Improving nursing student competence and confidence at medication administration in high risk pediatric and women's health clinical care

Sherrie Lessans PhD RN CNL, Jana Goodwin PhD RN, Christine King EdD MSEd, Malissa da Graca DNP MS RNC FNP-C, Amy Hoffer DNP MS CPN, Judith Combs-Haylett MSN RN

University of Maryland School of Nursing

Background

- Medication errors are 3X more likely in pediatric clinical care where dosages vary considerably by patient age, body surface area, and health status (Slocum et at, 2003; NCCMERP, 2021)
- The rate of medication errors in obstetrical care is nearly 2x higher than the general adult population under the pressure of obstetrical emergencies and high use of intravenous medications, and as much as 8X higher in neonates with complex health needs and critical care admissions (Jain et al, 2009; NCCMERP, 2021)
- Nursing students report significant performance anxiety and fears of making medication errors in high-risk pediatric and obstetrical clinical care that increases their risk of making a preparation or dosing error (Lin et al, 2013)
- Many factors shape this performance anxiety (Lin et al, 2014; Stolic, 2014; Ozyazıcıoglu et al, 2018)
    - Numeracy skills: in algebraic formula construction, fractions, SI conversions
    - Integrating pathopharmacology with conceptual understanding of dosing challenge with patients
    - Self concept of competence and fears of both making a mistake and being regarded as not competent
    - Technically proficiency with syringes and IV pump technology
    - Differences in both the access to and structure of medication administration records from clinical site to site as well as site limits on documentation in the EHR

Student Population and the Clinical Learning Challenge

- Large two-campus university-based nursing program with both traditional BSN and second degree master's entry to practice programs – combined student population of >900 students
- Established traditional pedagogical approach to preparing students for medication administration with lecture-based introduction of medication safety and skill validation in fundamentals and specialty courses, workbooks, worksheets, and in-course paper and pencil tests
- Significant responsibility was vested with bedside clinical instructors to assure competence and knowledge/skills transfer to bedside patient care
- Nearly 25% of continuing students were not able to complete a proficiency assessment at 100% at the start of each new semester utilizing this traditional approach
- Clinical instructors reported students unable to reliably calculate and prepare medications at the high-risk bedside with significant medication administration performance anxiety
- Students report high anxiety with medication preparation and administration responsibilities in high risk patient care areas including pediatric, obstetrical, and newborn care settings
- Students specifically report fears of mis-understanding the dosing challenge with weight based and divided pediatric doses, making calculation errors, and using technology- "live in near-miss fear"

Multi-step Intervention

- 2 year assessment and review of best practice literature on teaching medication preparation and safe dosing administration- working with faculty curriculum workgroup
- Adopted SafeMedicate™ as a teaching and assessment platform in the fall of 2019
    - All students purchase at the start of the first semester and complete numeracy assessment with self-directed resources for skills strengthening
    - Students are directed to complete specific learning modules linked to medication preparation and dose administration learning activities in Fundamentals of nursing course, followed by leveled content across semesters
    - Blueprint driven standardized ADA formative and summative assessments are completed in first semester with course provided remediation, the expectation of achieving proficiency at 100%
    - Added entry into semester standardized formative and summative assessments prior to each new specialty semester as a compliance requirement to begin clinical learning similar to other compliance requirements (CPR, vaccinations, site-specific onboarading activities)
    - Administrative review and intensive remediation as needed to assure leveled skill competencies is provided throughout this compliance assessment process across courses
- Introduced in-course skill strengthening activities in Spring and Summer of 2020 as a strategy to support pandemic related hybrid virtual and in-person clinical learning in high-risk pediatric and obstetrical clinical settings
    - Formative assessments as weekly clinical strengthening exercises
    - Short structured assessments that were linked to a vender supported virtual simulation product- either based on medications or technologies described in the simulation
    - SafeMedicate™ assessments provided as pre-work for simulation suite-based learning activities and simulations

Summary and Conclusions

- Semester over semester competence expectations improved with a noted reduction into 2nd and 3rd attempts ranging from 8-16 % points indicating that fewer students are entering each semester with conceptual, calculation, and technical skill deficits for clinical faculty to build on at the bedside
- Readiness for medication administration practice as a new nurse has improved by graduation as students.
- Students report that it is through the development of sound "habits of mind" across and within semesters that their comfort and confidence level at medication administration is improved
- Clinical faculty report students have more consistent leveled skills and less anxiety about preparing and dosing medications in high-risk populations.

Acknowledgement

- The authors would like to acknowledge the significant contribution of a large faculty curriculum workgroup that assisted with implementing pilot changes to strengthen student skill and confidence at safely administering medications as well as course directors across all leveled clinical courses for innovating and integrating SafeMedicate™ content and assessments into their courses.
- A special acknowledgement goes to the clinical faculty in our Simulation suite for their development assistance in supporting virtual simulation learning in the SafeMedicate™ platform: Rachel Figiel RN BSN CCRN, Jacquelyn Wallender RN, BSN, Amy Daniels, PhD RN CHSE

References

Jain S, Basu S, Parmar VR. (2009) Medication errors in neonates admitted in intensive care unit and emergency department. *Indian J Med Sci.* **63**:145–151. doi: 10.4103/0019-5359.50763.

Lin F, WenWu W. Lin H, Lee, T. (2014). The learning experiences of student nurses in pediatric medication management: A qualitative study. Nurse Education Today. 34: 744-748.

National Coordinating Council for Medication error reporting and prevention 2021.. Available from: http://www.nccmerp.org/. Cited 15 May 2021

Ozyazıcıoglu N, Aydın A, Surenler S, Cinar, H, Yilmaz, D, Arkan, B,Tunc, G. (2018). Evaluation of students' knowledge about paediatric dosage calculations. Nurse Education in Practice. 28: 34-39.

Slonim AD, LaFleur BJ, Ahmed W, Joseph JG. (2003) Hospital-reported medical errors in children. *Pediatrics.* **111**:617–621. doi: 10.1542/peds.111.3.617

Stolic S. (2014). Educational strategies aimed at improving student nurse's medication calculation skills: A review of the research literature. Nurse Education in Practice. 14: 491-503.