A Precision Dosing Tool to Teach Pharmacy Students Clinical Pharmacokinetics

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Background

- Recent guideline updates now recommend area under the curve monitoring for patients receiving vancomycin.
- Pharmacy students are taught how to perform these pharmacokinetic (PK) calculations, with most finding this topic to be quite challenging.
- To improve this learning gap, we augmented the standard vancomycin PK large group lecture and paired it with a small group session that incorporated an interactive, case-based discussion demonstrating a precision dosing tool.
- Surveys evaluated students' beliefs on the importance of and confidence in monitoring patients on vancomycin.

Methods

Precision Dosing Tool Intervention

- Clinical vancomycin PK cases were created for a 2-hour, small group session (n=24 students per session).
- Faculty facilitated various dosing and monitoring scenarios and reinforced key vancomycin PK concepts using case simulations in Insight RX.

Survey Design

- Likert scales were used to survey beliefs and confidence regarding vancomycin PK learning pre/post the small group session.
- This survey was also given to students in the legacy curriculum, who did not receive this small group session (control), before/after the standard vancomycin PK large group lecture.
- $\chi 2$, rank-sum and negative binomial regression were used to analyze differences between the two teaching methods.

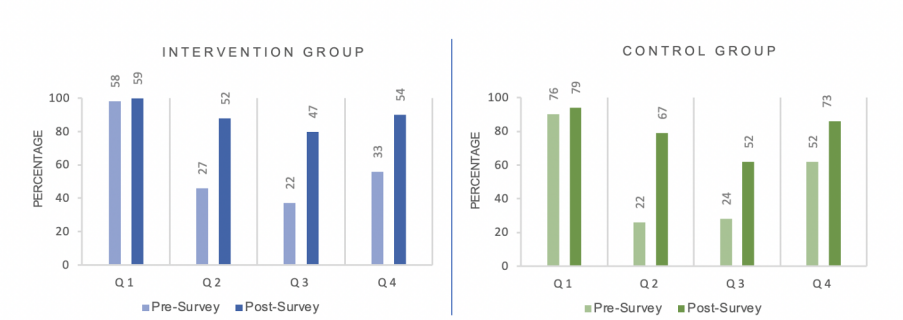

Figure 1. Pharmacy student responses of "agree" and "strongly agree" to four statements to assess beliefs and confidence regarding vancomycin PK.

Table 1. Negative binomial regression analysis for pre-survey

Survey Question	Odds Ratio (95% CI)	P value
Q1. I believe it is important for pharmacists to conduct vancomycin monitoring	1.09 (1.02 - 1.17)	0.01
Q2. I am confident in my ability to independently conduct vancomycin monitoring	1.01 (0.95 - 1.08)	0.72
Q3. I am confident in ability to explain vancomycin pharmacokinetic calculation steps to my preceptor	1.04 (1.0 - 1.09)	0.11
Q4. I received adequate training for me to independently conduct vancomycin monitoring	1.05 (1.0 - 1.11)	0.06

Results

- 143 pharmacy students participated; 62% and 66% response rates in intervention and control groups, respectively.
- The intervention group reported higher baseline agreement to all statements. Pre and post agreement increased in both groups regarding confidence to independently conduct vancomycin monitoring and confidence to explain vancomycin calculation steps (Figure 1).
- Analysis between the intervention and control groups revealed a significant difference in the belief that vancomycin monitoring is important (Table 1).
- There were no significant differences in their confidence to conduct vancomycin monitoring, although results favored the intervention group (Table 1).

Conclusions

- Use of a precision dosing tool to teach vancomycin PK significantly increased pharmacy students' beliefs on the importance of vancomycin PK monitoring skills and confidence to apply these skills.
- A follow-up survey will be administered halfway through clinical rotations to reassess beliefs, confidence and knowledge retention.
- Similar strategies to incorporate real-world technology and augment clinical PK learning may better prepare pharmacy students to provide clinical PK services consistent with guideline recommendations.

References

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