

257: Effect of Exposure to Asynchronous Virtual Clinical Environments on Actual/Perceived Competence in Drug Dosage Calculation: A Pilot Study

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**Simulation
Collective.**

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Acknowledgements: Co-Investigators

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Introduction

- Nursing students are expected to be ‘practice ready’ for safe medication administration upon qualifying.
- This pilot study investigates the relationship between exposure duration to asynchronous virtual drug dosage calculation scenarios and nursing student actual and perceived competence.

The Issue

- Medication errors: 3rd leading cause of death in the USA; global preventable harm persists.
- WHO prioritises medication safety in curricula (2017) and renewed its call (Sept 2025) to *'Educate all concerned health workers on safe medication practices, including paediatric dosing'*
- Nursing students' anxiety about calculations and administration increases risk of errors, near misses and patient harm.

Method

- Randomized quasi-experimental research design (pre- and post-test)
- Purposive sampling: 6 groups of 2nd/3rd-year undergraduate nursing students from 6 sites (UK and Canada)
- Students randomly assigned to 4 groups of different exposure duration (0-3 weeks) to the asynchronous VLE education intervention



Patient's Name
Patrick Grant

Sex **Male** Age **60 years**

Height **167 cm** Bodyweight **78 kg**

Body Surface Area
1.9m²

Diagnosis

COVID-19 related community acquired pneumonia (CAP)

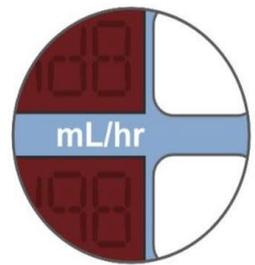
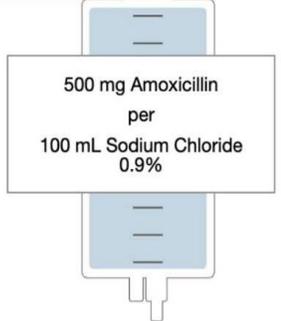
Allergies
Nil Known

OXYGEN PRESCRIPTION

Target SpO2	92% - 96%
Litres per Minute	5 L/min

INTERMITTENT INFUSIONS			Date
Date	Indication	Time	20/10/2025
20/10/2025	COVID-19 related community acquired pneumonia (CAP)	06:00	
Medication Order		Dose Calculation	-
500 mg Amoxicillin per 100 mL Sodium Chloride 0.9% three times a day, every 8 hours		Max Dose	14:00
		1g every 8 hours	-
		Infusion Duration or Rate	22:00
		30 minutes	-
		Prescriber's Signature	-
		Pharm	-
		Dr Jones	-

100 mL



Drug Monograph
For Use in safeMedicate Only

Medication Name
Amoxicillin

Indication
COVID-19 related community acquired pneumonia (CAP)

Mode of Administration
Intermittent infusion

Dose
500 mg three times a day, every 8 hours

Maximum Dose
1g every 8 hours

Prepared Medication
500 mg per 100 mL Sodium Chloride 0.9%

Administration Time
Administer over 30 minutes

30 minutes

Instructions
Course Duration: 5 days



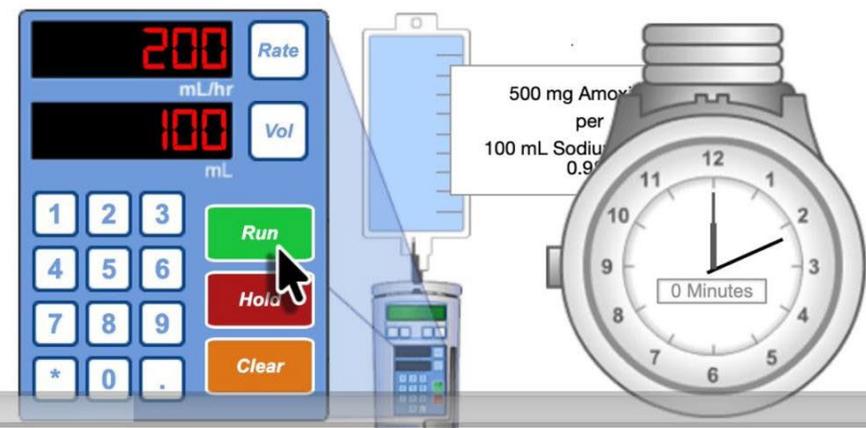
RATE CALCULATION

$$100 \text{ mL} \times \frac{60 \text{ min/hr}}{30 \text{ min(s)}} = 200 \text{ mL/hr}$$

