

Medication order adherence is defined as administrating dextrose and insulin initially and dextrose 1 hour after the insulin dose. Monitoring adherence is defined as checking blood glucose per the order set. In the previous order set, blood glucose was only checked immediately before, and 1 hour and 3 hours after administration of insulin and dextrose. In the new order set, blood glucose was checked immediately before, and 1 hour, 2 hours, and 3 hours after administration of insulin and dextrose. However, blood glucose sometimes was not checked at 2 hours and 3 hours. This may have occurred when a patient transferred to a different unit from where the initial order was placed. Even though the nursing clinical resource helps remind nurses of what interventions or medications were to be addressed, sometimes unanticipated workflow delays occurred. This is an opportunity for others to explore who may want to replicate the project.

According to Brož and coauthors (2019), specific hyperkalemia risk and treatment for patients with diabetes mellitus may differ depending on the type of diabetes. In this project, patients with diabetes accounted for 40.48% before and 41.77% after implementation with information on specific type of diabetes not collected. If this project is replicated, type of diabetes should be considered when treating patients for hyperkalemia.

The processes initiated from this evidence-based practice project have been sustained since implementation and remain the standard of care. Unit clinical leaders continue to monitor processes and patient outcomes through national benchmark data. New employees are introduced to the protocol and other standards of care processes during orientation. After project implementation, clarification of the nursing checklist was communicated to nursing staff in 2022 about patients treated for hyperkalemia. Specifically conveyed was that patients are not allowed to leave the unit until the hyperkalemia treatment protocol is completed, unless moving to a higher level of care or to an area that uses the protocol. Patient

monitoring is critical due to life-threatening side effects that can occur with hyperkalemia and hypoglycemia.

Conclusion

This nurse-led project reduced hypoglycemic events and prevented consequences for inpatients being treated for hyperkalemia throughout the organization. It remains the standard of care for patients with hyperkalemia. The nursing clinical resource is an inexpensive, evidence-based practice tool used to guide nurses on the treatment timeline based on the electronic order set. Inclusion of EKGs and continuous cardiac monitoring in the order set aided providers in following patients' plans of care. MSN

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Anterior Lumbar Interbody Fusion: One Patient's Journey

Mary L. Schreiber

Residual complications from a motor vehicle accident coupled with years of work in the construction field as a general contractor and electrician resulted in a 53-year-old male being plagued with chronic intractable lumbosacral and right leg pain caused by lumbar spondylosis (degenerative disc disease). Initially, the pain manifested in his right calf muscles and moved into his ankle and foot; numbness and paresthesia soon followed. He began experiencing severe right knee pain, and as time passed, unrelenting pain developed in his lumbosacral spine.

The patient was seen by multiple physicians and health professionals over a 3-year span in efforts to understand the problem and achieve pain relief: family physician, orthopedist, physical therapist, massage therapist, chiropractor, and pain specialist. Numerous radiological studies of his lumbar spine and right knee and an electromyography of his right leg had been performed. The L5-S1 vertebrae were shaved, which relieved nerve pressure and briefly reduced the pain. Within 2 months, he was experiencing intense lumbosacral and bilateral lower extremity pain. Acetaminophen (Tylenol®), nonsteroidal anti-inflammatory medications, and gabapentin (Neurontin®) were prescribed. None were effective in adequately relieving the increasing pain. Steroid injections were administered in his lumbar spine on four occasions. Opioids were not prescribed because of associated abuse and addiction risks.

The patient could not find a comfortable position as the pain increased when lying, sitting, or standing for extended periods (Ignatavicius, 2021). Symptoms and pain continued to increase in intensity, resulting in significant mobility deficits. He had become severely debilitated, and his work, family life, and livelihood were suffering. The pain specialist referred him to a neurosurgeon, who provided frank information regarding his condition. Magnetic resonance imaging (MRI) reflected extensive abnormalities throughout the lumbosacral spine (L-2 through S-1): facet arthropathy, disc protrusions, disc bulges, and foraminal stenosis. The L4-L5 level also reflected an articular cyst and an annular fissure. Surgery was recommended.

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Anterior lumbar interbody fusion achieves spinal fusion through a retroperitoneal approach. The complexity of this surgery requires multi-faceted post-surgical monitoring. Astute assessments and risk awareness places the nurse's role in a critical spotlight for patients to achieve successful outcomes.

