



Perceptions Among CRNAs on Qualitative Versus Quantitative Monitoring for the Assessment of Residual Neuromuscular Blockade

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INTRODUCTION

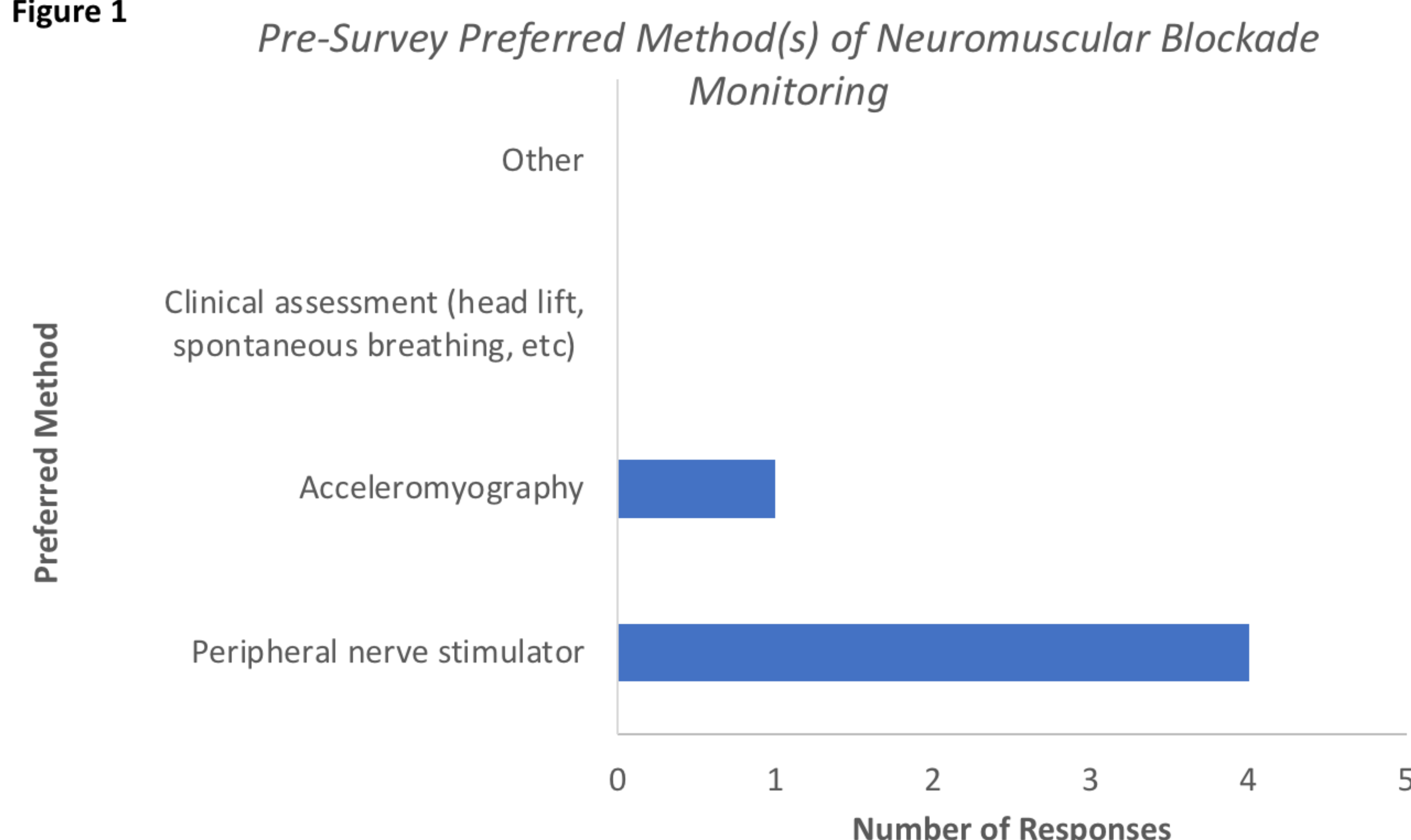
- Neuromuscular blockade medications are administered by CRNAs to intubated patients undergoing general anesthesia to elicit muscle paralysis.
- A peripheral nerve stimulator (PNS) provides an electrical stimulus to a nerve site, producing a series of muscular twitches.¹
- The most common stimulation pattern to measure neuromuscular blockade is the train of four count (TOF).²
- Acceleromyography devices use quantitative measurement to measure, analyze and provide a TOF ratio in real time.¹
- National guidelines recommend a TOFR ≥ 0.9 by quantitative monitoring before emergence and extubation.³
- There is limited understanding of providers' perceptions and preferences of the type of neuromuscular blockade monitoring used.
- The purpose of this quality improvement project was to assess anesthesia providers' perceptions, usefulness, and preference for using qualitative (PNS) versus quantitative (acceleromyography) measurements in the perioperative setting.

