

Reducing the Error Rate of Medical Personnel Performing Nebulizer Therapy Techniques with Invasive Ventilators

Ya-Ying Wang* ¹, Tzu-Jung Cheng¹, Hsiang-Ting Su¹, Hao-Sheng Sung¹

¹Respiratory therapy department, China Medical University Hospital., Taichung, Taiwan

P377

INTRODUCTION

Clinical observations have shown that some medical personnel still struggle to effectively administer nebulizer treatments for patients on invasive ventilators due to their lack of familiarity with respiratory therapy equipment.

In order to provide the best quality of respiratory care for patients, it is hoped that by implementing a cyclical quality management approach, the error rate of medical personnel performing nebulizer treatments on invasive ventilators can be reduced.

AIM

To reduce the error rate of healthcare personnel when performing invasive ventilator aerosol therapy techniques.

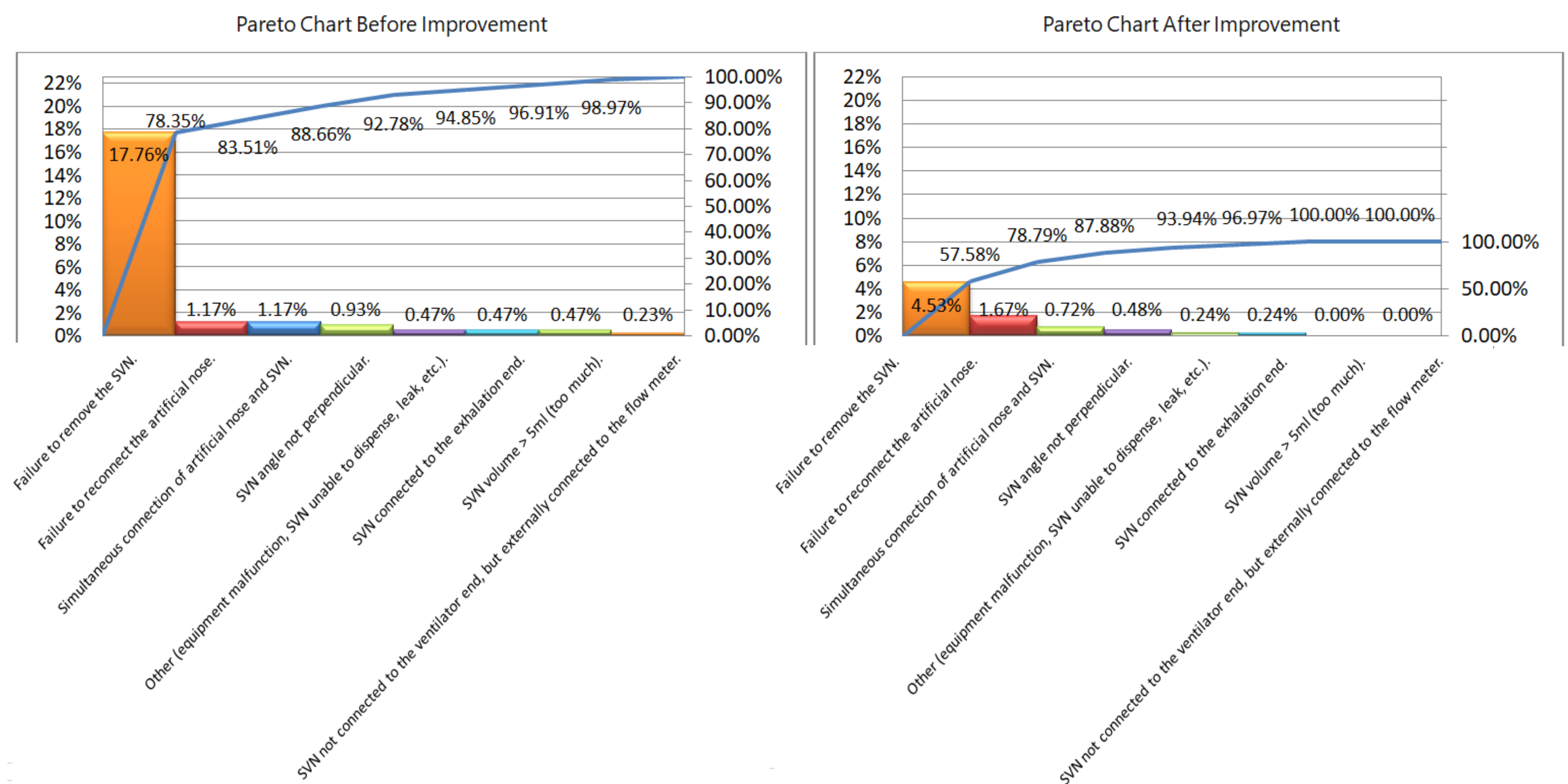
RESULTS

After the intervention strategies were implemented, the error rate for medical staff performing nebulizer treatments on invasive ventilators decreased from 22.66% before the improvement to 7.88%.

