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Introduction

- Single modality training programs have been implemented to address widespread deficiencies in tracheostomy knowledge and confidence among clinical providers, but investigations comparing training approaches, such as traditional live teaching, remote video learning, and e-modules, are rare
- Pediatric tracheostomy care e-module developed at Montefiore demonstrated increases in tracheostomy confidence and knowledge in a diverse learner group including RNs, APPs, RTs, attending physicians

Methods

- Prospective IRB-approved study 7/2021-6/2022
- Learner group: pediatric residents
- Randomized to hybrid vs. online (Zoom) vs. module-only following grouping by PGY level.
 - Hybrid group assigned to an online pediatric tracheostomy care module and a hands-on training session with faculty (one hour: 10-minute lecture, followed by skills session with a low-fidelity tracheostomy mannequin with informal question-and-answer)
 - Online group assigned the online module and a live video-conference session (one hour: 10-minute lecture, followed by skills session on Zoom® with identical low-fidelity tracheostomy mannequins and equipment for learners and instructor with informal question-and-answer).
 - Module-only group assigned the online module with no additional training session.
- Outcomes
 - Feasibility: Curriculum completion rates
 - Confidence: Survey with 5-point Likert scale
 - Knowledge: 10 question quiz
- Exposure variables
 - Curriculum study arm
 - PGY level

Results

- 85 residents enrolled. 26 (30.6%) completed in-person training, 22 (25.9%) completed video training, 37 residents (43.5%) in the module only group, including crossover of 3 from the hybrid and 7 from online group
- Greater increase in overall confidence among the hybrid (1.8±0.5, p<0.001) and online (1.9±0.9, p<0.001) groups than in the module only group (0.6±0.7, p=0.03).
- Quiz scores improved from a mean of 61.0% (n=58) to 72.2% (n=41) post (p=0.003).

Curriculum and Survey Completion

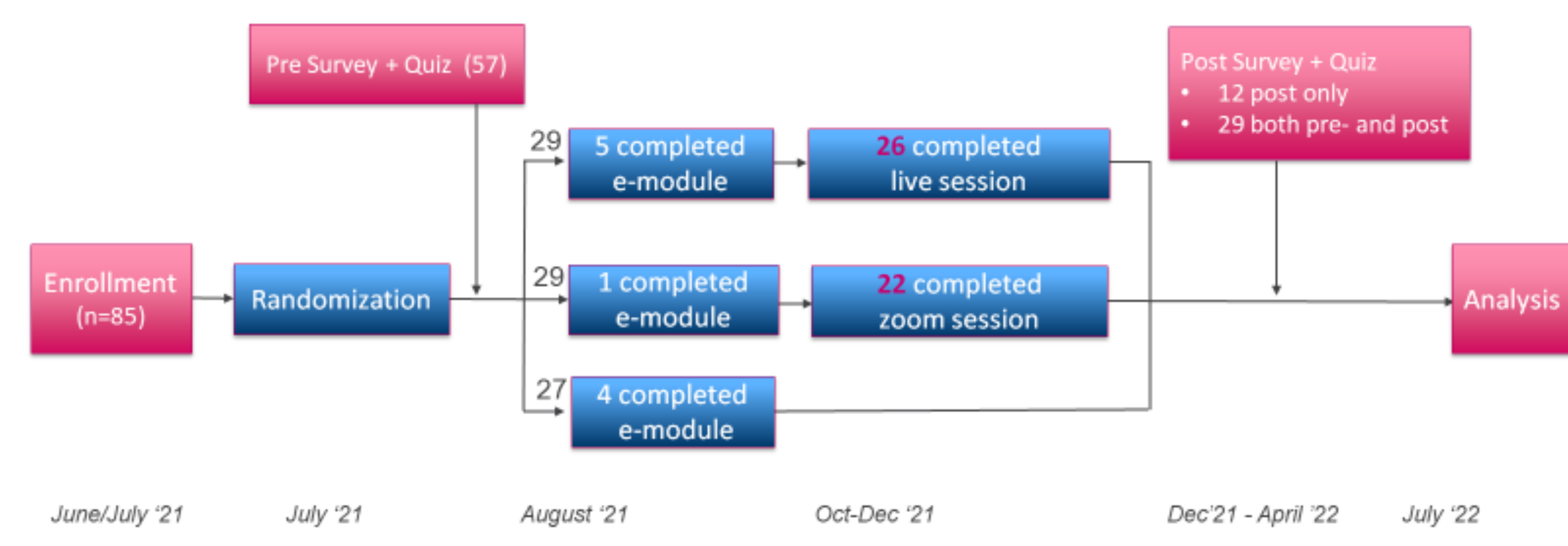


Table 1. Baseline confidence and quiz scores by PGY level (n=57)

