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Antimicrobial Stewardship: A Global Burden of Antimicrobial Resistance and The Effective Role of Pharmacists, Nursing, And Epidemiology Professionals

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Abstract:

Background: The emergence of antimicrobial resistance (AMR) presents a significant global health crisis, compromising the efficacy of antibiotics that are critical for infection control, cancer chemotherapy, and advanced surgical procedures. Despite past advancements in antibiotic development, progress has slowed, emphasizing the urgent need for antimicrobial stewardship (AMS).

Aim: This article explores the importance of AMS in mitigating AMR and highlights the roles of pharmacists, nursing, and epidemiology professionals in this endeavor.

Methods: A comprehensive review of AMS frameworks, strategies, and interventions was conducted, focusing on core program elements such as leadership, accountability, education, and targeted actions. Key metrics, including antimicrobial usage and resistance patterns, were evaluated to assess stewardship effectiveness.

Results: AMS programs have been instrumental in reducing inappropriate antibiotic use, improving patient outcomes, and minimizing AMR. Healthcare practitioners play a pivotal role in these initiatives, implementing strategies like pre-authorization, prospective audits, and tailored treatment protocols. Data from organizations like the CDC demonstrate the impact of AMS, with significant reductions in antibiotic-resistant infections and associated mortality.

Conclusion: AMS is essential for preserving the effectiveness of antibiotics, reducing healthcare costs, and combating AMR. Success depends on multidisciplinary collaboration, continuous education, and robust leadership. Strengthening AMS initiatives across healthcare and agricultural sectors is vital to safeguarding global health.

Keywords: Antimicrobial stewardship, antimicrobial resistance, pharmacists, nursing, epidemiology, healthcare, antibiotics, public health.

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Introduction:

The discovery of penicillin marked a pivotal moment in medical history, establishing antibiotics as an essential component of global health care, particularly in cancer chemotherapy and advanced surgical procedures. Unlike other drugs, antibiotics possess a unique dual impact, influencing both individual patients and the broader society. Each prescription not only combats infections but also applies selective pressure on bacterial populations, fostering the development of antimicrobial resistance (AMR), which poses a significant global health challenge.

Antibiotic Development and Current Challenges

Between 1935 and 2003, fourteen novel classes of antibiotics were developed. However, progress has slowed significantly since 1998, with only ten new antibiotics approved during this period. Among these, linezolid and daptomycin are the only ones to target new mechanisms of action. According to the World Health Organization (WHO) 2021 antibiotic pipeline report, eleven new antibiotics have been approved since 2017, of which only two, vaborbactam+meropenem and lefamulin, represent new classes with distinct targets of action. This limited innovation stems from the high costs, significant risks, and comparatively lower profitability of antibiotic development compared to medications for chronic diseases. The slow pace of antimicrobial development, coupled with the rapid emergence and spread of resistant organisms, underscores the critical need for antimicrobial stewardship (AMS) to optimize the use of existing antibiotics and mitigate the risks associated with AMR.

Defining Antimicrobial Stewardship

Stewardship refers to the responsible and judicious management of resources entrusted to one's care. The term "antimicrobial stewardship" was first introduced by John McGowan and Dale Gerding in 1996, emphasizing the causal relationship between antimicrobial use and resistance. They highlighted the urgent need for large-scale controlled trials employing advanced epidemiological methods, molecular typing, and detailed analyses of resistance mechanisms. Antimicrobial stewardship (AMS) encompasses the optimal selection, dosing, and duration of antimicrobial treatments to achieve the best clinical outcomes while minimizing adverse effects on patients and reducing the development of resistance. In simpler terms, AMS constitutes a coherent set of actions promoting the responsible use of antimicrobials. AMS is considered one of the foundational pillars of an integrated healthcare system, alongside infection prevention and control (IPC) and patient and medicine safety. These pillars, supported by robust AMR surveillance and a steady supply of quality medications, collectively aim to ensure equitable and high-quality healthcare. The principles of AMS also extend to the animal and agricultural sectors, underscoring the need for prudent use of antimicrobials across various domains.

The Role of Healthcare Practitioners

Addressing the escalating challenge of antimicrobial resistance requires healthcare practitioners to actively embrace their roles as frontline stewards. This involves prescribing antibiotics appropriately and educating patients and colleagues about their responsible use. Such interventions aim to foster sustainable behavioral changes in prescribing practices. The overarching goal of AMS interventions is to optimize the use of available antimicrobials while safeguarding the remaining treatment options for managing future infectious agents.