SETTING THE VOLUMETRIC PUMP STEP 2

Carefully study the information above. Set the correct rate and volume on the volumetric pump then click RUN. When you have completed this step, click **NEXT** to continue.

Example calculation from VLE intervention (IV infusion rate)





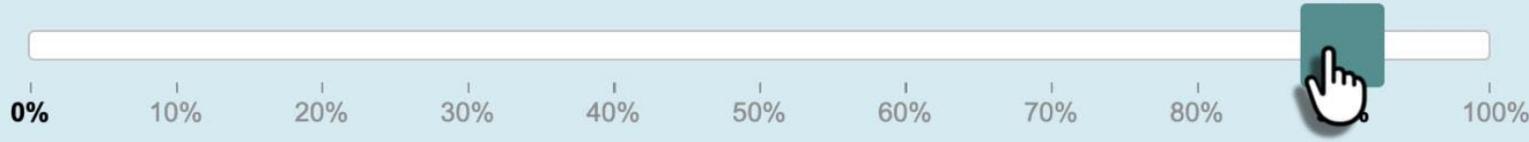
HOW CONFIDENT ARE YOU WITH THE ACCURACY OF YOUR ANSWER? STEP 3

Use the slider below to indicate how confident you are with the accuracy of the answer you have provided.

The slider has a range between 0% and 100%.
 0% = no confidence in the accuracy of your answer.
 100% = full confidence in the accuracy of your answer.

When you have completed this step, click **NEXT** to continue.

How confident are you that you have answered this problem accurately?



NEXT

Participants self-rate their confidence with calculation accuracy

CORRECT ANSWER

RATE CALCULATION

$$100 \text{ mL} \times \frac{60 \text{ min/hr}}{30 \text{ min(s)}} = 200 \text{ mL/hr}$$

SETTING THE VOLUMETRIC PUMP

YOUR ANSWER

RATE CALCULATION CONCEPTUAL CALCULATION

$$100 \text{ mL} \times \frac{60 \text{ min/hr}}{30 \text{ min(s)}} = 200 \text{ mL/hr}$$