Keywords: spondylosis, osteophyte, desiccation, retroperitoneal, spinal fusion

Degenerative disc disease can involve extensive anatomical changes (e.g., disc herniations), osteophyte (bone spur) development, loss of disc height, and disc desiccation (dehydration) (Parenteau et al., 2021). Patients with significant degenerative disc disease are candidates for lumbar disc fusion (Rathbone et al., 2023). Sseveral approaches to achieve lumbar disc fusion are available. One patient's journey through anterior lumbar interbody fusion surgery is discussed. A description of the surgery, advantages and contraindications, post-surgical care and implications, discharge planning and education, and recovery outlook for the patient are explored.

Medical and Social History

The patient was 6 feet 1 inch tall and weighed 220 pounds. He had no known medication allergies and was a non-smoker. He consumed one to two beers on occasion socially and denied using illicit drugs. His medical history revealed hypertension. Medication reconciliation identified a 30-year history of once daily oral metoprolol (Lopressor®) 50 mg, a multivitamin, and vitamin D3. The patient was married (30 years) to a registered nurse, and they had three grown daugh-

ters. He was a man of deep faith and worshiped in the Baptist church. In anticipation of having surgery and to help ease his anxiety of unknown aspects, the patient began speaking to healthcare professionals and other patients who had undergone the surgery. He researched his condition, surgical processes, risks, and benefits. He was an intelligent consumer and believed he was as prepared as possible for the surgery.

Anterior Lumbar Interbody Fusion

Anterior lumbar interbody fusion (ALIF) is a surgical procedure with a unique anterior retroperitoneal approach used for realigning and fusing unstable, damaged spinal vertebrae. The approach involves entry through the abdomen, providing clear visibility and direct access to the lumbar spine. The affected disc is removed and replaced with an implant, also known as a spacer or cage. The adjacent vertebrae are fused, which allows the vertebrae to heal together, creating one single bone and providing greater stability of the spine (American Academy of Orthopaedic Surgeons [AAOS], 2023; Parisien et al., 2022).

The length of time to complete this surgery is approximately 2 hours, although additional time can be required for patients with extensive disc damage and those who have had prior abdominal surgery or other conditions requiring special strategies. The implant may not require stabilization hardware; however, some surgeons will choose to add additional support and stability to the spine and implant by placing metal screws, rods, or plates in the fused area. This can require a second surgical procedure with a posterior lumbar entry to the fused area (Cleveland Clinic, 2024). This patient's case involved a second surgical procedure.

ALIF Advantages

The risk for morbidity and bleeding is considerably lower with an anterior approach. The patient positioning for surgery is supine, which lends to less potential discomfort or position trauma for the patient (Allain & Dufour, 2020). Because ALIF surgery provides direct access to the damaged disc anteriorly, the posterior spinal anatomy has less incidence of surgical morbidity. This surgery can be advantageous for patients who have had previous lumbar surgeries. The injury to muscle tissue is not as extensive, which promotes less pain and faster recovery. Because this approach provides a clear pathway to the affected disc space, the disc spacers used for repair can be larger, which allows greater stabilization of the affected area. Stability of the disc can lead to improved fusion (AAOS, 2023; Cleveland Clinic, 2024).

ALIF Contraindications

Numerous considerations must be explored to determine if a patient is an appropriate candidate for ALIF versus an alternate approach. An MRI study or computed tomography (CT) scan is performed to assess for vascular or urologic anatomical abnormalities, which can create barriers to accessing the spine and prohibit the anterior surgical approach (Allain & Dufour, 2020). A study by Kapustka and co-authors (2020) identified the *most common* iatrogenic injury during the retroperitoneal approach as being venous-related, and the *most serious* injury as an arterial wall dissection. Venous-related injuries are commonly associated with retraction efforts employed while creating a pathway to the interbody spaces (Lindado et al., 2022).

Patients who are unable to withstand prone positioning are not candidates for this surgery when a lumbar approach is included (e.g., patients with morbid obesity or respiratory failure) (Allain & Dufour, 2020). Fragility of bones from critical osteoporosis can lead to severe complications and requires special strategies. A clear contraindication is acute infection. Many conditions may or may not result in surgery being contraindicated. Patients with a history of abdominal surgeries, vascular and lymph node chain surgeries, pulmonary embolism, and radiation therapy require special considerations to determine the most favorable approach, if allowable (Allain & Dufour, 2020). This patient had no contraindications for surgery.

