

A Dedicated Non-Invasive Ventilation Study Day Improves Knowledge and Confidence Levels in Nurses



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BACKGROUND

The use of Non-Invasive Ventilation (NIV) within paediatrics has increased dramatically (Wolfler et al. 2018) and is reported to be widely used across Europe (Mayordomo-Colunga et al. 2018). With increasing usage and continuing developments in technology, modalities and interfaces the clinical skills and practical expertise of NIV must be maintained (Ellis, 2018).

Barbagelata et al. (2020) found that training programs in NIV are prevalent in European countries however, when searching specifically for educational programs AND efficacy of NIV there were no relevant clinical trials.

Time	Session
10:00-10:15	Welcome and introduction to the day
10:15-11:00	Mechanics of Ventilation and Respiratory Failure (Anatomy and Physiology; Acute Respiratory Failure I and II)
11:15-11:30	Break
11:30-12:30	Indications and Contraindications for NIV (PaO2/FiO2 Ratio; Cardiopulmonary interactions; facial deformities and trauma)
12:30-13:30	Ventilator Settings, Troubleshooting and Optimisation
13:30-14:00	Lunch
14:00-14:30	Case Studies/Scenarios
14:30-15:00	Acute NIV Set-up
15:00-15:30	Portable Ventilator Set-up
15:30-16:00	CPAP/Optiflow refresher
16:00-16:30	Quiz and Evaluation

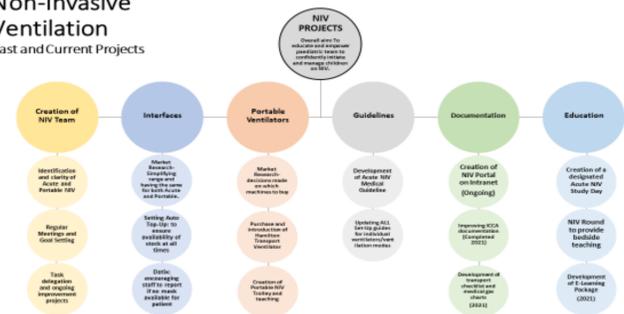
March 2018:
First Acute NIV Study Day consisting of classroom sessions and interactive equipment demonstrations as well as case study discussion and simulations.

The study day has now been delivered on 9 occasions over the last three years.

THE CHALLENGE

In 2018, changes were made to help improve the delivery and management of children requiring NIV across Paediatrics at the Royal Brompton Hospital. With the introduction of new ventilators, methods of NIV delivery, new guidelines and changes to interfaces, a dedicated Acute NIV Study Day was developed to increase knowledge and confidence of nurses.

Non-Invasive Ventilation Past and Current Projects



RESULTS

23 nurses attended the Acute NIV Study Day over four occasions. All attendees completed both the pre-and post-study day questionnaires. There were statistical significances found in both knowledge and confidence questions. 100% of nurses were able to identify the difference between Acute Respiratory Failure Type 1 and Type 2.

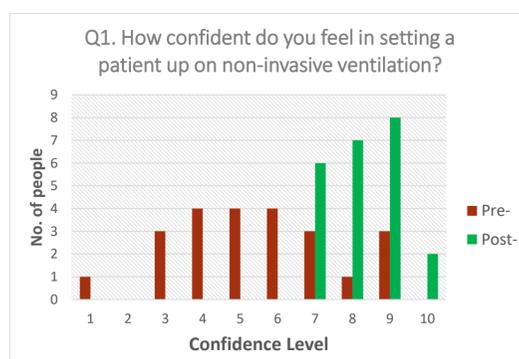
	Percentage Correct-Pre	Percentage Correct- Post	Significance (p value)
Q3	83%	100%	P<0.046
Q4	78%	100%	P<0.025
Q6	74%	78%	P<0.75
Q7	43%	43%	P<1.00

Results of Chi-square analysis on knowledge questions with only two possible answers

Questions 6 and 7 were **not** found to be statistically significant. Question 6 was to correctly identify the NIV interface for a specific scenario. The pre study day score was 74% and the post 78% meaning that there was very little change after the study day. In simple terms this suggests that a quarter of study day attendees chose the incorrect answer despite receiving teaching on this subject. Conversely, this also identifies that ¾ of the attendees already knew the correct interface to use prior to attending the study day.

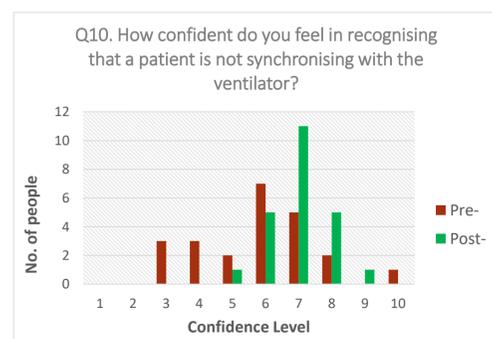
	Pre-Median	Post-Median	Significance (p value)
Q1: Setting up NIV	5	8	p=0.0001
Q2: Assessing effect of NIV support	5.5	8	P=0.0012
Q10: Recognising asynchrony	6.5	8	p=0.0001

Results of Wilcoxon Signed-rank Test on Confidence Level Questions



Post-study day confidence scores for question one ranged from 7 to 10 meaning that the median increased from 5 to 8. A Wilcoxon signed-rank test found a statistical significance of p=0.0001.

Pre-study day median for question ten was 6.5. This increased to 8 post-study day which was again statistically significant (p=0.0001.)



METHODS

- The primary aim of the study was to identify whether knowledge levels of nurses increased after attending the Acute NIV Study Day.
- A questionnaire was designed consisting of 10 questions: 3 questions were to measure confidence levels whilst the remaining seven were to assess knowledge.
- The chi-squared test was used for matched-paired data and the kappa statistic was also used to assess the association between the responses pre and post study day.

CONCLUSION

- Nurses are responsible for 24-h patient care and as key professionals in the coordination of patient care, nurses contribute to the efficient and cost-effective delivery of NIV to patients (Barbagelata et al. 2015, Ellis, 2018).
- What is interesting is that of the 4 articles found on this topic, 2 of the studies, although carried out on adult nurses, were performed at the same hospital as this study. This may be due to the cardiorespiratory specialism of the hospital and the high volume of NIV use. Combined adult and paediatric teaching would be worth considering.
- The results of this study have proven that the Acute NIV Study Day provided to paediatric nurses at The Royal Brompton Hospital improves both knowledge and confidence on NIV but it would be prudent to make improvements to the training as well as the questionnaire based on these results and repeat the audit.

REFERENCES

Wolfler, A., et al. (2015) Evolution of Noninvasive Mechanical Ventilation Use: A Cohort Study Among Italian PICUs. *Pediatric Critical Care Medicine*. 16(5):418-27

Mayordomo-Colunga, J., et al. (2018) Non-invasive ventilation practices in children across Europe. *Pediatric Pulmonology*. 53(8):1107-1114

Barbagelata, E., et al. (2020) The importance of education and training for noninvasive ventilation: suggestions from the literature. *The Egyptian Journal of Internal Medicine*. 31: 435-441