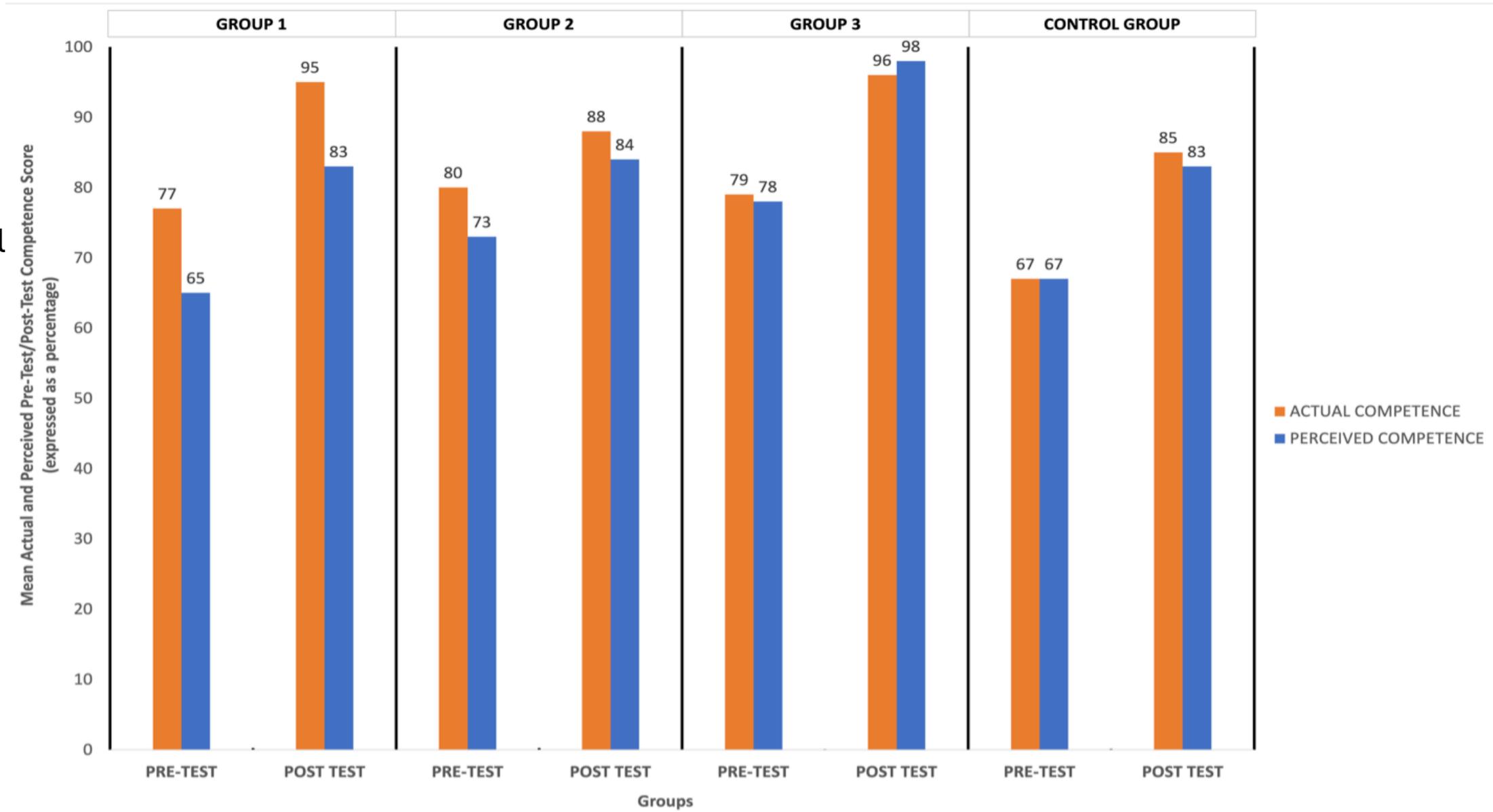
SETTING THE VOLUMETRIC PUMP TECHNICAL MEASUREMENT

HOW CONFIDENT ARE YOU WITH THE ACCURACY OF YOUR ANSWER?

You perceived that you were **90%** confident that you answered this problem accurately

This reflects that you under-estimated your competence by **10%**

Mean pre-test / post-test actual / perceived competence scores



Results:
Student actual competence increased across all 4 groups. Perceived competence mirrored this.

Implications

- Brief exposure to structured simulation with feedback boosts nursing students actual and perceived competence.
- Repeated exposure improves self-efficacy, confidence and learning satisfaction.
- Integrate into nursing education and rapid upskilling strategies (e.g., emergencies, workforce shortages, WHO call to action)

Conclusion & Next Steps

- Pilot study shows asynchronous VLEs improve students' actual and perceived drug dosage calculation competence.
- No clear dose-response relationship observed.
- Larger studies needed to examine instructional design, feedback, and interaction effects on learning outcomes.
- Findings should be shared more widely

SCAN QR CODE TO ACCESS VIDEO EXAMPLE

Effect of Exposure to Asynchronous Virtual Clinical Environments on
Actual/Perceived Competence in Drug Dosage Calculation:
A Pilot Study

**Video: Amoxicillin Infusion Rate Calculation
During Emergency Phase of Covid-19
Pandemic**



Thank you. Any questions?

Contact for more information

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