Surgery #1: ALIF

The patient was positioned in the supine position for the initial surgery. A vascular surgeon and a neurosurgeon collaborated to achieve an anterior retroperitoneal approach (AAOS, 2023). The transverse operative incision was made immediately inferior to the umbilicus and was approximately 5-6 inches in length. The surgeon's preference and type of surgery dictates the length and location of the incision (Ignatavicius, 2021). The vascular surgeon moved aside the vasculature and peritoneal sac. Tampons (swabs) and valves were used for positioning the peritoneal sac, which contains the stomach and intestines. Because the ureter adheres to the peritoneum, it also was shifted out of the surgical path (Allain & Dufour, 2020). Doing so created a direct pathway for the neurosurgeon to access the lumbar spine (AAOS, 2023; Cleveland Clinic, 2024). The damaged disc was removed, and the disc space was cleared. A spacer was inserted to replace the damaged disc, restoring the original disc height and stabilizing any motion in the affected area. Various implants are

FIGURE 1.
Postoperative Abdominal, Lumbar Surgical Incisions and Views of Orthotic Brace

Abdominal incision on postoperative day 6.

Lumbar incisions on postoperative day 6.

Anterior view of orthotic brace.

Posterior view of orthotic brace.

Source: Kinard, 2024. Photos used with permission.

available and can consist of metal, plastic, or bone. Use depends on the patient's spinal pathology and the surgeon's preference (AAOS, 2023; Allain & Dufour, 2020). This patient's implant was made of a plastic (synthetic) material. After placement of the implant, the vasculature and organs were repositioned, and the incision was closed with dissolvable stitches internally. A topical sterile surgical glue was used to close the outer wound. Figure 1 displays photographs of the abdominal and lumbar surgical incisions.

Surgery #2: Lumbar Implant Stabilization

The second surgical procedure was performed on the second postoperative day. The patient was positioned in the prone position for the procedure. Entry to the lumbar spine was made posteriorly via three incisions, as displayed in Figure 1. The primary path to the implanted disc was made with a 2-inch (approximate) vertical incision with 1-inch right and 1-inch left (approximate) incisions adjacent to the

primary site, which allowed for insertion of supporting surgical instruments for placing the stabilization hardware. The posterior incision sites were closed with dissolvable stitches internally and outer stitches, which were removed after 10 days. As part of recovery and discharge planning, the patient was fitted with an adjustable orthotic back brace that restricted anterior and posterior motion (AAOS, 2023; Ignatavicius, 2021).

Post-Surgical Care and Implications

Interprofessional team members were pleasantly surprised at the patient's positive response after both surgeries. Common to all patient care after major surgery with general anesthesia, nurses assessed the patient's respiratory status and level of consciousness. Abdominal assessment was two-fold in this case: assessment for peristalsis and to inspect the surgical wound. Postoperative ileus is a frequent post-abdominal surgery occurrence that requires intervention (Dickerman, 2022). The patient was log-rolled to achieve inspection of the lumbar incision sites. Vital signs remained stable as did neurological assessments, both of which were measured every 4 hours. Pain was managed vigilantly. Opioid analgesics were administered every 4 hours for pain. Special notice was given to the lower extremities regarding strength, sensory perception, and mobility (Ignatavicius, 2021).

The patient insisted on getting out of bed to ambulate. Patients should be encouraged to get out of bed and begin to ambulate as soon as possible, preferably on the day of surgery and no later than the first postoperative day (AAOS, 2023). The physical therapist provided support regarding proper positioning and methods to mobilize safely. The patient got out of bed with assistance and was self-sufficient with toileting. By the evening of his surgery, he was independently ambulating in the hallways with a walker.

Men typically have greater success voiding when standing, which provides an incentive to get out of bed sooner. Nurses must be vigilant in assessing the patient's urination status. The bladder walls are formed by the detrusor muscle, which relies on spinal nerves in the sacrum to function, and urinary retention can indicate spinal nerve damage (Ignatavicius, 2021).

Bleeding is a mainstay for post-surgical risks and has a low occurrence rate with ALIF surgery (Allain & Dufour, 2020). Nurses must remain vigilant in assessing for indications of bleeding, and surgical dressings also must be inspected for clear drainage, which can be indicative of leaking cerebrospinal fluid. Fat embolism is another potential complication, which manifests with chest pain, dyspnea, and petechiae (in chest, neck, inner cheeks, and conjunctiva). Deep vein thrombosis prophylaxis must be employed (Ignatavicius, 2021). Although low in occurrence with ALIF surgery, migration of the implant (subsidence) can occur. Subsidence involves implant migration into the vertebral bodies, resulting in severe pain caused by diminished disc space, which can lead to a multitude of complications and the possibility of surgical revision being required (Parisien et al., 2022).

