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Background

Comprehensive care of preterm and medically-complex infants is critical. There is a need for knowledgeable, skilled, confident neonatal professionals to provide this specialized, comprehensive care. The most challenging skills an infant must learn is to feed orally.

Speech-language pathologists (SLPs) provide specialized intervention to ensure safe and efficient transitions to oral feeding. However, due to the high-risk nature of medically-complex infants, few graduate programs offer hands-on opportunities to develop the requisite skills. Simulation is relatively new for SLP programs but offers opportunities for training with high-risk populations in a safe environment. This research contributes to evidence that simulation is effective in training SLPs to work with medically-complex infants.

Need

- SLPs work with medically-complex infants & children in all settings
- Students in graduate SLP programs have limited opportunity to develop skills working with these populations
- Most SLPs and other professionals in the field did not receive training in pediatric dysphagia in their formal education (Hall, 2001)
- Disparity between student performance in educational v. medical placements because of fear, anxiety, and limited opportunity

Methods

Sequential, mixed methods investigation of the influence of high-fidelity simulation on student knowledge & confidence managing medically-fragile infants

- Participants:** 2 sequential cohorts; randomly assigned to groups of 3
- Control ($n = 28$)
 - Experimental ($n = 24$)

Measures: Researcher-developed. Validated by content experts

- Knowledge:
 - 10-item assessment (97% agreement across 3 experts)
 - 2 times: pre-coursework and post-coursework + intervention
- Confidence Survey
 - 17 items (4pt Likert scale) & 5 qualitative questions (Cronbach's $\alpha = .93$ overall)
 - 3 times: pre coursework, post coursework, post intervention

Intervention: All students received the same didactic coursework

- Control: written case study
- Experimental: high-fidelity hybrid simulation



Simulation Design

Goal: develop a scenario to engage students in applying clinical decision making in feeding readiness assessment. Case scenario was developed with experts from Cincinnati Children's Hospital and was the same for both groups.

Objectives: Participants will,

1. Identify behavioral & physiological markers of instability
2. Interpret markers of instability & employ strategies to assist the infant in maintaining stability
3. Judge readiness to feed, the quality of bottle feeding, & make feeding recommendations

