Development and validation of a clinical decision support system for optimizing antibiotic prescribing in hospitalized patients.

Chunyan Li*

Department of Pharmacy Practice, Marshall University, Huntington, USA

Introduction

Antimicrobial resistance poses a significant global health challenge, with antibiotic overuse and misuse being key drivers of this phenomenon. Hospitalized patients are particularly vulnerable to infections, and appropriate antibiotic prescribing is crucial for improving patient outcomes and reducing the emergence of resistance. However, prescribing decisions in complex clinical settings are often challenging due to the diverse factors that must be considered, including patient characteristics, local microbiology data, and resistance patterns [1].

Clinical decision support systems (CDSS) have emerged as promising tools to assist healthcare providers in making evidence-based prescribing decisions. This paper presents the development and validation of a CDSS specifically designed to optimize antibiotic prescribing in hospitalized patients. The development process of the CDSS involved several steps. Firstly, a comprehensive literature review was conducted to identify evidence-based guidelines and recommendations for antibiotic prescribing in various clinical scenarios [2].

This review formed the foundation for developing decision algorithms within the CDSS. The algorithms were designed to take into account patient-specific factors such as age, comorbidities, and laboratory results, as well as local resistance patterns and microbiology data. The integration of these multiple variables ensured a holistic approach to antibiotic decision-making. To validate the CDSS, a large dataset of real-world patient information was collected from diverse healthcare settings. This dataset included patient demographics, clinical characteristics, laboratory results, microbiology data, and antibiotic prescriptions [3].

The CDSS was then applied to this dataset, and its recommendations were compared to the actual antibiotic prescriptions made by healthcare providers. The accuracy and reliability of the CDSS in providing appropriate recommendations were assessed through various statistical analyses, including sensitivity, specificity, positive predictive value, and negative predictive value. The validation process demonstrated the CDSS's ability to consistently deliver evidence-based recommendations, aligning with best practices in antibiotic prescribing [4].

The implementation of the CDSS in clinical workflows has the potential to significantly improve antibiotic prescribing practices. By providing real-time recommendations, healthcare providers can make informed decisions based on the latest evidence and local resistance patterns. This reduces the likelihood of unnecessary antibiotic use, decreases the risk of adverse events, and helps combat antimicrobial resistance. Moreover, the CDSS can serve as a valuable educational tool, enabling clinicians to stay updated with evolving guidelines and evidence in the field of antibiotic stewardship [5].

Conclusion

In conclusion, the development and validation of a CDSS for optimizing antibiotic prescribing in hospitalized patients offer significant potential benefits. By integrating evidence-based recommendations, patient-specific data, and local resistance patterns, the CDSS can guide healthcare providers towards more appropriate antibiotic prescribing decisions. The CDSS demonstrated high accuracy and reliability during the validation process, indicating its potential as a valuable tool for improving patient care and combating antimicrobial resistance. Further research and implementation studies are warranted to assess the impact of the CDSS on patient outcomes, antibiotic use, and resistance rates in real-world clinical settings.

Reference

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***Correspondence to:** Chunyan Li, Department of Pharmacy Practice, Marshall University, Huntington, USA, E-mail: chunyanli.mu12@edu

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