MamaNatalie® versus NOELLE®: A Randomized Controlled Trial of Birth Simulation for Medical Students

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NO DISCLOSURES
Learning Objectives

1. Identify the strengths and limitations of research on birth simulation
2. Discuss how a low-cost birth simulator developed for low-resource settings is being used at Johns Hopkins
3. Learn the results of a study comparing two simulators during medical students’ PRECEDE experience prior to the Women’s Health Clerkship
Background

- **High fidelity birth simulation**
  - Literature supports use for teaching novice medical students how to monitor stages of labor and manage a normal vaginal delivery
    - Jude, et al. 2006: Higher levels of confidence
    - Deering, et al 2006: Self-reported comfort w/ basic procedures
    - Holmstrom, et al 2011: Improved confidence and higher scores on oral and written exams
Student performance as rated by preceptors following simulation is not typically reported.

- Confidence is expected to follow adequate teaching and feedback.
- Unclear whether this results in improved student performance.
- An unskilled, overly confident medical student is potentially dangerous.
Limitations of high fidelity birth simulation models

- Cost $4000-50,000
- Lack portability
- No person-to-person communication
- Limited use during OB/GYN clerkship and limited resource settings
Background

- **MamaNatalie®**
  - Lower cost ($750)
  - Portable
  - Person-to-person communication
  - No studies supporting use on OB/GYN clerkship
Research Question

Is a lower cost, low-tech, birth simulator (MamaNatalie®) as effective as a high fidelity birth simulator (NOELLE®) in teaching medical students how to perform a spontaneous vaginal delivery prior to the Women’s Health Clerkship?
Study Design

• IRB approved randomized controlled trial
  – MamaNatalie® (MG)
  – NOELLE® (NG)

• Intervention at beginning of Women’s Health Core Clerkship
  – Lecture on normal and abnormal labor
  – Simulation of spontaneous vaginal delivery
Methods

• **Outcome Measures**
  – Pre and post-simulation surveys on student confidence
  – Skills checklists completed by students and preceptors after the student’s first delivery
  – Post-clerkship surveys on student confidence, number of deliveries, perceived helpfulness of simulation
Results

• One hundred ten medical students (95% of those eligible) participated

• Preceptor evaluation completion rates
  – 81.8% of 55 students in MG
  – 80.0% of 55 students in NG

• Final post-clerkship survey completed by 93 students (85% follow-up rate)
Results

• Primary outcome: Performance of vaginal delivery maneuvers w/ hands-off supervision as rated by preceptors
  – No significant differences between MG and NG
  • Most involvement: Delivery of placenta (65.9% of MG vs. 52.3% of NG)
  • Least involvement: Control of fetal head (20.5% in MG vs. 23.3% in NG)

• No significant differences between MG and NG student self evaluations
Results

• Secondary Outcome: Post-clerkship student self-reported confidence they could perform a normal vaginal delivery w/ hands-off supervision
  – Thirty seven (78.7%) of 47 MG students
  – Twenty nine (65.9%) of 44 NG students
  – P=0.17

• Median (range) number of deliveries
  – MG: 4 (0-12)
  – NG: 3 (0-9)
Mean Confidence Performing Vaginal Delivery Steps

* $p=0.005$

SVD confidence levels are based on a scale:
0 = Could not perform step
1 = Could perform with close hand-on-hand supervision
2 = Could perform with hands-off supervision
Post-Clerkship Results

• Simulation was “extremely realistic”
  – MG: 60.4% of 48 students
  – NG: 56.5% of 46 students

• Simulator should continue to be used:
  – MG: 100% of 53 students
  – NG: 99.1% of 53 students

• Comfort with using the pelvic model
  – Facilitator wearing model (98% of 50 students)
  – Classmate wearing model (88% of 50 students)
  – Comfortable wearing model (82% of 50 students)
Discussion

• **Strengths:**
  – Randomized design
  – Performance as rated by preceptors
  – Confidence similar to previous studies

• **Weaknesses:**
  – Loss to follow-up
  – Possible halo effect
  – Power analysis based on previous study w/ different primary outcome
Conclusions

• MamaNatalie® is as effective as NOELLE® in training medical students how to perform uncomplicated spontaneous vaginal delivery

• Further studies needed to determine effectiveness of using MamaNatalie® for other levels of learners, teaching complex skills, and improving provider-patient interactions
References


Questions

• Thank you!