Male patients also can experience retrograde ejaculation resulting from the retroperitoneal approach, specifically involving L5-S1. The surgical technique over this disc space can result in damage and dysfunction of the nerves, which control a valve that allows for expulsion of ejaculate. Nerve damage can prevent the valve from opening properly, causing the ejaculate to travel into the bladder (least opposing pathway). Although this typically resolves on its own (Allain & Dufour, 2020; Dickerman, 2022), patients should be made aware of this potential issue.

Consideration also must be given to priapism, which is a medical emergency involving a painful erection lasting more than 4 hours. While limited research is available to support a root cause, incidents of priapism have been associated with surgical procedures. Nurses must investigate this possibility when indicative assessment findings are present to ensure prompt treatment is provided (Otten & Dunn, 2024). The patient in this case experienced no postoperative complications.

Discharge Planning and Education

Patients can remain in the hospital for up to 3 postoperative days and longer when complications manifest. In the absence of complications, discharge primarily relies upon pain management and mobility outcomes (AAOS, 2023). Nurses are instrumental in facilitating discharge readiness through motivation and patient education. Table 1 lists discharge education specifics that are important to discuss with the patient and caregiver after ALIF surgery.

Outlook for Recovery

Recovery time after ALIF varies; it may take several months before patients can safely resume primary activities. Bone growth is a slow process, and fusion of the vertebrae can take up to 1 year (Cleveland Clinic, 2024). The patient in this case was 5 months into the recovery phase when he shared his experience. He voiced no regrets for having the ALIF surgery, and stated, "I feel a lot better than I did before the surgery. I

TABLE 1.
Discharge Education After ALIF Surgery

Plan for a helper at home. • Having a caregiver to assist with daily needs during the initial recovery period is recommended.
Manage pain. • Take pain medication as directed. • Avoid allowing pain level to increase to significant level.

Perform incision care as instructed.
• Keep incision sites clean and dry.
• If dressings are over incision sites:
  • Monitor the dressings for drainage or blood.
  • Do not remove the dressings.
  • Reinforce dressings, when needed, and contact the surgeon if problems arise.

Heed caution with activities. • Wear orthotic back brace as instructed. • Perform muscle-strengthening exercises and use proper body mechanics, per instructions. • Do not drive for 6-8 weeks or until released to do so by the surgeon. • Walking is permitted and should be done daily. • Do not lift items that weigh more than a gallon of milk (~5 pounds). • Do not push or pull items. • Do not make bending or twisting movements, as doing so can result in injury to the fused site. • Do not engage in sexual intercourse until cleared to do so by the surgeon.
Consume adequate nutrition and hydration. • Make healthy choices to aid healing of fusion and incision. • Focus on a weight-reduction diet, as obesity can lead to further spine degeneration.
Avoid smoking and alcohol. • Bone growth is hindered by nicotine. • Alcohol can affect wound healing, prompt bleeding, and cause additional postoperative complications.
Report noted problems or symptoms of infection, such as: • temperature >101 degrees F. • redness or warmth at surgical sites. • malodorous or purulent drainage from surgical sites. • edema at surgical sites.
Follow up with surgeon as directed. • Surgeon performs x-rays and a physical assessment to ensure healing is on track and to address any identified problems.

Sources: AAOS, 2023; Cleveland Clinic, 2024; Ignatavicius, 2021; Parenteau et al., 2021

could not have stood that pain. I was on the brink of breaking. Now, mornings are typically the better part of my day. Walking is my friend" (M. Kinard, personal communication, December 19, 2024). He was not completely free of lumbar pain and experienced transient paresthesia in his legs. The "nagging" pain varied from day to day. The patient was careful to follow the post-surgical activity recommendations and was able to return to work, performing small jobs that did not entail excessive activity. He recognized his activity level had to remain quite restricted and had a positive outlook for continued improvement in the months ahead.

