

Optimising ICU Antibiotic Use: A Narrative Review of Antimicrobial Stewardship Program



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Introduction & Background

Antimicrobial Resistance (AMR) occurs when microbes like bacteria, viruses, fungi, and parasites evolve to resist antimicrobial treatments. This resistance makes antimicrobials ineffective, making infections difficult or even impossible to treat. As a result, AMR increases the risk of infectious disease transmission, health complications, long-term health issues, and increased mortality rates (WHO, 2023). Antimicrobial Stewardship (AMS) involves choosing the right antibiotics, the correct dosage, and the appropriate treatment length to treat infections effectively (Shrestha, Zahra and Cannady, 2023).



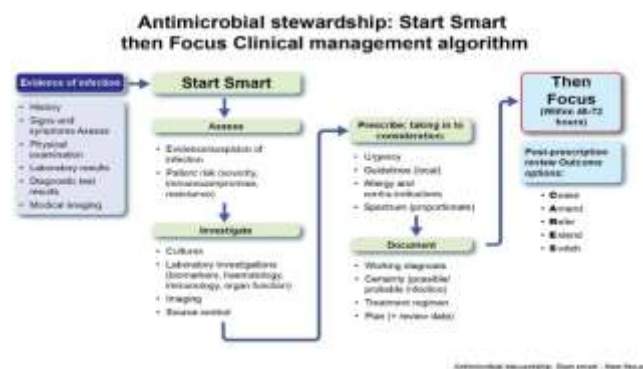
Method

The JBI critical appraisal checklist was used to appraise the studies. Four quantitative studies (randomised and retrospective) were included.

- 1. Antibiotic stewardship rounds, a quantitative study (Seidelman et al., 2021)**
 - Prospective Cluster Randomized Crossover Study
- 2. Evaluating the long-term antibiotic stewardship program (ASP) (Singh et al., 2022)**
 - Retrospective cohort study
- 3. Evaluation of the effectiveness and safety of a multi-faceted computerized antimicrobial stewardship intervention (Yuan et al., 2023)**
 - Cluster-randomized controlled trial
- 4. Early antimicrobial stewardship team intervention (Rashidzade et al., 2021)**
 - Randomized control trial

Results

Study / Sample	Intervention	Key Findings
4683 ICU patients (cluster-RCT)	Weekly antimicrobial stewardship rounds	16% overall reduction in antibiotic use; largest in neurology ICUs (28%)
400 ICU patients (9 yrs)	Audit & feedback-based ASP	Sustained reductions in carbapenem & fluoroquinolone use (31%)
2470 surgical patients (cluster-RCT)	Multi-faceted computerized AMS system	Reduced days of therapy (DOT), defined daily doses (DDD), and costs; 23.9% lower inappropriate prescribing
90 patients (RCT)	Early AMS review after MET call	67% of intervention group appropriate at 72h vs 44% controls; high acceptance of de-escalation & discontinuation



Conclusions & Discussions

- ❖ All studies have proven that there is a significant reduction in antimicrobial use with ASP.
- ❖ Singh et al., showed a 31% reduction in antimicrobial usage, which promises long-term benefits of the antimicrobial stewardship program (ASP). Similarly, Yuan et al., depicted a 23.9% reduction in ASP. On the other hand, Seidelman et al., reported a decrease in antibiotic usage based on unit specifications.
- ❖ Computerized technology was used in Yuan et al., and Rashidzade et al., to detect and treat sepsis, which is directly proportional to antimicrobial prescription. This is quite a promising aspect in the near future as technology evolves rapidly. High chances of implementing technology in suspecting and treating sepsis are expected.



Scan for
References

Key summary - PDSA cycle

Plan -

Objective - Improving antimicrobial stewardship (AMS) among nurses in ensuring appropriate treatment

Do-

- ❖ To develop a checklist based on NICE guidelines or computerized warning signs.
- ❖ Education and training on AMS for bedside nurses about,
 1. Monitoring antimicrobial usage
 2. Communication with multidisciplinary team
 3. Evaluating the patient's clinical condition
 4. Timely de-escalation of antimicrobials
 5. To recruit an AMS champion

Study -

1. Track trends on antibiotic usage (audit)
2. Review patients' clinical outcomes and records

Act -

- > To collect/track data on antimicrobial usage from patients' records
- > To adjust the practices based on results
- > Share the report with the wider team to drive improvement

