



And then talk about, obviously, the research aims, and methods, and results. And then some time in discussion and the regulatory implications. And normally, when we come to conferences, a lot of the research that we're hearing about is really hot off...it's not even off the press yet.

But the research that I'm going to be talking about actually was published in the January 2023 edition of the "Journal of Nursing Regulation." So I'm not going to go into all the data tables, and results, and analysis, and that type of thing, but really focus on kind of the big, big picture. So please feel free to ask me questions. I've got it right here.

If you need to know any of the details, I've got a lot of it in here also. But that's my plan. So this is the third presentation in hour and a half, but I am going to go over the definition of simulation. A technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions.

So a really holistic, all-encompassing definition of simulation. I think a lot of times we think about a computerized manikin in an acute care situation. But I'd like you to think a little bit more broadly about simulation in public health nursing environment, or in a non-acute environment, thinking about standardized patients, thinking about screen-based virtual simulations, thinking about a little bit more holistic definition of simulation than what we might immediately go to.

Or at least, I'll speak for myself, what I immediately go to when I think of simulation. And then currently, in our Washington Administrative Code 246-840-534 in 2016, we adopted reflecting the 2014 NCSBN national simulation study that up to 50% of a specific content area could...required clinical hours in that area could be replaced with simulation.

And there are some wording in there trying to sort evoke high-quality simulation. But that administrative code is about the use of simulation for clinical experiences in LPN, RN, RN to BSN nursing education programs in the state of Washington. We just have seen an increasing use of simulation for all the reasons that our previous presenters have talked about, limitations in clinical placement sites, limitations in what students can do when they are in those clinical placement sites, around medication administration, or very high acuity, or transmissible diseases, these types of things.

And in addition, oftentimes, when we think about the increasing use of simulation, we think about all of the gaps that it's filling, or all of the lacking characteristics of clinical placement sites.

But I also like to think about all of the great developments we've had in simulation. It's gotten a lot better. It's gotten a lot less expensive. People have figured out how to do things well. And so there's been a lot of advances in simulation that have also led to the increased use of simulation, really since the early 2000s. And then, obviously, we just saw an explosion in the use of simulation during the pandemic.

And specifically in the use of screen-based simulations when people were isolated to their homes, in front of their computers. And then there's publications really kind of in 2016, and this one that I've quoted here, Sullivan et al., 2019, is this emerging evidence towards saying that hours spent in simulation are more efficient, or more effective than time spent in traditional clinical.

And most of the regulations around simulation, when simulation is substituted for traditional clinical, it's at a one-to-one ratio, where one hour of simulation counts as one hour of required clinical time. And so this emerging evidence is suggesting that because the time spent in simulation is more efficient or more



And we selected five trying to represent urban, rural, associate degree, bachelor's degree, public, private. Selected five, four of them ended up actually being able to participate. One had to drop out just due to COVID.

And there are other things that were going on. So I have this map of Washington State here. It only shows three counties. Two of the programs are in the same county. But one thing that's very important to know is that there's a mountain range that goes right here. So this does represent urban and rural, even though they're all essentially touching.

And we also wanted to focus on... And again, since this was kind of a one-shot wonder, we're not doing across the whole course, let alone a whole program. We're doing literally one set of learning objectives. We wanted to focus on students who are in their first acute care clinical site or course.

And we focused on four specific learning objectives that we thought were complex enough that we could see changes or improvement in them, but also simple enough that you could address them in somebody's first clinical course. So our learning objectives were identify actual potential safety hazards in the patient environment, apply therapeutic communication with patients and families, demonstrate effective interprofessional communication using Esper, and demonstrate safe medication administration.

And again, similar to one of the other studies that was presented, we had this really well-controlled simulation environment for two of our arms. And then we had clinical. And we had no idea what was going to go on in clinical. We did, again, try to have learning objectives that can reasonably be addressed in first acute care, clinical. And also provided training for those clinical instructors to try to get some continuity around pre-briefing facilitation and debriefing across the screen-based virtual, the manikin-based simulation, and the traditional clinical experience.

So really trying to compare the times, and the modality that students were exposed to. So this is what the students did. We had our group of pre-licensure nursing students. And before going into their activity, they did a pre-test, just a cognitive knowledge pre-test of 20 questions for...I'm sorry, five, addressing each of those four learning objectives.

And then they were randomized to either do four hours of traditional clinical experience, two hours of screen-based simulation, or two hours of manikin-based simulation. And again, trying to keep as much control around the variables in terms of pre-briefing facilitation and debriefing, and really having that modality. And then, obviously, the time difference.

So the four hours of traditional clinical versus the two hours of each of the simulation. And then once they were done with those activities, they did a post-test knowledge exam. Again, different questions, but five addressing each of the four learning objectives. And then a patient care performance assessment.

So for this, students individually went in, and there was videotape so that somebody could assess it later, a standardized patient encounter where they took care of a patient. And each of these learning objectives were addressed. So we had a trained actor. They were videotaped. Students went in individually. And then we later on, a masked viewer, somebody who didn't know what group the student was in, rated those patient care performance using the Lasater Clinical Judgment Rubric, which has the four concepts of noticing, interpreting, responding, and reflecting.