Conclusion

ALIF is a unique approach for lumbar surgery that has demonstrated positive outcomes with low morbidity (AAOS, 2023; Allain & Dufour, 2020; Kapustka et al., 2020). The concept of surgery can be difficult for patients to accept. Performing an abdominal approach to achieve spinal surgery can add to that difficulty. The patient in this case was in debilitating pain. The support provided by the surgeon and the research and preparation by this patient were deciding factors for moving forward with ALIF surgery. His compliance with postoperative instructions was

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proving to be positive. He was in less pain and was regaining his quality of life, which fueled even greater motivation and commitment to work toward greater success. MSN

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What Medical-Surgical Nurses Need to Know about Caring for Patients with a Neutropenic Fever

Susan Bohnenkamp
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A neutropenic fever is a life-threatening complication from the myelosuppressive therapy given to treat cancer. It differs in appearance from typical sepsis (Boccia et al., 2022). Neutropenia is defined as a decrease in the neutrophils, a type of white blood cell, that increases the risk of infection (American Cancer Society [ACS], 2024). All healthcare team members need to be aware of the signs and symptoms of infections because they may be blunted in patients with neutropenia. A mild fever may be the only sign of an infection. Other signs and symptoms of febrile neutropenia (FN) may include chills, tachycardia, breathing difficulty, dizziness, pain, mouth sores, and sore throat. Mortality rates associated with FN can be as high as 40%, making identification and effective clinical management a high priority (Keck et al., 2022).

Causes of neutropenia include cancers affecting the bone marrow, types of infections, immune conditions, medications, and nutritional problems (ACS, 2024). Neutropenic fevers must be managed early as delayed treatment may lead to increased risk for mortality. Other significant complications to FN include renal failure, hypotension, respiratory difficulty, and heart failure (Frith et al., 2023). Many times, the etiology of the fever cannot be determined; only about 30% of cases have a primary cause (Punnapuzha et al., 2023). Bacterial organisms account for most infections, but viral and fungal etiologies are possible (Lyon et al., 2024).

What Is a Neutropenic Fever?

A neutropenic fever is a one-time oral temperature of 38.3°C or higher, or an ongoing temperature of 38.0°C or higher for over 1 hour with a neutrophil count of less than 1500 (Punnapuzha et al., 2023) . The absolute neutrophil count (ANC) is a calculation of the percentage of neutrophils and bands in the white blood cell (WBC) count. The formula to calculate the ANC is WBC count (cells/microliter [mcL]) x percentage (polymorphonuclear cells + band neutrophils/100). ANC of less than 500 cells/mcL is considered severe neutropenia, while profound neutropenia is less than 100 cells/mcL. When WBCs reach their lowest point (nadir), which typically occurs 7-10 days after receiving chemotherapy (ACS, 2024), the patient is most at risk for a severe infection.

Assessment and Work Up

A thorough assessment is essential when caring for a patient with neutropenia. Taking the patient's history should include asking what chemotherapy the patient is receiving and what cycle day it is. Does the patient have a history of infections (especially bacterial)? Documentation of medication taken and allergies is important. During the assessment, the nurse should look for signs of infection, such as pain and tenderness. Laboratory testing typically includes a complete blood count, two sets of blood cultures (one peripheral, one from any central catheter), and urine

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A neutropenic fever is a potentially life-threatening complication of chemotherapy. Nurses must be aware of and assess patients for the signs and symptoms of neutropenia, and educate patients and their families on interventions to prevent febrile neutropenia.

Keywords: neutropenia, neutropenic fever, febrile neutropenia, cancer

culture. Cultures should be obtained immediately if there is any suspicion of infection. If the patient is experiencing diarrhea, a stool sample should be collected; a chest x-ray should be performed if the patient has respiratory symptoms. Other laboratory tests may include creatinine, liver function tests, and specific electrolytes (Punnapuzha et al., 2023).

Treatment

FN is a medical emergency and needs to be treated immediately. The Multinational Association for Supportive Care in Cancer (MASCC) Risk Assessment Scoring Index and The Clinical Index of Stable Febrile Neutropenia (CISNE) are tools that assist providers in determining if the patient has high-risk or low-risk FN; results guide management (Punnapuzha et al., 2023). These authors indicated high-risk patients include persons who have received cytotoxic therapy that may result in ANC less than 500 cells/mcL for more than 7 days, active uncontrolled comorbidities, progressive cancer, hepatic or renal insufficiency, having chimeric antigen receptor (CAR) T-cell therapy or alemtuzumab (Campath®) within the last 60 days, CISNE score 3 or higher, or a MASCC index risk score less than 21. High-risk patients with a neutropenic fever should have intravenous antibiotics administered within 60 minutes of triage. Options include cefepime (Maxipime®) or ceftazidime (Fortaz®) 2 grams every 8 hours; piperacillin/tazobactam (Zosyn®) 4.5 grams every 6-8 hours; or antipseudomonal carbapenems: imipenem/cilastatin (Primaxin®) 500 mg IV every 6 hours or meropenem (Merrem®) 1-2 grams every 8 hours. Vancomycin (Vancocin®) is not used initially but coverage may be added if there is suspicion of skin infections, pneumonia, hemodynamic instability, or central line infections. Antifungal coverage is added for fevers that last longer than 4-7 days. Pre-emptive antifungal therapy may be used for high-risk patients and may reduce duration in comparison to empirical therapy (Uneno et al., 2022). Antibiotics are continued until the patient's ANC is 500 cells/mcL or less.

