IMPACT OF ANTIMICROBIAL STEWARDSHIP STRATEGIES ON ANTIMICROBIAL USE: A SYSTEMATIC REVIEW

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BACKGROUND

The increasing emergence of multi-drug resistant bacteria coupled with dwindling antibiotic development pipeline is a major health problem globally. As resistance is largely attributed to inappropriate antimicrobial use, antimicrobial stewardship has been implemented worldwide with varying outcomes. We performed a systematic review on the various antimicrobial stewardship strategies to evaluate the outcomes of these initiatives.

METHODOLOGY

Database Search
PubMed, Cochrane Library and Embase databases from January 2000 to February 2014 and bibliographies of retrieved articles were searched.

Search Terms
The following search terms were used: (Antibiotic OR Antimicrobial) AND (Stewardship OR Implementation OR Restriction).

Type of Studies
• Interventional studies employing audit-feedback, formulary restriction or Computerized Decision Support System (CDSS)
• Randomized Controlled Trials (RCT), Controlled Before-After (CBA) and Interrupted Time Series (ITS) with minimum 3 time points
• Studies that recruited non-adult patients and articles not written in English were excluded.

Qualitative Review and Meta-analysis
A qualitative review of articles was carried out and statistical analyses were performed using the random effects model.

RESULTS

Thirty-two studies were identified (21 ITS, 8 RCT and 3 CBA) with audit-feedback being the most common strategy.

Antimicrobial Consumption and Cost-savings
A reduction (9.7% - 90.7%) in target antimicrobial consumption was observed in 20 studies. Nine studies showed a 9.9% to 23.0% reduction in cost for the targeted antimicrobials.

Microbiological Outcome
Seven out of 8 studies which analysed the incidence of *Clostridium difficile* infections demonstrated a reduction in infection rate by 8.0% to 36.3%. In addition, 9 other studies showed a decrease in the incidence of resistant isolates to target antibiotics including gram-negative bacilli and Methicillin-resistant *Staphylococcus aureus*.

Appropriateness of Antimicrobial Use
A meta-analysis of 3 audit-feedback and 1 CDSS studies demonstrated significant improvement in the appropriateness of antibiotic prescription post intervention (Figure 2).

Duration of Antimicrobial Use
Three audit-feedback studies also showed a significant reduction in the duration of target antimicrobial use in the meta-analysis (Figure 3).

Clinical Outcomes
No statistical difference in mortality (12 studies), length of hospitalisation (11 studies) or 30-day readmission (3 studies) was demonstrated.

CONCLUSION

Antimicrobial stewardship strategies employing the use of audit-feedback, formulary restriction and CDSS were effective in improving appropriate antimicrobial use, reducing antimicrobial use, expenditures and resistance, without compromising patient safety.