	PGY-1 (n=29)	PGY-2 (n=29)	PGY-3 (n=27)	p-value
Baseline survey and quiz completed	20	18	19	0.84
Previous clinical performance of tracheostomy tube change	1	2	8	0.02
Confidence (1-5, mean±SD)				
• Determining if a trach tube is in proper position	1.3±0.6	1.3±0.7	2.1±1.0	0.007
• Determining if a trach tube is obstructed	1.5±0.6	1.6±0.7	2.3±1.1	0.02
• Suctioning	1.5±0.8	1.4±0.5	2.2±0.9	0.01
• Changing established trach tube	1.2±0.4	1.6±1.0	2.1±1.1	0.004
• Responding to accidental decannulation of mature trach	1.0±0.2	1.5±1.0	1.8±1.0	0.007
• Responding to accidental decannulation of fresh trach	0.9±0.4	1.2±0.4	1.2±0.4	0.05
Baseline quiz score (mean±SD)	51.0±14.8	57.8±18.3	74.0±16.3	<0.001

Table 2. Change in mean confidence and quiz scores by study arm, PGY level, and curriculum completion (n=29)

	Overall	Study Arm			PGY Level			Curriculum Completion	
		Hybrid (n=9)	Online (n=9)	Module only (n=11)	PGY-1 (n=10)	PGY-2 (n=8)	PGY-3 (n=11)	Any (n=19)	None (n=10)
Change in mean confidence (Likert 1-5)	1.1±0.2***	1.8±0.2***	1.9±0.3***	0.6±0.2*	1.8±1.1***	1.5±0.8***	0.9±1.1*	1.7±1.0***	0.7±0.8*
• Determining if a tracheostomy tube is in proper position	1.4±1.1***	1.6±0.9***	2.1±1.1***	0.6±0.8*	1.7±0.9***	1.8±0.9***	0.7±1.6 (NS)	1.7±1.3***	0.7±0.9*
• Determining if a tracheostomy tube is obstructed	1.3±1.3***	1.8±1.0***	1.8±1.6**	0.6±0.9	1.6±1.4**	1.6±0.7***	3.3±1.3*	1.9±0.9***	0.4±1.2 (NS)
• Suctioning	1.4±1.2***	2.2±0.8***	1.9±0.3***	0.3±1.2 (NS)	1.5±1.4**	1.6±1.2**	0.7±1.2 (NS)	1.9±0.9***	0.4±1.1 (NS)
• Changing established trach tube	1.2±1.3***	1.6±0.5***	2.1±1.3**	0.3±1.1 (NS)	1.5±1.2**	1.6±0.7***	1.5±1.4**	1.7±1.2***	1.0±1.1*
• Responding to accidental decannulation of mature trach	1.6±1.2***	2.1±1.1***	1.8±1.1**	0.9±1.0*	1.8±1.1***	1.5±0.8***	0.9±1.1*	1.8±1.1***	0.7±0.7**
• Responding to accidental decannulation of fresh trach	1.1±0.9***	1.3±1.0**	1.4±1.0**	0.6±0.7*	1.6±0.3***	1.5±0.2***	0.9±0.3*	1.3±1.0***	0.7±0.7*
Change in quiz score	9.7±21.3*	14.4±25.5 (NS)	14.4±16.7*	1.8±20.4 (NS)	19.0±1.67***	21.2±21.0*	-0.8±1.4 (NS)	13.7±20.6**	2.0±21.5 (NS)

Trach: tracheostomy. Per-protocol analysis. NS = no statistically significant change. *p<0.05, **p<0.01, ***p<0.001

Conclusions

- Tracheostomy care training sessions for pediatric residents in-person and over a live video platform resulted in similar increases in confidence with pediatric tracheostomy care.
- Self-directed module completion was low
- Limitations: survey completion was low, though similar across study arm and PGY-level groups
- Future directions: follow-up with learners regarding confidence, knowledge and skill retention; larger, more diverse learner group; simulation-based study of learner behaviors, correlation with training completion, survey and quiz scores

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