Assessing the impact of e-Health tools on antibiotic use

Érico Carvalho[1], Marta Estrela[1], Maruxa Zapata-Cachafeiro[2,3], Adolfo Figueiras[2,3,4], Fátima Roque[5,6]and Maria Teresa Herdeiro[1]

1 iBiMED–Institute of Biomedicine, Department of Medical Sciences, University of Aveiro, Aveiro, Portugal;
2 Department of Preventive Medicine and Public Health, University of Santiago de Compostela, Santiago de Compostela, Spain;
3 Consortium for Biomedical Research in Epidemiology and Public Health (CIBER Epidemiology and Public Health-CIBERESP), Madrid, Spain;
4 Health Research Institute of Santiago de Compostela (IDIS), Santiago de Compostela, Spain;
5 Research Unit for Interior Development, Guarda Polytechnic Institute, Guarda, Portugal;
6 Health Sciences Research Centre, University of Beira Interior (CICS-UBI), Covilhã, Portugal.

ABSTRACT

Background: Considering the rapid emergence of e-Health tools, particularly clinical decision support systems (CDSSs), assessing the influence of these tools on antibiotic use for respiratory tract infections became an interesting object of research, in which resulted this systematic review.

Methods: To avoid bias, the search was conducted by two independent researchers, aiming to identify studies evaluating the effectiveness of CDSSs in improving antibiotic use, as a primary outcome. As a secondary outcome, the acceptability and usability of CDSSs was also assessed.

Results: After the selection, 22 articles were included for analysis. The study outcomes were classified as 1) antibiotics prescription practices or 2) adherence to guidelines. Overall, 68% of the included studies had statistically significant outcomes related to the interventions.

Conclusions: Overall, the results show a positive impact on the prescription and conscientious use of antibiotics for respiratory tract infections. Moreover, introducing powerful e-health tools, such as CDSSs, into clinical practice, appear to have great potential for improving clinical care and, consequently, patient outcomes.

INTRODUCTION

In recent years, medical science has been challenged with the emergence of highly resistant bacterial strains, resulting especially from antibiotic misuse and overuse. In the context of primary care, both antibiotic overuse and a lack of adherence to guidelines are prevalent, albeit underestimated, issues: 20–50% of the total amount of antibiotics prescribed in intensive care are unnecessary or inappropriate.

Antibiotic overuse in respiratory tract infections is very evident. Although antibiotics are ineffective against viral pathogens and should thus only be prescribed when secondary bacterial infections develop, almost 75% of prescribed antibiotics were not prescribed according to guidelines, and only 11% of them were optimally prescribed.

Health information technology, namely CDSSs, aims to improve the quality of care by optimizing the exchange and coordination of health care information, implementing state-of-the-art clinical practices and reducing medication errors and adverse events. These tools and can be very useful for improving guideline adherence, and antibiotic prescription, particularly regarding respiratory infections.

RESULTS

Searches in the scientific databases MEDLINE-PubMed and EMBASE were conducted. The inclusion criterion of the studies was the impact of e-health tools on antibiotics use in respiratory tract infections.

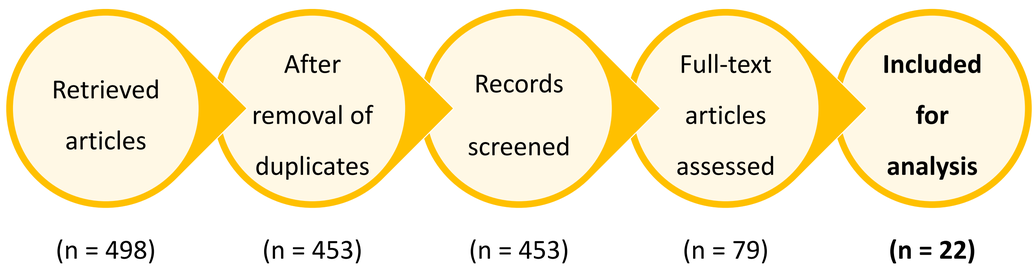

Fig 1. Application of search strategies to retrieve the total number of studies for analysis.

15 out of the 22 studies had statistically significant outcomes related to the interventions. However, some heterogeneity in the strength of the effectiveness of CDSSs can also be noted, as some studies show modest, albeit positive and significant, results.

Overall, the studies showed positive results on antibiotics prescription of improving the quality or reducing the number of antibiotics prescriptions. The results also reflect an overall improvement in guideline concordance. Guideline adherence also improved when CDSS tools were used more than once.

CONCLUSION

Antibiotic prescription is a particularly complex area in medical decision-making. This systematic review indicates that interventions using e-health tools, especially CDSSs, can be effective in optimizing and reducing antibiotics prescription. These tools also allow the emergence of new opportunities in clinical care, by incorporating antimicrobial policies, decision support, and antimicrobial usage surveillance. Moreover, health professionals appear to be very receptive to the use of e-health tools. The conclusions of this review can be used to deepen the knowledge and promote debate on the impact of CDSSs on optimizing antibiotic use and prescription.

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