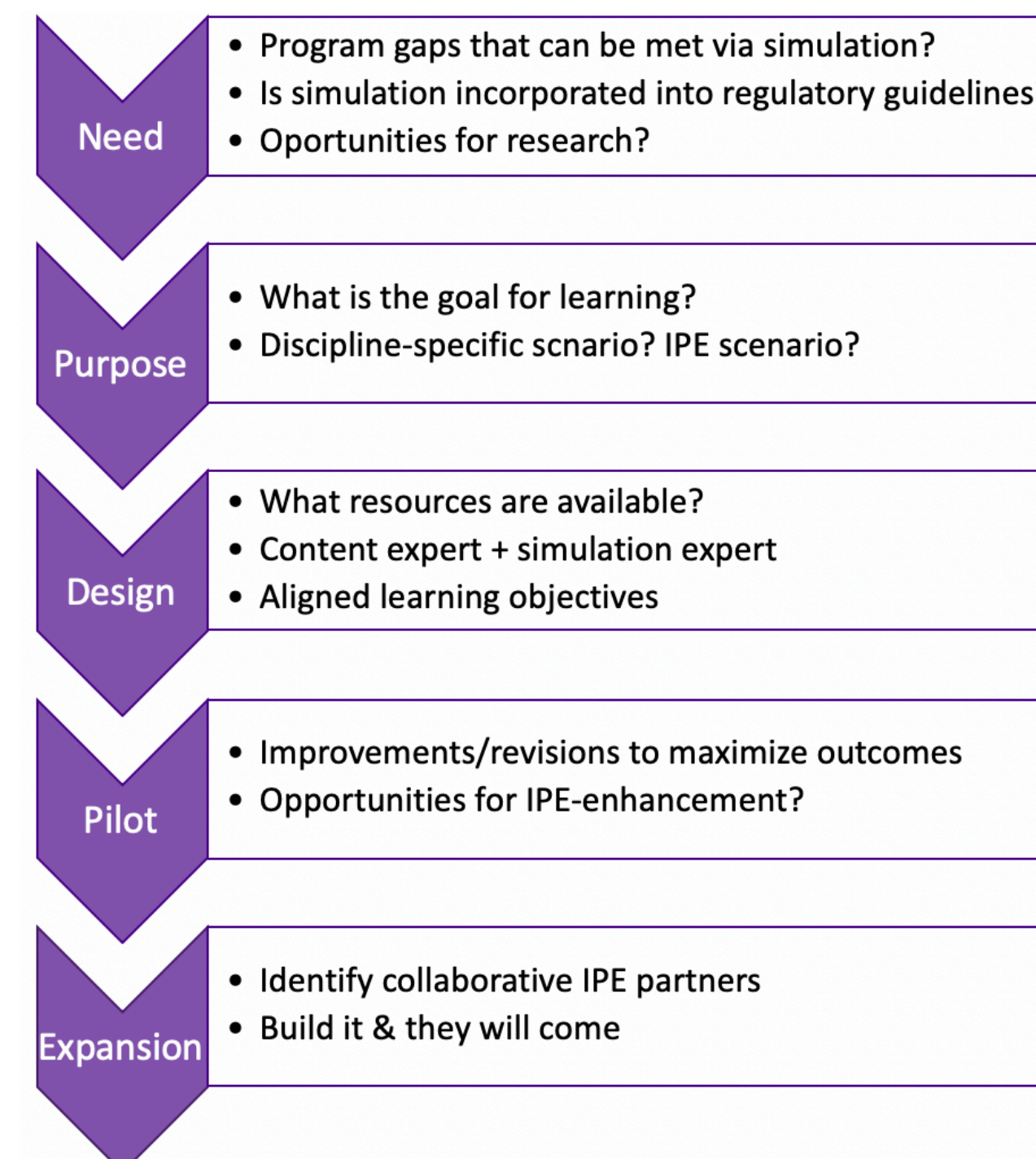
Written Case

- Unfolding & branching
- Allowed student to make critical decisions

Simulation

- Manikin: SuperTory® Gaumard Scientific
- Embedded participant: bedside nurse

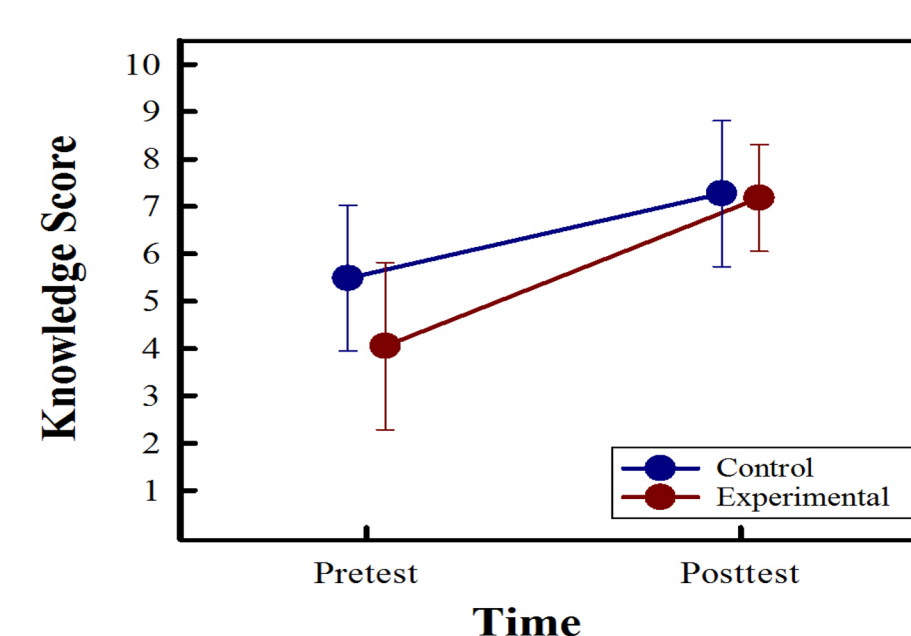
Simulation Design Process



Results

KNOWLEDGE

Pre/Post Mean Knowledge Scores



Repeated Measures ANOVAs

- Significant change from pre to posttest
 - Control ($F(1, 27) = 31.333, p < .001, \eta_p^2 = .537$)
 - 33% change
 - Exp ($F(1, 23) = 66.194, p < .001, \eta_p^2 = .742$)
 - 76% change