METHODS

- A single plan-do-study-act cycle was used.
- Team and project chair meetings facilitated ideas, planning, tools, processes, surveys and data collection.⁴
- Participating CRNAs and clinical contacts were identified by the project chair and project communication was primarily by email.
- Project approval was obtained through the partnering organization.
- A pre- and post- intervention questionnaire was sent regarding participants' perceptions and use of neuromuscular blockade monitoring.
- An educational video was provided on the use of the acceleromyography device.
- Data collected through survey questions included nominal, ordinal, interval, ratio, and free response information.
- Data was downloaded to Excel and analyzed after collection.
- Patient anonymity was maintained during this project.

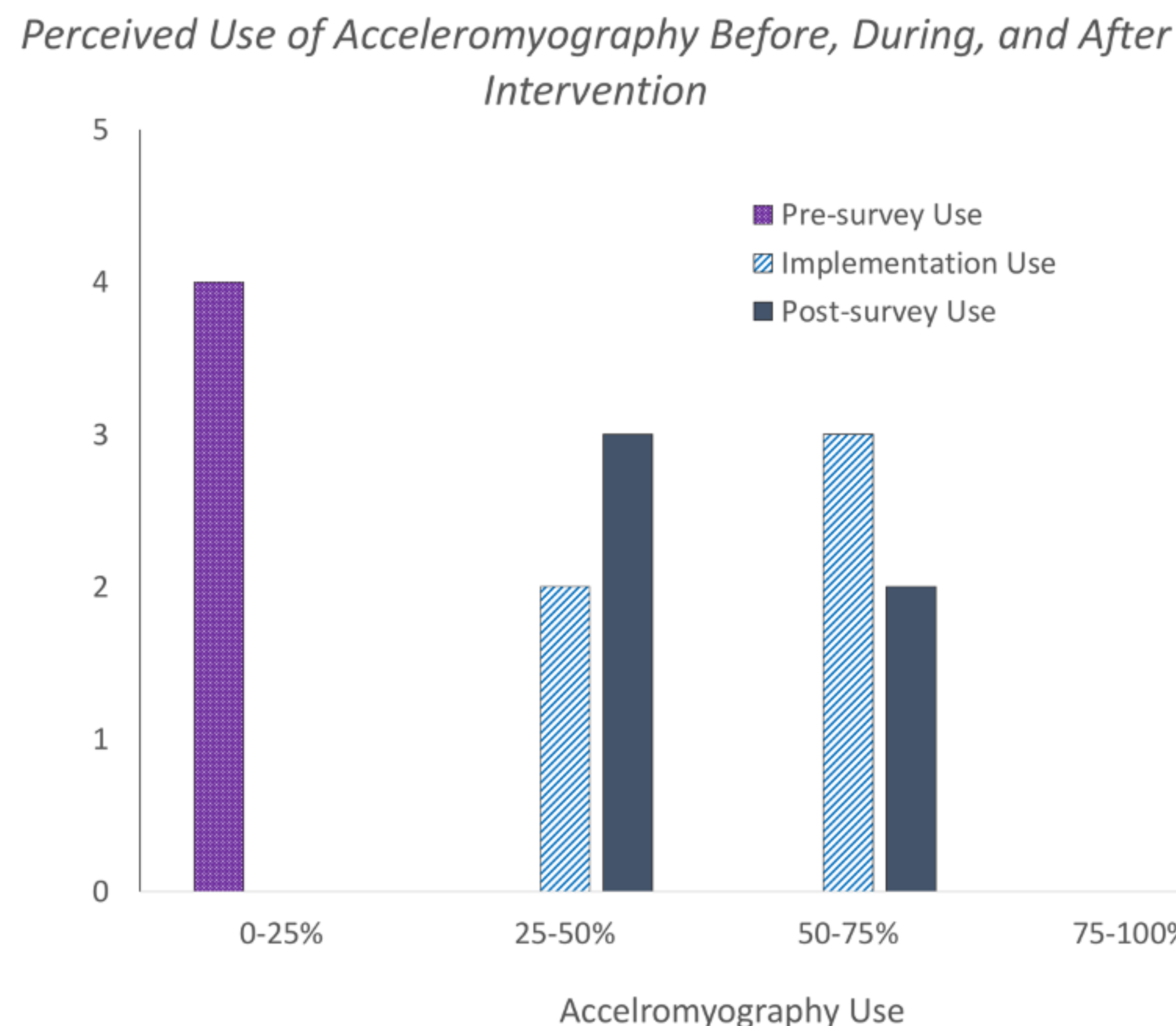
RESULTS

Figure 1



Note: n=4. Multiple selections allowed with a free text option under other methods.

Figure 2



Note: Pre-survey n=4. Implementation n=5. Post-survey n=5

DISCUSSION

- Four out of five CRNAs participated in the data collection and implementation period.
- Participating CRNAs most often use PNS as their preferred method to monitor neuromuscular blockade.
- One participant currently uses acceleromyography to monitor neuromuscular blockade.
- All participants used acceleromyography 0-25% of the time prior to extubation in the pre-survey.
- Acceleromyography usage was increased among participants during the implementation period.
- Most respondents perceive the accuracy of acceleromyography as neutral compared to their current methods.

CONCLUSIONS

- The project aligns with the recommendations from the APSF that quantitative neuromuscular blockade monitoring should be used when neuromuscular blockade medications are administered.³
