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RESEARCH PAPER

Evaluating antimicrobial therapy: How reliable are remote assessors?

Menino Osbert Cotta [a,b,*], Tim Spelman [a], Caroline Chen [a],
Rodney S. James [a], Danny Liew [b], Karin A. Thursky [a],
Kirsty L. Buising [a], Caroline Marshall [a,b]

[a] Victorian Infectious Disease Service, Royal Melbourne Hospital at the Peter Doherty Institute for Infection and Immunity, Melbourne, Australia
[b] Department of Medicine, University of Melbourne, Melbourne, Australia

Abstract *Introduction:* Assessing the quality of antimicrobial prescribing provides hospitals with a means of targeting and measuring the impact of antimicrobial stewardship interventions. There are limited data available on the reliability of these assessments among different types of hospital assessors deployed away from the bedside (ie remotely). Importantly, it is unclear if assessors inexperienced in clinical infectious diseases can reliably evaluate the quality of antimicrobial prescriptions. This study sought to determine the reliability of assessments made by remote hospital assessors with different levels of clinical infectious diseases experience. These assessments were based on (1) concordance with national prescribing guidelines and (2) 'overall appropriateness'.
Methods: 180 prescriptions were assessed for 'concordance with guidelines' and 'overall appropriateness' at the bedside (ie locally). Prescription data were then given to fifteen remote assessors. These assessors were blinded to local assessments. Inter-rater reliability was calculated using Fleiss' kappa statistics.
Results: Higher levels of agreements were achieved for 'concordance with guidelines' assessments. Local and remote antimicrobial management teams had the highest level of agreement and this improved when looking at antimicrobial treatment used to treat respiratory tract infections (kappa score = 0.67). Reliability in assessments was moderate for local pharmacist assessments and fair to slight for local infection control assessments.
Conclusions: There is scope to develop tools that will improve assessment reliability of antimicrobial therapy among remote assessors. Clinical pharmacists provide reliability comparable to

* Corresponding author. Department of Medicine, Royal Melbourne Hospital, University of Melbourne, Grattan St, Parkville, Victoria 3052, Australia. Tel.: +61 422 356 468; fax: +61 3 8344 1222.
E-mail address: menino.cotta@unimelb.edu.au (M.O. Cotta).

infectious diseases experts, however, infection control practitioners may require further education and training to improve reliability in assessments.

Highlights

- Many hospitals lack the capacity to assess antimicrobial appropriateness by local assessors with infectious diseases training.
- It is unclear whether assessments of antimicrobial prescriptions are consistent among remote assessors.
- Findings can be used to determine the types of remote assessors that can reliably assess antimicrobial therapy.

Introduction

Hospital antimicrobial use has been implicated in accelerating development of antimicrobial resistance worldwide [1]. Many institutions have targeted improving antimicrobial prescribing through reducing unnecessary use and rationalising therapy by a variety of antimicrobial stewardship (AMS) interventions [2].

Consumption of antimicrobials has been used as an outcome indicator for AMS; however, use of crude volume-based usage data is often not accurate when evaluating antimicrobial use. Assessing the quality of antimicrobial prescribing represents a more descriptive method. Periodic auditing of antimicrobial prescriptions has the ability to inform AMS program coordinators of prescribing practices that require targeting via a continuous quality improvement process [3].

Evaluation of antimicrobial therapy can be made solely on the basis of pathogen-antimicrobial susceptibility [4,5], however, there are other aspects of the antimicrobial prescription, such as spectrum of activity, dose and duration that need to be considered when assessing antimicrobial prescriptions. Concordance with endorsed prescribing or treatment guidelines provides an alternative method to audit the quality of antimicrobial therapy [6]. There are limitations with this approach in that guidelines may not be available for all indications or may be considered insufficient when taking into account patient specific factors, such as patient drug allergies or the risk of drug toxicity [7].

As a result, the opinion of health professionals trained in clinical Infectious Diseases (ID) may be used to determine 'overall appropriateness' of therapy [6,8,9]. Multi-disciplinary teams consisting of an ID physician or clinical microbiologist and specialist ID pharmacist (termed antimicrobial management teams [AMTs]) have previously been shown to be effective in reducing antimicrobial use through post-prescription assessment with direct intervention and feedback [10,11]. Additionally, national consensus statements have recommended the use of AMTs as part of hospital-wide AMS programs [12,13].

However, a recent Australia-wide antimicrobial prescribing survey noted that many hospitals lack the capacity, either due to geographical location or funding constraints, to have local (ie onsite) expert assessors such as AMTs, ID physicians or clinical microbiologists [14]. Results of this survey showed that approximately a quarter of the 151 participating hospitals sought assistance from assessors that only had access to the data collection form, and thus performed the assessment of antimicrobial prescriptions away from the bedside (ie remotely or 'offsite'). Additionally, of the 334 assessors that participated, a third (33%) were non-specialist ID pharmacists whilst a further 27% of assessors were infection control practitioners (ICPs) from a nursing background.

Taking into account that many assessors of antimicrobial prescriptions may not have formal training in clinical ID and/or may have performed this assessment remotely, there is need to ascertain whether quality assessments of antimicrobial prescriptions are consistent among this heterogeneous group of remote assessors.

Therefore, the aim of this current study was to determine the level of inter-rater reliability between assessments made by local and remote health professionals with different levels of clinical ID experience for (1) concordance with national antimicrobial prescribing guidelines and (2) 'overall appropriateness' using a newly developed appropriateness assessment tool. It was hypothesised that there would be greater inter-rater reliability among local and remote ID experts compared to those not trained in ID (termed 'non-ID experts').

Methods

Antimicrobial prescriptions included in the study were sampled from prescription data collected as part of the 2013 Australia-wide antimicrobial prescribing survey conducted by the National Antimicrobial Prescribing Survey (NAPS) initiative [14]. Data for each prescription were collected using a standard data collection form (available