ICAP Journal Club

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Article


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Study Summary

This study aimed to assess implementation of an antimicrobial stewardship program using a health partnership model at a district hospital in Ghana over a six-month period. A point prevalence survey (PPS) was conducted at baseline, midpoint, and end of the project to assess antibiotic use and infection management. Feedback on each PPS was given to the hospital to inform practice and behavioral change and improve antibiotic use.

Study Setting

- A 135-bed district-level hospital with a catchment population of over 300,000, located on the campus of the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana.

Methods

- The AMS intervention was implemented between November 1, 2021, and May 31, 2022, targeting all health cadres in the hospital.
- The AMS intervention utilized a health partnership model, whereby experts from the Ulster University School of Pharmacy in Northern Ireland provided remote technical support for intervention delivery before, during and after the project.
- The intervention was a bundled stewardship program embedded with infection prevention and control (IPC) based on the *World Health Organization (WHO) AMS* and *Commonwealth Partnerships for Antimicrobial Stewardship* (CwPAMs) toolkits.
- The AMS program included the following components:
  - Education on antimicrobial resistance (AMR)/AMS/optimal antibiotic use and IPC using hybrid training seminars.
  - Audits of antibiotic use using PPS and feedback given to prescribers, pharmacists, and hospital management through face-to-face meetings and WhatsApp.
Advocacy on rational prescribing using culture and drug susceptibility testing and therapy review by pharmacists and the AMS team.

Key stages of the intervention included:
- Formation of a multidisciplinary AMS committee comprised of three pharmacists, a nurse (who also served as the hospital’s IPC focal person), three medical doctors (including an infectious disease specialist), a hospital administrator, and two laboratory scientists who met at least monthly to discuss AMS activities conducted in the hospital.
- Creation of an AMS team, which consisted of two pharmacists, one nurse, two medical doctors, and one laboratory scientist, and which was led by a family medicine consultant and infectious disease specialist and a clinical pharmacist/researcher; the AMS team met monthly and conducted daily reviews of antibiotic use on the wards, as well as quarterly AMS activities.

Activities carried out by the AMS team included:
- Monitoring to ensure indications for antibiotic therapy are appropriately documented.
- Educating clinicians to take samples for culture and susceptibility testing before empiric antibiotic therapy is initiated.
- Conducting seminars and daily ward rounds to provide counseling and recommendations to clinicians to improve prescribing behaviors.
- Selecting antibiotics to place on restricted access (requiring pre-authorization before use) to reduce their inappropriate use.

Cross-sectional PPS were conducted at baseline, midpoint (four months after the project start), and end of the project (six months after the project start).

The Global-PPS (G-PPS) protocol was used to measure antibiotic use (administered via oral, parenteral, rectal, or inhalational routes) and healthcare-associated infections (HAI) among all patients who were admitted to acute care inpatient wards before 8:00 a.m. on the survey day.

Data were collected anonymously from both paper-based medical records as well as the electronic medical records system.

Study Population
- A total of 152 patient records were included in the three PPS, including 46, 48, and 58 records in the first, second, and third PPS, respectively.
- Most of the included patients were female (63.2%) and the median age was 26.5 (interquartile range 19, 38) years.

AMS Outcomes
- Antibiotic use at baseline was 65% and decreased to 59.7% at the end of the project, while intravenous therapy was reduced from 70.8% to 64.7%.
- The HAI rate also decreased from 17.5% at baseline to 6.5% at the project endpoint.
• At baseline and endpoint, third generation cephalosporins were the most used antibiotics (21.4% and 21.2%, respectively). At the midpoint, penicillin with beta-lactamase inhibitors were the most used at 21.4%.

• At baseline, the most common indications for antibiotic use were lower respiratory tract infections (40.9%), lower urinary tract infections (18.2%), and skin and soft tissue infections (18.2%). At the endpoint, 19% of indications were lower urinary tract infections, 19% were sepsis, 14.3% were lower respiratory tract infections, and 14.3% were upper urinary tract infections.

• None of the antibiotics prescribed belonged to the Reserve category according to the WHO Access, Watch, and Reserve (AWaRe) classification. At baseline, Access antibiotic use was 40%, increased to 62% at midpoint, and leveled off at 50% at the project endpoint. Use of antibiotics in the Watch category decreased from 60% at baseline to 38% at midpoint, leveling off at 50% at the endpoint.

• Monthly culture and drug susceptibility testing requests increased from 111 requests at the beginning of the intervention in November 2021 to 330 requests in April 2022.

Critical Analysis

This study demonstrated that implementation of a bundled AMS program embedded in IPC using a health partnership model that included education, audit and feedback, and advocacy on rational prescribing based on culture and drug susceptibility testing and therapy review by pharmacists and the AMS team. This resulted in a reduction in antibiotic use among inpatients and a reduction in the rate of HAI, as well as an increase in the use of antibiotics belonging to the WHO Access group over six months.

The following points should be considered when interpreting the study findings:

• No assessment of patient outcomes was conducted, so the impact of the intervention on length of stay, morbidity, and mortality are unknown.

• Assessments were conducted over six months, which is too short to assess the durability of the intervention.

• As only three time points were evaluated at different months of the year, the observed post-intervention changes may have been confounded by seasonal variations in antibiotic use.

• The assessment was conducted in a district-level university hospital, and the findings may not be generalizable to health facilities with different contextual characteristics.

• Statistical analyses were not performed to test the significance of the change in antibiotic use and HAI rate.

• While Access antibiotic use increased to 50% at the endpoint, further interventions are warranted to reach the WHO benchmark of 60%, which may include implementation of AMS guidelines and facility-specific antibiotic formularies.
• Data on culture positivity rate and turnaround times for culture and drug susceptibility requests were not assessed. Given the increase in sample volume, it is important to monitor these indicators of microbiology lab quality and capacity.

**Implications**

Implementation of a bundled AMS program embedded in IPC using a health partnership model improved inpatient antibiotic use and infection management during the six-month intervention period. This study demonstrates how the WHO AMS and CwPAMs toolkits can be utilized to implement evidence-based AMS interventions in resource-limited settings. While the study provides evidence that education, audit, and feedback, and advocacy on rational prescribing can lead to short-term improvement in antibiotic use in a resource-limited setting, it is also essential to ensure utilization of local data to inform infection management and continuous quality improvement to achieve the desired impact on health outcomes.

*This article synopsis was written by Dr. Getachew Kassa. Share your thoughts on this article or suggest an article for Journal Club by emailing him at gk2353@cumc.columbia.edu.*