- Data analysis results from survey responses align with current literature in that most CRNAs prefer a qualitative device to monitor neuromuscular blockade.¹
- There was a positive improvement in acceleromyography utilization among CRNAs after education was provided and implementation of the project, supporting literature findings.¹
- Outcomes of this project may have beneficial implications for patients, CRNAs, and the partnering organization.
- Recognition of inadequate neuromuscular blockade reversal may be objectively recognized and managed promptly using quantitative monitoring (acceleromyography) compared to a qualitative method (PNS).

REFERENCES

1. Dunworth, B. A., Sandberg, W. S., Morrison, S., Lutz, C., Wanderer, J. P., & O'Donnell, J. M. (2018). Implementation of acceleromyography to increase use of quantitative neuromuscular blockade monitoring: A quality improvement project. *AANA Journal*, 86(4), 269-277
2. Renew, J. R., Hex, K., Johnson, P., Lovett, P., & Pence, R. (2020;2021;). Ease of application of various neuromuscular devices for routine monitoring. *Anesthesia and Analgesia*, 132(5), 1421-1428. <https://doi.org/10.1213/ANE.00000000000005213>
3. Naguib, M., Brull, S. J., Kopman, A. F., Hunter, J. M., Fulesdi, B., Arkes, H. R., Elstein, A., Todd, M. M., & Johnson, K. B. (2018). Consensus statement on perioperative use of neuromuscular monitoring. *Anesthesia and Analgesia*, 127(1), 71-80. <https://doi.org/10.1213/ANE.0000000000002670>
4. Langley, G.L., Moen, R., Nolan, K.M., Nolan, T.W., Norman, C.L., & Provost, L.P., (2009). The improvement guide: A practical approach to enhancing organizational performance (2nd ed.). Jossey-Bass Publishers.