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Myriamme Neree
Walden University

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Walden University

College of Nursing

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Myriamme Neree

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Dr. Barbara Niedz, Committee Chairperson, Nursing Faculty

Dr. Joan Hahn, Committee Member, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

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Executive Summary: Quality Improvement Initiative
Reducing the Use of Erythropoiesis-Stimulating Agents in Hemodialysis Patients

by

Myriamme Neree

MS, Kaplan University, 2017

BS, Binghamton University, 1992

Executive Summary Submitted in Partial Fulfillment
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Summary

This Doctor of Nursing Practice project was a quality improvement (QI) initiative. Nephrologists were inconsistent in ordering iron studies and sometimes delayed the initiation of erythropoiesis-stimulating agents (ESAs) on admission to the inpatient site. These delays often led to suboptimal outcomes. The practice-focused question guiding the project asked whether a nurse-driven iron protocol would improve adherence to anemia management guidelines. The project's purpose was to evaluate the impact of the evidence-based nurse-driven protocol. I used descriptive and inferential statistics for data analysis. Findings demonstrated a statistically significant improvement in the timely completion of iron studies and in intravenous (IV) iron administration; however, a reduction in ESA use at discharge did not change pre- to postimplementation. The results indicated a statistically significant association between the intervention and iron profile ordering, $X^2 = 58.54, p < .001$. The change was also statistically significant for iron IV administration ($X^2 (1, N = 396) = 10.90, p < .001$) and for increased ESA administration based on criteria in the nurse-driven protocol ($X^2 = 9.62, p = .002$). My recommendations to the project site included sustained use of the protocol, a unit-based dashboard, and policy changes for the protocol. The project's implications for nursing practice include enhanced clinical autonomy, standardization of anemia care, and cost-effective resource to provide access to needed therapy for all patients with evidence of improved patient outcomes for a vulnerable patient population, a positive social change.

Background

Hospitalized hemodialysis patients were exhibiting inconsistent adherence to iron supplementation guidelines at admission to the inpatient site, leading to inappropriate ESA use, including delayed treatment and higher costs. Chart reviews at the site revealed wide variability in ordering iron studies and initiating IV iron before ESA therapy, contrary to Kidney Disease Outcomes Quality Initiative (KDOQI) recommendations that emphasize iron repletion as first-line management for anemia (see Lee & Tarnag, 2021). This gap in practice underscored the need for a nurse-driven iron protocol to standardize iron profile assessments and guide evidence-based anemia management.

The project's purpose was to implement and evaluate a nurse-driven anemia management protocol to optimize iron therapy and reduce inappropriate ESA utilization in hospitalized hemodialysis patients. The project question was: Among hospitalized hemodialysis patients, does implementing a nurse-driven iron protocol increase the rate of iron profile orders on admission and reduce ESA use at discharge?

I conducted a comprehensive search using CINAHL, PubMed, ProQuest, and Cochrane Library databases. Keywords included *hemodialysis*, *anemia management*, *iron supplementation*, *erythropoiesis-stimulating agents*, *nurse-driven protocol*, and *quality improvement*. The search initially yielded 126 articles, which were screened by title and abstract for relevance to inpatient dialysis and anemia protocols. After applying inclusion criteria of being peer-reviewed, published between 2018–2024, and adult inpatient or ESRD population and removing duplicates, 17 studies remained. Of these, three were Level I (randomized controlled trials and systematic reviews) and two were Level II

(quasi-experimental or cohort) studies, providing a solid basis for the project because they were of good or excellent quality (see Dang et al., 2022). A final group of seven studies provided support from the literature for the project. According to Dang and Dearholt's (2022) Johns Hopkins nursing evidence-based practice model, levels of evidence are categorized by the strength of the research design. Level I represents the highest level, such as randomized controlled trials or systematic reviews; Level II includes quasi-experimental studies; Level III covers nonexperimental and qualitative research; Level IV represents expert opinions, consensus guidelines, or nationally recognized standards; and Level V includes case reports or QI data. Each piece of evidence is also assigned a quality rating. For this project, Zununi Vahed et al. (2021), Susantitaphong et al. (2020), and van den Oever et al. (2020) provided Level I evidence, while Karaboyas et al. (2020) and Zhang et al. (2023) offered Level II evidence. Patel et al. (2020) and Al-Jabi et al. (2023) were appraised as Level IV.