Nurses must work closely with the provider and pharmacy to ensure antibiotics are ordered and available to administer. Low-risk patients may be given antibiotics in an outpatient clinic using fluoroquinolone plus amoxicillin/clavulanate (Augmentin®) or clindamycin (Cleocin®) if allergic to penicillin. (Punnapuzha et al., 2023). In addition to immediate administration of antibiotics, evidence-based guidelines recommend prophylactic granulocyte colony-stimulating factors. These have been shown to reduce FN incidence while improving chemotherapy dose delivery (Boccia et al., 2022).

Central venous catheter (CVC)-related infections can occur in patients with cancer who have neutropenia (Kim et al., 2021). CVC removal is recommended if any of these organisms caused the CVC-related infection: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida*, and rapidly growing nontuberculous mycobacteria. Antibiotics should be continued for uncomplicated infections up to 14 days after line removal and 72 hours of negative cultures but may need to be extended for patients with complicated CVC-associated infections (Haddadin et al., 2022).

Implications for Medical-Surgical Nurses

Nurses are vital to the care of patients with FN. Monitoring vital signs for patients with neutropenia is critical. Recognition of the fever or any signs of sepsis is important as initiating antibiotic therapy is time-sensitive (Wagner, 2024). Nurses should concentrate on prevention of FN, and provide education to patients and their families on interventions to protect themselves when the immune system is suppressed. If patients are at home and on a regimen that may cause neutropenia, they and their families should know how to monitor temperature and to implement parameters for when to call the care team. The Centers for Disease Control and Prevention (n.d.) offer patient education materials related to neutropenia and infection prevention. Patients with neutropenia should avoid people who are sick; if the ANC is less than 1000, they also should wear a face mask in public.

Nurses should advocate for patients and do everything to identify elevated temperature and start antibiotics right away. For example, plants or flowers (dried or fresh) should not be placed in the rooms of patients with neutropenia because of possible surface microbes (Oncology Nursing Society, 2021). While there is little evidence on a neutropenic diet, many organizations advocate for safe food handling practices. These include cleaning the hands, food, and surfaces; cooking to safe internal temperature; chilling food immediately; and avoiding cross-contamination of raw meat, poultry, seafood, eggs or ready-to-eat raw fruits or vegetables (Krott & Lyons-Potter, 2024). The goal is for patients to get the ordered treatment and be protected against infections. Nurses are key in providing this care (Wagner, 2024).

Conclusion

A neutropenic fever is an oncologic emergency and needs to be addressed immediately. Recognizing FN, collecting cultures, and administering antibiotics are crucial to prevent sepsis. Nurses are integral members

of the care team, educating patients and families on prevention of infections and recognition of FN. MSN

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Characteristics Nurses Seek in Their Leaders

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As the healthcare climate evolves, the need for effective leadership has never been more crucial. Decades of research reveal nurses' role performance, work satisfaction, and clinical outcomes are linked to effective nursing leadership (Alsadaan et al., 2023). Guided by mentors who are clinical experts and leaders, novice nurses expect to learn and grow in their roles when they enter the profession. Leaders who are present, possess essential leader qualities, and model effective leadership behaviors are best able to help novice nurses achieve their personal and professional goals. Leadership traits and behaviors nurses value in their leaders will be examined, with an emphasis on the connection between these characteristics and issues impacting nursing development and practice.

Nurse leaders must manage a multigenerational workforce comprising Baby Boomers, Generation X, Millennial, and Generation Z nurses. Recent studies indicate there are generational differences in the qualities followers seek in their leaders (see Table 1). While there is some overlap between generational leader preferences, distinct differences could create challenges for nurse leaders. Baby Boomer nurses were raised during multiple military conflicts and significant political unrest, contributing to a sense of duty and service that translates to prioritization of work and employer loyalty (Purdue Global, 2024). Nurse leaders who are professional, maintain integrity, and work hard to support employees or the organization are preferred (Campbell & Patrician, 2020). Born during the digital age and internet availability, Generation Z nurses conversely are shaped by a global perspective and rapid technological innovation (Purdue Global, 2024). They prefer leaders who possess a diverse and inclusive perspective, are comfortable with technology, and support change and innovation to improve the workplace or patient care (Aksakal & Ulucan, 2024).

