



Original Research Article

Implementation of a Program for Optimizing the Use of Antimicrobials: Outcomes After Six Months of Activity

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Abstract: The optimal use of antimicrobials is crucial to curbing the rise of antimicrobial resistance (AMR), improving patient outcomes, and reducing healthcare costs. This article presents the results of implementing an antimicrobial stewardship program (ASP) over a six-month period at a tertiary-care center. We review quantitative changes in antibiotic use, adherence to prescribing guidelines, resistance trends, and safety metrics. Observed improvements in prescribing accuracy, reductions in inappropriate antimicrobial usage, and enhanced patient safety indicators are discussed alongside visual representations of these outcomes.

Keywords: Antimicrobial Stewardship Program (ASP), Antimicrobial Resistance (AMR), Antibiotic Prescribing, Tertiary Care Hospital, Patient Safety.

INTRODUCTION

Antimicrobial resistance threatens global health, mainly due to the irrational and excessive use of antibiotics. Antimicrobial stewardship programs (ASPs) have emerged as a leading strategy in healthcare institutions, aiming for:

- Optimized antimicrobial use and dosage
- Improved patient treatment outcomes
- Reduced adverse effects and healthcare costs
- Lower AMR rates^{[1][2][3]}

ASP implementation typically involves pharmacist or infectious disease specialist-led multidisciplinary teams, protocols for antibiotic prescribing, regular audit and feedback, education, and monitoring of process/outcome metrics.

METHODS

Program Design and Setting

A multidisciplinary stewardship team initiated the ASP, including the following interventions:

- Formulation of evidence-based empirical antibiotic guidelines
- Educational sessions for prescribers
- Daily review and feedback for ongoing prescriptions
- Mandated documentation for indication and planned duration
- Enhanced laboratory reporting for targeted de-escalation

Data Collection and Analysis

Pre-implementation data were collected for six months, followed by six months of post-implementation monitoring. The following metrics were assessed:

- Antimicrobial consumption (defined daily doses, DDD per 1,000 patient-days)
- Adherence to prescribing policy and rates of guideline-concordant use
- Antimicrobial de-escalation frequency
- Days of therapy (DOT) per 1,000 patient-days
- Indicators of AMR and pathogen susceptibility patterns
- Patient outcomes: length of stay (LOS), 30-day readmission, mortality rates
- Cost analysis: antimicrobial expenditure pre- and post-intervention

Statistical comparisons were conducted using chi-square and t-tests, with significance set at $p < 0.05$.

RESULTS

1. Antimicrobial Utilization

- **Total antimicrobial DDD decreased by 6–16%** after six months of ASP activity^{[2][4][5]}.
- The mean stewardship-focused antibiotic utilization dropped from 510.3 to 426.4 DDD/1,000 patient days (16.4% reduction, $p < .001$)^[4].
- Broad-spectrum and anti-pseudomonal antibiotic usage showed the most notable declines.

Table 1: Antibiotic Usage Before and After ASP (per 1,000 patient days)

Metric	Pre-ASP	Post-ASP	% Change
Total DDD	510.3	426.4	–16.4%
DOT (all antibiotics)	561	463	–17.4%
Broad-spectrum agents	-	–11.3%	

2. Adherence to Prescribing Policy

- Policy adherence improved from 23.7% to **41.8%** after ASP implementation^[2].
- More prescriptions documented indication, duration, and appropriate culture sampling before initiation (from 36.7% to 60.4% of cases).

3. De-escalation Rates

- De-escalation (modification to more targeted therapy) increased from 22.7% to **43.5%** post-ASP^[2].

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