The evidence I reviewed demonstrated that optimizing IV iron prior to ESA therapy significantly improves hemoglobin stability and reduces overall ESA requirements (Susantitaphong et al., 2020; van den Oever et al., 2020; Zununi Vahed et al., 2021). The Level II studies supported the effectiveness of nurse-led anemia management models in enhancing adherence to protocols, reducing time-to-therapy and lowering ESA costs (Karaboyas et al., 2020; Zhang et al., 2023).

The strength of the evidence, predominantly Levels I-II, provided a reliable foundation for this QI project, influencing the educational plan, evaluation metrics, and expected outcome measures. Level IV studies identified frequent ESA use without prior

iron testing, revealing poor adherence to anemia management protocols. Patel et al. (2020) supported implementing standardized, nurse-driven processes requiring iron studies and repletion before ESA use to improve safety and efficiency. In a clinical practice guideline, Al-Jaba et al. (2023) emphasized Kidney Disease: Improving Global Outcomes' (KDIGO) first approach, showing that treating iron deficiency before ESA use improves hemoglobin stability and quality of life in dialysis patients. The findings endorse integrating iron monitoring and patient-centered outcomes into anemia protocols.

Project Development

To flesh out the details of the QI project, I used the plan-do-study-act model (see Appendix). To implement the project as a pilot, I enlisted the support of the chief of nephrology and three key nephrologists to test the nurse-driven protocol. The protocol was based on the National Kidney Foundation's (2006) KDOQI guidelines. Consistent iron monitoring ensures appropriate management of anemia and reduces unnecessary ESA exposure, and the increase in iron profile ordering postintervention aligns with KDIGO (2020) recommendations that emphasize assessing iron status before initiating ESAs. Additionally, aligning with the American Association of Blood Banks (2023) transfusion guidelines, improved iron assessment may help reduce transfusion dependency in critically ill and dialysis patients.

The nurse-driven protocol was initiated on July 10, 2025, following a comprehensive staff education program and careful integration into the existing workflow. Outcome variables included the ordering of an iron profile at admission, the

initiation of ESA therapy at admission, and the presence of an ESA order at discharge. Data were obtained from the admitting patient's electronic medical record (EMR). De-identified retrospective and prospective data were extracted from the EMR for two timeframes: pre-implementation (April 8–July 8, 2025) and postimplementation (July 10–October 8, 2025). I analyzed the collected data were analyzed using SPSS Version 31, employing descriptive statistics and chi-square tests to compare proportions between pre- and postintervention groups.

Results

I downloaded a total of 396 cases from the project site's electronic health records and included them in a de-identified data set. There were 201 in the preintervention group and 195 in the postintervention group. Key outcome metrics were included for analysis.

Outcome 1: Iron Profile Ordered Within 24 Hours of Admission

There were 32 iron profile orders in the preintervention group and 102 in the postintervention group. The likelihood ratio chi-square indicated a statistically significant improvement in compliance ($\chi^2 = 60.719, p < .001$). According to the protocol, when patients' hemoglobin and hematocrit met criteria, the nurse placed iron orders on admission. In the preintervention period, 32 of 201 (15.9%) patients had an iron profile drawn within 24 hours. This increased to 102 of 195 (52.3%) in the postintervention period. The intervention resulted in a threefold increase in adherence to early diagnostic testing, demonstrating strong uptake of the protocol's education and decision-support components among dialysis nursing staff. Most patients in both pre- and postintervention phases were chronic hemodialysis inpatients. As a result, there were opportunities to

initiate IV iron replacement therapy, an alternative to ESA administration. All patients in both groups met criteria for iron initiation based on current anemia management guidelines (see KDIGO, 2021).

Outcome 2: IV Iron Administration When Indicated

Appropriate administration of IV iron increased after the intervention. In the preintervention period, 23 of 201 (11.4%) patients received IV iron, compared to 47 of 195 (24.1%) in the postintervention group. The change was statistically significant ($\chi^2 = 10.90, p < .001$). IV iron use more than doubled, which suggests that timely iron studies led to more accurate identification of iron deficiency and a more consistent alignment with evidence-based anemia management guidelines, including PBM and KDOQI-recommended iron-first strategies before ESA administration. This alignment validates the approach taken in the project and ensures that the project site is providing the best possible care.