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Nurses' role performance, work satisfaction, and clinical outcomes are linked to effective nursing leadership. Traits and behaviors nurses value in their leaders are examined, with an emphasis on the connection between these characteristics and issues impacting nursing development and practice.

Keywords: leadership, nurse leaders, leadership characteristics

Gender differences also are evident among Millennial leader preferences (Aksakal & Ulucan, 2024). Male and female Millennials believe a forward-thinking, visionary perspective is the most important leader quality. Beyond that, females prefer a leader who is team-oriented, equitable, and transparent, while males prefer strong management skills, cognizance, and privacy.

The current healthcare environment is characterized by high patient acuity, shortened lengths of stay, reimbursement tied to quality of care, rapid integration of technology, and insufficient resources associated with nurse burnout, intent to leave, and turnover (Alsadaan et al., 2023; Koehler & Olds, 2022). These issues are well-known to novice nurses. They expect leaders to help them manage these complexities and succeed in their professional roles. The ability of nurses to provide evidence-based quality care is influenced by direct and indirect nurse leadership behaviors (Alsadaan et al., 2023). The most effective leaders are those who tailor their leadership to the unique needs of healthcare organizations, units, and nurses.

Novice nurses expect leaders to provide a safe and healthy work environment (Orukwowu, 2022). Alsadaan and colleagues (2023) determined leaders who foster autonomous practice, encourage responsibilities beyond job expectations, engage with nurses, and

TABLE 1.
Generational Characteristics and Preferred Leader Traits

	Baby Boomers	Generation X	Millennials (Gen Y)	Generation Z
Generational Characteristics	• 1946-1964 • Optimistic • Sense of duty • Loyal to employer • Workaholic	• 1965-1980 • Independent and flexible • Questioning • Values self above employer • Change averse if it impacts personal life	• 1981-2000 • Civic-minded • Achievement-focused • Seeks challenges and growth • Motivated by leaders	• 2001-2020 • Digitally astute • Global-minded • Values innovation and independence • Keen to adopt new technologies
Preferred Leader Traits	• Professional • Supportive • Trustworthy • Empowering • Values integrity • Has a nursing background	• Supportive • Dependable • Works well in teams • Values clinical experience • Possesses analytical skills	• Supportive • Values teamwork, clinical experience, and competence • Dependable and dedicated • Empowering • Nonjudgmental • Values work-life balance • Fosters healthy work environment and relationships • Recognizes employees • Integrates technology • Nurtures advancement	• Forward-thinking • Values management skills • Owns one's errors • Maintains confidentiality • Aware and just • Works well in teams • Possesses digital skills • Emotionally intelligent • Possesses strong communication skills • Honest • Respectful

Sources: Aksakal & Ulucan, 2024; Campbell & Patrician, 2020; Dols et al., 2019; Keith et al., 2021; Purdue Global, 2024

cultivate supportive work environments have a positive impact on nursing performance by boosting motivation. Novice nurses do not want leaders to overshadow their ability to make decisions and engage in problem-solving but rather support their ability to make independent decisions and manage patient care appropriately. When leaders communicate effectively, outcomes for patients and staff ultimately improve (Fowler et al., 2021). This is because effective communication skills can reduce miscommunication, encourage shared decision-making, and provide a sense of collegiality; these qualities are preferred by multiple generations of nurses (Aksakal & Ulucan, 2024; Campbell & Patrician, 2020; Dols et al., 2019; Keith et al., 2021).

In a national study of more than 20,000 U.S. nurses spanning five generations, Koehler and Olds (2022) concluded potentially preventable loss (e.g., inadequate advancement opportunities, job dissatisfaction, lack of respect, work environment) was the reason most widely reported related to nurses' intent to leave their jobs. Novice nurses seek leaders who can foster their professional growth and development. Leaders can allocate resources for ongoing training, identify advancement opportunities and guide nurses towards them, and advocate for organizational initiatives that promote wellness and work-life balance. Collectively, these endeavors align with generational leader preferences, thus reducing burnout and retaining nurses in the workforce.

