Does The Presence Of Observers Influence The Success Of The Neonatal Endotracheal Intubation: A Randomized Crossover Trial?

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ABSTRACT

Background and Objectives: Endotracheal intubation is a commonly taught to trainees. This procedure can attract additional observers. The impact of observers on neonatal intubation performance by trainees has not been studied. We conducted a study to evaluate if additional observers present during NMEI (neonatal mannequin endotracheal intubation) by junior trainees affects their performance and stress levels.

Design/Methods: A randomized cross over trial was conducted. First year residents with no experience in neonatal intubation were assigned to NMEI condition A or B randomly on day 1. Subjects were crossed over to the other condition on day 2.

Condition A: Only one observer was present

Condition B: Presence of an audience of 5 health care providers

Differences in the time to successful NMEI was recorded and compared between conditions. A heart rate monitor was used to measure peak heart rate above baseline during NMEI under both conditions.

Results: 49 residents were recruited. 72% were female, with a median age of 25 years (IQR: 24-27). Time to successful intubation was comparable under both conditions (mean difference -3.94 secs, 95% CI -8.2 to 0.4). Peak heart rate was significantly lower under condition A (mean difference -11.9 beats/min, 95% CI -15.98 to -7.78).

Conclusion(s): Although the time required to NMEI did not increase, our results suggest that presence of observers significantly increases trainee stress. The addition of extraneous observers during simulation training may better equip residents to deal with such stressors.

OBJECTIVES

Teaching endotracheal intubation to junior residents under difficult conditions is already challenging. The presence of additional observers during intubation may lead to anxiety.

The goal of our study was to demonstrate that the presence of an audience of extraneous observers would have a negative impact on performance and stress levels during NMEI (neonatal mannequin endotracheal intubation) by junior residents.

METHODS

Population: First year residents with no prior newborn intubation experience were recruited. The study was conducted at Maisonneuve Rosemont Hospital, a Level III NICU in Montreal, Canada.

Intervention: A neonatal mannequin was setup in a delivery room suite on a radiant warmer. After their arrival to the delivery room, participants were given a stylet and a 3.5 ET tube and asked to intubate orally a neonatal mannequin. Each individual attempt was timed from insertion to the removal of the laryngoscope using. The duration of all attempts was limited to a total of 45 seconds and failure to intubate was assigned an intubation time of 45 seconds. Subjects were asked to wear a cardiac monitor and heart rate was assessed continuously.

Each volunteer was randomly assigned to NMEI scenarios under two different conditions, A or B, on consecutive days.

Condition A: Only one staff neonatologist was present with the participant during NMEI.

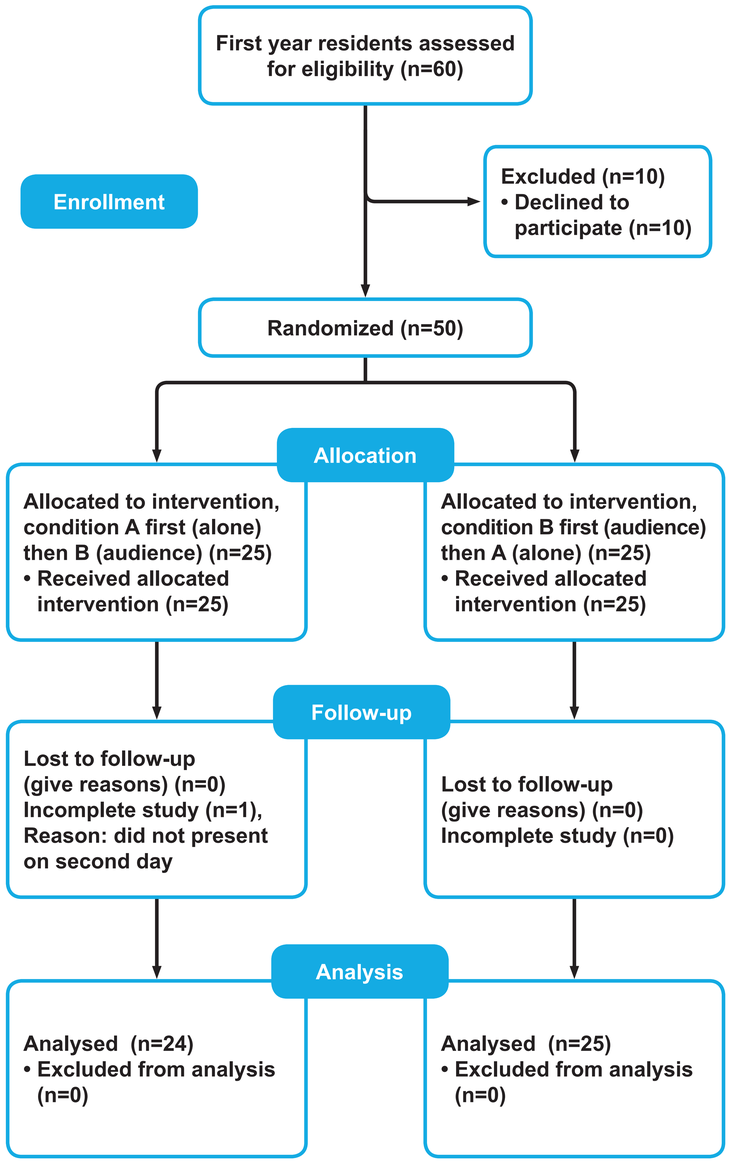
Condition B: An audience of 5 health care providers were present to watch the participant during NMEI, with at least 2 neonatologists.

The residents who performed NMEI in condition A on day one were crossed-over to NMEI the next day under condition B, and vice versa.

Outcome: The mean difference in total intubation time between condition A and B was compared. The increase in heart rate from baseline (5 minutes before NMEI) to peak (during laryngoscopy) as a percentage value was compared between conditions A and B. The rate of success on the first attempt as well as the rate of success across all attempts was compared.

RESULTS

Figure 1: Study recruitment and participant flow



Median age for all participants was 25 years (IQR 24-27) and 72% were female.

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Table 2. Performance during intubation under conditions A and B

	Condition A (staff only)	Condition B (audience)	Difference A-B	*p-value*
Time to intubation (sec), mean (95% CI)	30.9 (27.7, 34.1)	34.8 (31.7, 37.9)	-3.94 (-8.2, 0.4)	*0.07**
% heart rate increase over baseline (bpm), mean (95% CI)	38.4 (34.6, 42.2)	50.3 (45.3, 55.3)	-11.9 (-15.98, -7.78)	*<0.001**
Number of successful intubations (%)	39 (79.6)	32 (65.3)	-	*0.14***
Number of successful intubations on first attempt (%)	31 (63.2)	29 (59.2)	-	*0.83***

Bpm: beats per minute. 95% CI: 95% confidence interval.
*: paired t test
**: McNemar test

CONCLUSION

This is the first study in medical eduction which evaluated the impact of an audience on stress and junior resident performance. The time and the rate of successful NMEI was identical under both conditions, whether with one or multiple observers. However we clearly documented that a larger audience alone, neutral and without other distractors, increases stress in trainees during NMEI. Our results suggest that the presence of non-mandatory personnel as observers is detrimental to the trainee. We suggest that medical educators should also consider adding an audience as an external stressor during simulation scenarios.

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