One-way ANOVA

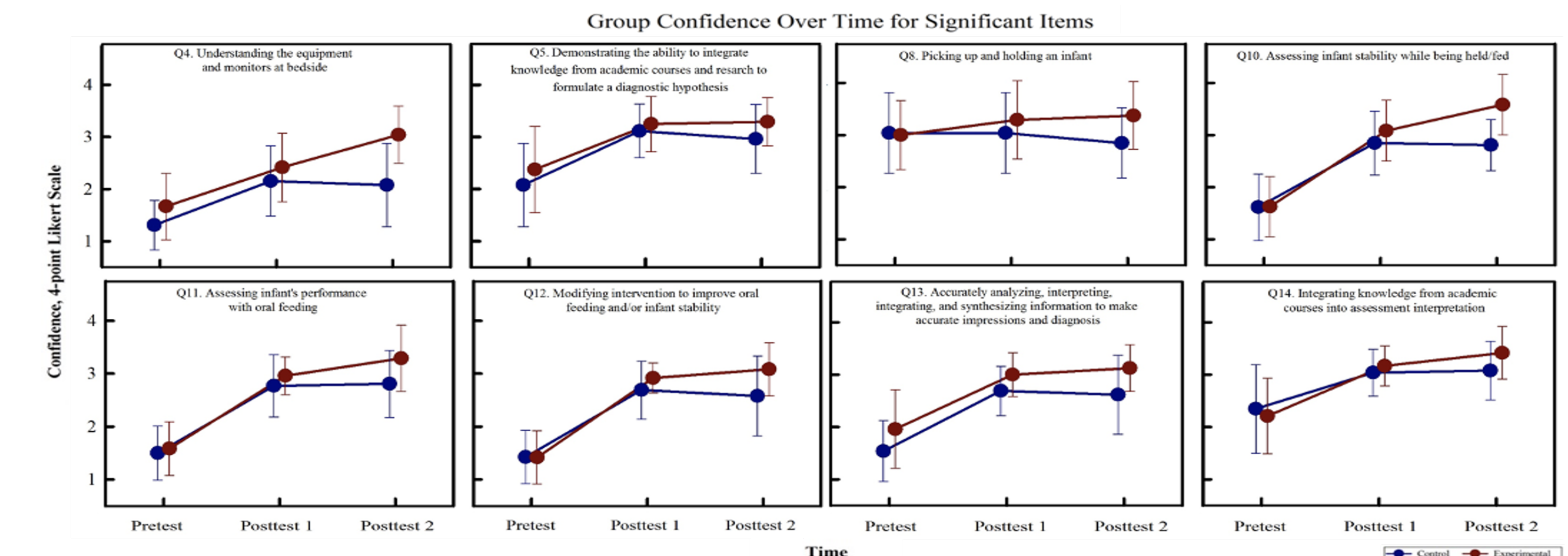
- No significant difference between groups at posttest

CONFIDENCE

Group comparisons of confidence at timepoint 3, by question, with timepoint 2 as the covariate (ANCOVA).

Question	F	p	η_p^2
1. Thoroughly reviewing client history/reason for referral	0.051	.823	.001
2. Securing necessary information from caregivers and other professionals	0.010	.920	.000
3. Appropriately responding to questions and concerns from caregivers or other professionals	0.548	.463	.011
4. Understanding the equipment and monitors at bedside	22.064	<.001*	.315†
5. Demonstrating the ability to integrate knowledge from academic courses and research to formulate a diagnostic hypothesis	4.137	.047*	.078°
6. Conducting baseline observation/assessment to determine oral feeding readiness	1.461	.211	.029
7. Observing performance of the client with insight	1.884	.176	.037
8. Picking up and holding an infant	22.782	<.001*	.317†
9. Positioning an infant for oral feeding	3.557	.065	.068°
10. Assessing infant stability while being held/fed	24.776	<.001*	.336†
11. Assessing infant's performance with oral feeding	5.533	.023*	.103°
12. Modifying intervention to improve oral feeding and/or infant stability	4.189	.046*	.079°
13. Accurately analyzing, interpreting, integrating, and synthesizing information to make accurate impressions and diagnosis	4.810	.033*	.089°
14. Integrating knowledge from academic courses into assessment interpretation	4.144	.047*	.078°
15. Making appropriate recommendations based on observations and assessment	3.797	.057	.072°
16. Verbally explaining results of a pediatric feeding/swallowing assessment	0.187	.667	.004
17. Providing written results of a pediatric feeding/swallowing assessment	3.210	.079	.061°

Results (cont.)



- Experimental (sim) group had greater percent change for 10 items
- Followed up with an ANCOVA controlling for responses post-coursework to examine the influence of the intervention.
 - No significant difference between groups at pretest for the items
 - Significant group differences on 8 items (above) at posttest

Discussion

The results of this study support the systematic integration of high-fidelity simulation in speech-language pathology graduate programs. *All* students gained knowledge. **Students in simulation had greater gains in confidence with hands-on skills!** Increased self-efficacy with clinical behaviors such as holding an infant and assessing feeding readiness is critical to supporting preparedness to work with this high-risk population.

Simulation supports students in synthesizing & applying theoretical knowledge into clinical situations. Feeding simulation also offers opportunities for interprofessional learning that would not only benefit SLPs, but also all those involved in the critical process of feeding infants including nurses.

Simulation-enhanced Interprofessional Education (Sim-IPE)

WHY Sim-IPE?

Sim-IPE is an effective approach to promoting the development of collaborative skills by maximizing on the pedagogy of both simulation and IPE. Increased IPE and interprofessional collaborative practice is essential to improving patient safety & outcomes, which is vital when transitioning medically-complex infants to oral feedings. Through future Sim-IPE collaborations, students from relevant professions will be engaged in immersive & authentic experiences which prepare them to meet the expectations of interprofessional collaborative practice environments.

Evolution of Collaboration

- Research development by SLP
- Collaborative relationship with Nursing Simulation Team
- SLP expertise + simulation expertise = simulation design
- Pilot simulation & feedback
- Collaborative planning for future iterations

Plans for the Future

- Integrate nursing students for IPE
- Unfold simulation by semester from simple to complex
- Systematic integration of Sim-IPE for all health students
- Focus on implementing and training others (e.g., RD, OT, PA) in best practices in Sim-IPE design for future collaborations