Novice and experienced medical-surgical nurses depend on strong leaders in the face of mounting challenges in the healthcare environment and nursing profession. Numerous references informed a broad discussion of leadership characteristics desired by nurses in practice. Yet, no research was located that specifically outlined leader traits and behaviors preferred by nurses practicing in medical-surgical settings. This represents a critical gap in knowledge necessary to address the needs of medical-surgical nurses and leaders. MSN

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A New Look at the PICO Question

Lynne M. Connelly

Most readers are familiar with the PICO mnemonic, which stands for *population, intervention, comparison,* and *outcome. Time* may be added if appropriate. This mnemonic, which is used commonly in evidence-based practice (EBP) projects, also can be misused. PICO is not appropriate in all situations and can lead to problems if viewed as the most important part of EBP. In this column, the purpose, components, and some issues related to PICO will be discussed.

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Although useful in many incidences, PICO (*population, intervention, comparison, outcome*) as a structured approach to a literature search should be employed carefully and thoughtfully. The purpose, components, and issues related to PICO are discussed.

Keywords: PICO, evidence-based practice, EBP, clinical question, literature search

Purpose of PICO

PICO is a structured format used to help nurses develop an EBP question to search the literature for the best practice answer to their clinical question (Polit & Beck, 2021) as was used by Lally and colleagues (2025) and Hodge and co-authors (2025) in projects described in this issue. PICO is not a research method; it is a search strategy. Once a PICO question is developed and the search begun, the PICO question should not be changed (Ford & Melnyk, 2019).

PICO is used when there is sufficient literature to provide an answer to a clinical question. The original purpose was to assist consumers of evidence (clinicians), not the creators (researchers) of that evidence (Schiavenato & Chu, 2021). Use of a structure for questioning is often helpful for people relatively new to searching literature. PICO helps clinicians focus on the patients they want to address, important aspects and outcomes, and keywords.

Components

Components of this structured format include the *population* of interest to the clinician, such as adults with hypertension. Other important characteristics and demographics, such as gender or geographic area, may be needed as descriptors. *Intervention* is the action of interest, which can be a treatment, procedure, diagnostic test, or predictive factor (e.g., nurse-led smoking cessation classes or screening scale for falls). Ford and Melnyk (2019) suggested clinicians searching for the best practice should search for any intervention that addresses the practice. The best practice may not be one considered before the search.

Comparison would be an alternate action to the intervention in the studies, such as normal practice or another type of intervention. The *outcome* is the effect of the intervention, such as an impact on blood pressure or on the number of patients who quit smoking (McKenzie et al., 2024). As mentioned, time can be added if appropriate. There have been other variations developed when the question does not fit neatly into these categories, as when there is typically no comparison in the studies, or a comparison is not known initially.

PICO as Part of EBP

PICO is a tool to assist in developing the clinical question and completing a literature search for an EBP project. Despite the thoughts of some people, it is not an element of EBP (Schiavenato & Chu, 2021). EBP involves much more than the search of literature; it involves critically evaluating the literature to determine the quality of the evidence and identifying a meaningful answer to the clinical question (Ford & Melnyk, 2019). It can be used as a starting point in a search, but other methods should be employed as well, including the ancestry method of reviewing the reference lists in identified articles.

Of importance, the answer identified for the PICO question only applies to the present time. The answer most likely will not be a final one and will require updating (Owens, 2021). Further enquiry also should be part of the thought process.

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Other Issues

Ford and Melnyk (2019) noted they often find the questions incorrectly written. Just as in research and quality improvement, a sloppy evidence-based question can lead to a sloppy search of the literature, which in turn can lead to a sloppy answer. For example, PICO questions should not include directional terms such as *increased* or *decreased* as this can bias the search. Not all the appropriate literature will be located if a directional outcome is used, and the answer may be biased. Also, if clinicians direct their search in a particular direction because they think they know what the answer will be, this will bias the findings and the answer they reach. In addition, comparisons may be very different in different studies or not described well, so this should be considered when evaluating findings of a search. PICO questioning also can omit certain areas of research such as qualitative research. Clinicians should remember they may find there is not enough literature to produce an answer to the question. The finding of not enough literature is a starting point for possible research.

Although useful in many incidents, PICO as a structured approach to a literature search should be employed carefully and thoughtfully. Another important point to draw from this discussion is that PICO is not the whole of EBP, which involves much more. Evaluation of the quality of the evidence is an essential part of the process. One suggestion is to contact an experienced librarian or nursing colleague with research experience to provide advice and assistance. Ford and Melnyk (2019) offered an excellent source on how to write and how not to write a PICO question. MSN

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