In the detailed analysis by cause, the error rate for “Did not remove the SVN” decreased from 17.76% before the improvement to 4.53%; the error rate for “Did not reconnect the artificial nose” increased slightly from 1.17% to 1.67%; the error rate for “Artificial nose connected at the same time as the SVN” dropped from 1.17% before the improvement to 0%.

Whether looking at the overall situation or the detailed layer-by-layer analysis, the error rates improved by more than 50%.

Comparison of Results



METHOD

In the surgical intensive care unit, for patients receiving nebulizer treatment via a ventilator with an artificial nose circuit, there were 428 samples collected, with 97 errors, resulting in a pre-improvement error rate of 22.66%.

Based on a cause-and-effect diagram and root cause verification, the errors were identified as: “Failure to disconnect the SVN,” “Failure to reconnect the artificial nose,” and “Connecting the artificial nose and SVN simultaneously.” Decision matrix analysis was then used to select interventions : creating multimedia videos for placement on an educational web platform, establishing QR codes for creating reminder cards for staff to carry.

After implementing these methods, a reevaluation in the surgical intensive care unit was conducted to confirm the effectiveness of the improvements.

CONCLUSIONS

Due to the large number of medical personnel and shift rotations, conducting e-learning for on-the-job education can benefit more people, saving more time and being more efficient compared to explanations at various units.

Providing post-lecture quizzes can help understand the participants' learning outcomes.

However, face-to-face education allows for immediate clarification of issues, and regular on-site demonstration teaching can offer a variety of learning methods.

Understanding the operation of various equipment, continuously learning and improving oneself, alleviating anxiety from unfamiliarity, and providing the best care quality for patients all contribute to promoting overall professional medical care.

ACKNOWLEDGEMENT

We would like to express our gratitude to China Medical University Hospital for promoting QCC activities. Special thanks to all colleagues in the Respiratory Therapy Department for their assistance in data collection, and to the professor for guidance on professional quality management techniques. We also appreciate the valuable suggestions provided by the team leader on the research design. We are grateful to all team members for their hard work and dedication throughout the research process. Additionally, we thank all clinical healthcare professionals for their contributions, which made the successful completion of this study possible.

Finally, we extend our sincere thanks to the anonymous reviewers and the editor for their valuable feedback.

REFERENCES

1. Chunming Shi, Jiacheng Zhu, Jinrong Liu, Yuehua Yuan, & Yihao Peng. (2008). Guidelines 2 for Respiratory Therapists on the Use of Mist Therapy Delivery Systems. *Taiwan Society for Respiratory Therapy*, 19(2), 21–39.
2. Chen, S., & Chen, Y. (2014). Application of Nebulizers in Clinical Care. *Infection Control Journal*, 24(6), 293–300.
3. Dean hess, & Rajiv dhand. (2023, November 6). Delivery of Inhaled Medication in Adults. *UpToDate*.
4. lin, M., Peng, Y. peng, chen, M., yeh, H., & Huang, M. (2007). A Study on Bacterial Contamination of Small-Volume Nebulizers after Aerosol Therapy. *Infection Control Journal.*, 17(5), 287–298.
5. Yang, S., Chen, C., lin, H., & Wan, G. (2018). Influential Factors of Aerosolized Therapeutic Drugs Delivery Efficiency. *Chang Gung Journal of Science*, 29(5), 1–11.
6. Xiao, X., Zhou, L., Bai, S., Hong, S., Liu, J., Cai, Y., Zheng, R., & Tan, M. (2022, February 23). Respiratory Therapy Equipment Pipeline Safety Manual. *Respiratory Therapists Society of the Republic of China*.

CONTACT INFORMATION

Name of Contact Person : Ya-Ying Wang
Affiliation : Respiratory Therapy Department,
China Medical University Hospital
Email :029784@tool.caaumed.org.tw
Phone Number : +886-4-2205-2121 ext.12540
Address : No. 2, Yude Road, North District,
Taichung City, Taiwan