And then the Creighton Competency Evaluation Instrument, which looks at patient safety, assessment, communication, and clinical judgment. And then this was all part of their coursework. So, of course, wanted to give everybody an equal shot at everything. So then after they had done those assessments, that was our outcome data primarily, all the students eventually did all of the activities.

Not on the same day. This happened over a course of several weeks. But everybody eventually got to do all of the activities. That makes the IRB really happy, and it's just the right thing to do. And then once they had done everything, then we did a survey where we asked them. So there's the Clinical Learning Environment Comparison Scale that we used, and students were able to go in, and assess how well they thought each environment...now that they'd experienced them all, how well each environment met their learning needs.

And then a subset of students also came in and did a cognitive task analysis interview, to get some ideas of how well each learning environment helped them become better clinical judgers... improve their clinical judgment.

Any questions about this? I feel like sometimes it makes perfect sense to me, but I've not explained it very well. [inaudible]. Yeah?

- [Male] What were you using for the performance assessment? The pre-test and post-test?

- Those were items that Elsevier gave us. And they were multiple choice items. Yep. Yeah?

- [Female] I have just one question about the manikin. Is it high fidelity, or just...

- They were high fidelity. Yep. Across the sites, I'm not sure if there was variability in exactly which model, but they were high fidelity. Yeah. Great. Okay, so our results. A lot more than 152 students did part of this study, but that's how many students did the whole darn thing, and that we actually were able to use the results for.

59.21% were the private institution, 88% in urban location, 59.21% were BSN, so obviously the corollary would be ADN. Forty-six percent had prior health care experience. Most had English as a first language.

Eighty-two percent were female, and the age range was kind of what you'd expect. In fact, I think that might be the exact number that we saw previously. I think 53 was the highest age that we saw in a previous slide. So this was our sample, and this is what we found. So the first aim to assess the comparative effectiveness of the three types of experiential learning activities, measuring cognitive learning, patient care performance outcomes of students who participated in either four hours of traditional clinical, two hours of manikin-based simulation, or two hours of screen-based simulation.

So we've got pre-test, post-test. There was no difference between the groups. So again, as good as. We're not looking for significant improvement. And then with the patient care performance outcomes. So this is supposed to represent the little video camera with their standardized patient encounter.

I'm having fun with Microsoft icons. There were no significant differences between the students who participated in the four hours of traditional clinical, two hours of manikin-based simulation, or two hours of screen-based virtual simulation. I said that wrong.

The students who participated in the virtual or manikin-based simulation did as well or significantly better, depending on which item we're looking at, than the students in the four hours of traditional clinical. The one thing that...and this has been important for the regulatory conversation, is the students in the screen-based virtual simulation did not perform as well in the area of patient safety.

So that is one thing that has kind of come up again and again, when we tried to say what can be counted using this one-to-two ratio to replace traditional clinical. And then the second aim.

Examine how each type of experiential activity informs nursing students' clinical judgments. So again, this Clinical Learning Environment Comparison Survey is where the students look at after they've done all the activities. So again, first outcome data is all from after they've only done one of the activities. But then after they've done all of the activities, they were able to tell us how well they thought that each of the learning activities met their learning needs.

And the way I like to describe the results from this piece is that the grass is always greener on the other side. So students who did clinical first thought that the manikin-based simulation was significantly better. Students who did the manikin-based simulation thought that traditional clinical met their learning needs better.

And nobody really preferred the screen-based virtual simulation. And then the cognitive task analysis interview. This just got some themes out. What is it? What is it about the each of the learning environments that you thought was better or worse? And I've got a couple of quotes that I wanted to share with you. The first theme was around the advantages of simulation.

And one of the students said, "Simulations are more..." Or one of the themes is that simulations are more active than traditional clinical. So a student said, "When you're in simulation, you're constantly doing something. We were constantly debriefing on what we could do better." And then another advantage was that clinical is less focused and has more wait time.

So an example of a quote was, "I feel that I learned most about the nurses and their daily routine in their shift, but I don't feel like I am learning a lot about clinical judgment, or how they make their choices for their patients." And then the second kind of overarching thing was the simulation had some disadvantages. And so one of the quotes that a student said, "It's always better to have something that's real. Anything that can give you those initial clues. With a manikin, you can only do so much, but then you're trusting that the scenario runs some other way to make up for the nonverbal cues that you miss."

And I thought, "Well, I don't think I could say it better myself." That's exactly the advantages and disadvantages of the simulations, at least that they did as part of this study. And I should say that the screen-based virtual simulations were open source ones that are available online, where there's live action, and then you pick kind of a branching scenario of what will happen next.

And then the third aim was to conduct the cost utility analysis, comparing the three types of experiential activities. And this kind of inverted triangle here is just... Manikin-based simulation is super expensive. And even though it was shown to be as effective, or by some measures, more effective than the traditional clinical, the costs completely obliterated that in terms of the cost utility.

And then the screen-based simulation is less expensive, but also a little bit less effective than the manikin-based simulation. And then clinical is quite affordable from the perspective of the nursing education program. So when you look at things in terms of the cost per unit of utility, it switches things

up a little bit. And certainly, when you're thinking about a program director or dean, who's trying...if you count an hour spent in simulation as two hours of required clinical time, you're kind of getting double