Outcome 3: ESA Use on Admission

ESA administration increased following the intervention. In the preintervention group, 73 of 201 (36.3%) patients received an ESA on admission, compared with 101 of 195 (51.8%) in the postintervention group. This difference was also statistically significant, ($\chi^2 = 9.62, p = .002$). The increase in ESA use is a positive outcome and is consistent with the earlier identification of anemia severity and more precise classification made possible by more timely iron studies. When iron deficiency was corrected, more patients were appropriately qualified for ESA therapy. Thus, the increase likely reflects more appropriate treatment rather than overuse.

The nurse-driven iron protocol produced several measurable improvements: iron profile ordering increased from 15.9% before implementation to 52.3% after implementation (a 36.4% increase); IV iron administration rose from 11.4% to 24.1% (a 12.7% increase), demonstrating improved recognition and treatment of iron deficiency; and ESA use on admission increased from 36.3% to 51.8% (a 15.5% increase), likely reflecting improved accuracy in anemia classification after iron studies were completed promptly. The nephrologists' routine discharge practice also guides ESA continuation.

The intervention successfully shifted practice patterns toward evidence-based, iron-first anemia management and demonstrated strong feasibility and impact in a critical-care environment. Implementation of the nurse-driven iron protocol significantly improved anemia management among hospitalized dialysis patients. Iron study completion within 24 hours of admission increased for patients who met the criteria for IV iron replacement based on ferritin and transferrin saturation results. All those eligible received IV iron as per protocol, reflecting stronger adherence to evidence-based practice and improved interdisciplinary coordination.

I collected qualitative data through weekly focus group discussions and informal nurse debriefings after implementation. Nurses consistently reported increased confidence and comfort in administering IV iron. They emphasized that the standardized protocol reduced uncertainty and improved workflow efficiency. Nurses also described stronger collaboration with nephrologists and pharmacists, which increased confidence in patient safety. These perceptions reinforced the quantitative findings and showed that structured nurse-driven processes enhance both safety and team communication in

anemia management. Qualitative feedback from nurses highlighted greater confidence, clarity, and ownership in managing anemia, confirming improved compliance with ordering postintervention. No adverse safety signals were identified during the pilot, reinforcing that a nurse-driven, evidence-based approach can enhance adherence to national anemia guidelines, improve patient safety, and strengthen nursing leadership in clinical decision-making (see American Association of Colleges of Nursing, 2021; KDIGO, 2021).

Safety monitoring and staff feedback were integral to the implementation process. I collected data through retrospective chart audits, direct observation, and postimplementation nursing debriefings. Quantitative data from EMRs included medication administration records, ferritin and transferrin saturation results, and ESA orders. Safety surveillance focused on identifying infusion-related adverse events, including hypotension, rash, and anaphylaxis. No adverse safety signals, including these events, were observed or reported during the pilot, confirming that IV iron was administered safely under the nurse-driven protocol.

Implementation of the nurse-driven iron protocol not only standardized anemia management within the inpatient dialysis unit and improved laboratory test compliance but also empowered the nursing staff by giving them a more active role in patient care. This QI initiative supports broader institutional goals of medication stewardship, cost containment, and adherence to KDOQI and PBM guidelines.

Limitations included a small sample size in the early postimplementation phase, potential variability in documentation accuracy, and limited generalizability beyond the

inpatient dialysis unit setting. Additionally, missing laboratory data and new fellow nurses may have affected full adherence to the protocol. The pilot was conducted over a relatively short period. While improvements were substantial and statistically significant, the sustainability of these changes remains unknown. Practice change in high-turnover, high-acuity environments may degrade without ongoing education and reinforcement. Given the high turnover among dialysis staff and competing clinical priorities, ongoing education is essential. Quarterly sessions, brief EMR tip sheets, and case reviews can reinforce the protocol and ensure new staff receive standardized training.

Conclusions

The findings from this project demonstrate that a nurse-driven iron protocol can produce a significant, evidence-based improvement in the management of anemia among hospitalized patients in the dialysis unit. The postintervention increase in iron profile ordering, supported by a statistically significant chi-square test, validates the effectiveness of structured nursing leadership in promoting adherence to anemia management guidelines. Through education, workflow integration, and interprofessional collaboration, nurses successfully translated research into clinical practice, optimizing patient outcomes while supporting cost-efficient care delivery.

