Education of Perioperative Nurses on Recognition and Treatment of Local Anesthetic System Toxicity

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Abstract

Purpose: The goal of this quality improvement project was to identify if providing education and simulation to perioperative nurses would increase knowledge about local anesthetic system toxicity (LAST).
Design: This QI project was implemented in a small hospital in the Midwest Region of the United States and incorporated a PowerPoint presentation and simulation.
Methodology: An anonymous knowledge test was given pre-intervention, immediately post-intervention, and one-month post-intervention.
Conclusion: Results suggested statistically significant increase in immediate knowledge gained.

Introduction & Background

- LAST is a low-volume, high risk event which lacks education in undergraduate nursing programs and in hospitals for non-anesthesia staff.
- Early detection of LAST has been shown to improve patient outcomes and nurses are in a prime position at the bedside to recognize early signs and symptoms (Bevil et al, 2020).
- Due to a high use of regional anesthesia techniques most surgical patients at a small hospital in the Midwest Region of the United States receive local anesthetics putting them at risk for LAST.
- This hospital currently has no LAST education or training in place for perioperative nurses.

PICOT Question

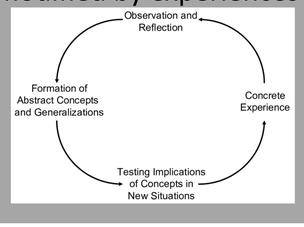
In perioperative nurses, will formal training and simulation compared to current practice of no formal training or simulation increase the ability to recognize local anesthetic system toxicity immediately and one month post education?

Review of Literature

- LAST is an event that can occur after injection of local anesthetics and is characterized by nervous and cardiovascular system symptoms (El-Boghdadly et al, 2018).
- Technique, patient characteristics, and local anesthetic choice factor into the risk of development of LAST (El-Boghdadly et al, 2018; Wadlund, 2017).
- Rapid Recognition and treatment are necessary to improve patient outcomes (El-Boghdadly et al, 2018; Neal et al, 2018; Wadlund, 2017).
- Simulation-based learning is an effective method of improving knowledge and skills of staff in the perioperative area (Bevil et al, 2020; Hibberson et al, 2019; Kaldheim et al, 2022; Mai et al, 2020; Mogler et al, 2020).
- Simulation-based learning consists of three distinct phases that can be varied to fit the needs of the population it is being implemented into (Wakefield et al, 2021).
- Barriers exist to implementation but there are strategies that can be utilized to overcome them and allow for a positive experience (Hibberson et al, 2021; Mogler et al, 2020).

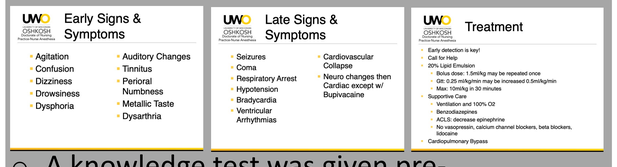
Theoretical Model

Kolb's Experiential Learning Theory operates as the theoretical model for this project. Kolb's theory is a cyclical process involving four stages in which knowledge results from and is continually modified by experiences (Kolb, 1984).



Methodology

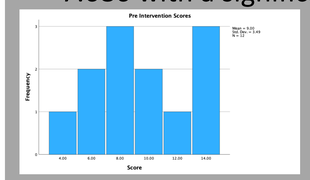
- Sample population included volunteer perioperative nurses from a small hospital in the Midwest Region of the United States (n=12).
- Intervention consisted of a PowerPoint presentation outlining recognition and treatment of LAST and a simulation in which a patient develops LAST.

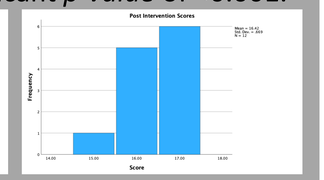


- A knowledge test was given pre-intervention, immediately post-intervention and will be given one-month post-intervention to evaluate immediate and long-term retention of knowledge gained.
  - Participants were asked not to use any resources to complete the test
  - Tests were kept anonymous
- Preliminary results were analyzed using a Paired T-test.

Results

- Mean score of the pre-test was 9.0 with a standard deviation of 3.49
- Mean score of the immediate post-test was 16.42 with a standard deviation of 0.669
- Analysis of pre and immediate post-test scores resulted in a paired t-test value of –7.686 with a significant *p-value* of <0.001.





Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			One-Sided p	Two-Sided p
Pair 1	Pre.Intervention – Immediate.Post	-7.41667	3.34279	.96498	-9.54057	-5.29276	-7.686	11	<.001	<.001

- After collection of one month post test scores a one-way repeated measures ANOVA will be completed to assess for a difference in scores at the three time periods.

Discussion

- The intervention of a PowerPoint presentation and simulation was successful in increasing perioperative nurses' knowledge on LAST. This is evidenced by statistically significant increase in immediate post-intervention test scores.
- This education could be repeated yearly or more often if needed to educate new staff and as a refresher for other staff members.
- Limitations to this study include it was a single site with a limited sample size.

References

Available upon request