

# Causes of Vancomycin Dosing Error; Problem Detection and Practical Solutions; A Retrospective, Single-Center, Cross-Sectional Study

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## ABSTRACT

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**Background:** Vancomycin dosing error and inappropriate monitoring is a common problem in hospital daily practice. In King Abdulaziz Medical City (KAMC) in *Jeddah*, a high percentage of abnormal vancomycin trough levels is still detected despite using the recommended dose.

**Objective:** The current research objective is to study the major causes of vancomycin dosing errors.

**Methods:** This retrospective, single-center, cross-sectional study was carried out at KAMC hospital in Jeddah from January 1<sup>st</sup> until December 31<sup>st</sup>, 2019. All adult patients ( $\geq 15$  years) who received vancomycin and had an initial abnormal trough level at the measured steady state were included in this study. 472 patients have met the study inclusion criteria. The current study evaluated the factors that play a role in causing vancomycin trough level abnormalities such as sampling time, vancomycin dosing, and patient's pharmacokinetic and pharmacodynamic variations.

**Results:** In this study, we found that pharmacokinetic and pharmacodynamic variability was attributed to 65% of vancomycin's abnormal trough level. Also, the result showed a significantly increased odds of the low trough in the non-elderly group (OR 6, 95% CI 2.48 – 14.9,  $P < 0.001$ ) and febrile neutropenic patients (OR 2.21, 95% CI 1.119 - 4.365,  $P < 0.05$ ). However, the odds of high trough levels were significantly elevated among patients who have  $\text{CrCl} < 50$  ml/min (OR 5, 95% CI 1.262 - 20.539,  $P < 0.05$ ). In addition, the present investigation revealed that the occurrence of abnormal vancomycin levels was not affected by daily duty time or working days ( $p > 0.05$ ).

**Conclusion:** The current study indicated that vancomycin dosing errors were common in KAMC patients; thus, there is an unmet need to evaluate the causes of vancomycin abnormal trough level and optimize a strategy that would enhance the therapeutic effectiveness and minimize the potential toxicity.