These results reaffirm the central role of advanced practice nurses as catalysts for change in complex healthcare environments. By aligning practice with established standards, such as KDIGO (2020), KDOQI (2006), and American Association of Blood Banks (2023), the project exemplifies how nurse-led interventions can close gaps between inpatient and outpatient care and reduce reliance on ESA therapy and

transfusions. The sustained adoption of this protocol (which is a primary recommendation to the site) has the potential to improve patient safety, enhance quality metrics, and foster a culture of continuous learning within the critical care setting. Continued monitoring, interdisciplinary collaboration, EMR integration, and broader institutional dissemination are recommended to sustain these gains and further strengthen anemia management across the organization. A monthly anemia management dashboard would be very useful on the unit to visually track key indicators, including iron profile ordering rates, IV iron administration, ESA utilization, transfusion rates, and overall protocol adherence. Creating this dashboard promotes transparency, strengthens accountability, and supports data-driven leadership across the unit and represents another important recommendation to the site.

Additional recommendations include:

- finalize the protocol and integrate it across all inpatient units
- submit policy for approval to the hospital's Clinical Practice Committee
- continue education sessions during onboarding and annual competencies
- create dashboard for ongoing tracking of iron management and outcomes
- explore expansion to cover outpatient transitions and discharge summaries
- adjust the protocol: add EMR alerts for rechecking iron indices after three doses of IV iron
- adjust the protocol to clarify ESA use thresholds to match the latest guideline updates

Ultimately, this QI initiative contributes to positive social change by advancing equitable, standardized anemia care for vulnerable patient populations, ensuring that decisions on iron therapy and ESA administration are guided by clinical evidence rather than practice variability. The outcomes serve as a model for other institutions seeking to empower nursing leadership; strengthen multidisciplinary collaboration; and achieve meaningful, measurable improvements in patient-centered care.

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Appendix: Nurse-Driven Protocol to Optimize Iron Therapy

Plan

Problem Statement: Iron studies are not routinely ordered for hospitalized ESRD patients on dialysis, resulting in inconsistent anemia management. Current practices often rely on nephrologist preference rather than guideline-based protocols (e.g., KDOQI), which can lead to premature ESA initiation and a lack of continuity in outpatient dialysis care.

Goal:

Develop and implement a nurse-driven protocol to ensure the timely assessment of iron status and the provision of appropriate iron supplementation in alignment with evidence-based guidelines.

Objectives:

- Standardize iron study orders upon admission for ESRD dialysis patients.
- Empower dialysis nurses to initiate protocol-based iron therapy.
- Reduce inappropriate ESA use and improve hemoglobin stability.
- Stakeholders: Dialysis nurses, nephrologists, MICU/ED staff, hospital pharmacists, lab services, quality improvement team.

Metrics:

% of admitted ESRD patients with iron studies within 24 hours.

% receiving IV iron when indicated.

PreESA use rate compared to postimplementation.

Hemoglobin stability at discharge.

Do

Actions Taken:

- Created a multidisciplinary workgroup (dialysis nurses, nephrologist, QI, pharmacy).
- Developed protocol using KDOQI and KDIGO guidelines.
- Educated dialysis nurses on the new protocol (live sessions and quick guide).
- Implemented EMR order set for iron studies with admission dialysis orders.

- Started pilot on two inpatient units (MICU and Stepdown) for 6 weeks.

Study

Data Collected:

Pre and postintervention data on iron study completion, iron administration, ESA use, and hemoglobin trends.

Nurse feedback on protocol usability.

Monitoring of adverse events (e.g., iron overload, hypersensitivity).

Act

Next Steps:

- Finalize the protocol and integrate it across all inpatient units.
- Submit policy for approval to the hospital's Clinical Practice Committee.
- Continue education sessions during onboarding and annual competencies.
- Create dashboard for ongoing tracking of iron management and outcomes.
- Explore expansion to cover outpatient transitions and discharge summaries.
- Adjust the protocol: add EMR alerts for rechecking iron indices after three doses of IV iron.
- Adjust the protocol to clarify ESA use thresholds to match the latest guideline updates.