Function and Current Practices

The Centers for Disease Control and Prevention (CDC) estimate that 20 to 50% of antibiotic prescriptions in acute care hospitals in the United States are either unnecessary or inappropriate. Similar patterns are observed in nursing homes and long-term care facilities (LTCFs), where 40 to 75% of prescribed antibiotics

may be deemed inappropriate. Current scientific literature consistently highlights the need to reduce the inappropriate use of antimicrobials across all healthcare settings. Recognizing this urgency, organizations such as the Centers for Medicare and Medicaid Services (CMS), CDC, and Society for Healthcare Epidemiology of America (SHEA), in collaboration with the Joint Commission, have developed antimicrobial stewardship standards for hospitals, critical access hospitals, and nursing care centers. Additionally, CMS mandated in 2019 that all U.S. hospitals establish antimicrobial stewardship programs by March 2020 to address this growing concern effectively.

Goals of Antimicrobial Stewardship Programs

Antimicrobial stewardship programs aim to promote responsible antibiotic use to achieve several critical goals. These include ensuring the appropriate selection of antibiotics concerning drug type, dosage, route of administration, and treatment duration, while also facilitating timely de-escalation to pathogen-specific therapy. AMS programs seek to prevent the overuse, misuse, and abuse of antibiotics in various settings, including hospitals, outpatient facilities, and the agriculture sector. Another important goal is to mitigate adverse effects associated with antibiotic use, such as infections caused by *Clostridioides difficile*, while also minimizing the development of resistance. Furthermore, AMS programs contribute to reducing healthcare-associated costs, highlighting their economic and clinical value.

Core Elements of Antimicrobial Stewardship Programs

The successful implementation of AMS programs depends on several core elements, starting with leadership commitment. Strong leadership is crucial to ensuring the effectiveness of AMS initiatives. This includes formal declarations advocating for improved antimicrobial use, the provision of training and education, and ensuring that staff from relevant departments are allocated adequate time and resources to contribute to stewardship activities. Leadership also involves dedicating financial and technological resources to support AMS programs. Accountability is another key element, requiring clear roles and responsibilities, often involving infectious disease specialists or pharmacists with expertise in antimicrobial use. Effective AMS strategies also rely on targeted interventions, such as pre-authorization protocols and audit-feedback mechanisms, to ensure appropriate prescribing practices. Additionally, continuous monitoring of antimicrobial usage and resistance patterns, coupled with transparent reporting, enables data-driven decision-making and program optimization. Finally, ongoing education and advocacy efforts are critical for raising awareness among healthcare professionals, patients, and the public about the importance of responsible antibiotic use. By integrating these core components, antimicrobial stewardship programs can effectively address the growing threat of AMR, ensuring sustainable healthcare practices and preserving the efficacy of existing antimicrobials for future generations.

Accountability and Drug Expertise

The identification of a dedicated leader for an antimicrobial stewardship program (AMS) is essential for its success. Research demonstrates that programs led by physicians with formal training in infectious diseases and antimicrobial stewardship yield significant positive outcomes. Additionally, appointing a pharmacist as a co-leader enhances program effectiveness and has been associated with improved outcomes [7].

Action

Action entails the implementation of policies and interventions that promote optimal antibiotic usage. Such policies include documenting specific details, such as dosage, duration, and indications for antimicrobial prescriptions. These practices facilitate prompt modifications or discontinuations as needed [8]. Furthermore, facility-specific treatment protocols tailored to local susceptibility patterns, antibiograms, and national guidelines can optimize the selection and duration of antibiotics. Stewardship interventions fall into three main categories. Broad interventions include "antibiotic time-outs," prior authorizations, and prospective audits with feedback. For instance, an "antibiotic time-out" conducted by physicians 48 hours after initiating treatment allows for reassessment of antibiotic necessity and choice, facilitating early de-escalation [9]. Prior authorization involves infectious disease specialists reviewing specific antibiotics before they are prescribed. Pharmacy-driven interventions focus on optimizing dosages based on drug

properties, organ function, and therapeutic drug monitoring. Pharmacists also provide alerts for overlapping antimicrobial coverage and identify potential drug interactions [10]. Infection and syndrome-specific interventions aim to refine treatment for conditions like urinary tract infections (UTIs), ensuring that patients with asymptomatic bacteriuria are not treated unnecessarily. Similar strategies address infections such as community-acquired pneumonia, skin and soft tissue infections, methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridioides difficile* (CDI), and culture-proven invasive infections [11].

Tracking and Reporting Antimicrobial Use and Outcomes

Monitoring antimicrobial use and evaluating the outcomes of stewardship efforts are vital for identifying areas of improvement. For instance, tracking whether diagnostic criteria are correctly applied and if appropriate antimicrobials are prescribed ensures adherence to guidelines. The Centers for Disease Control and Prevention (CDC) has developed the Antibiotic Use (AU) module within the National Healthcare Safety Network (NHSN) to support automated data collection and analysis of therapy duration and antibiotic use in specific patient care settings [12]. Tracking intervention outcomes also provides insights into the effectiveness of stewardship initiatives, enabling the optimization of antimicrobial use.

Education

Continuous education for prescribers about antibiotic resistance, prescribing practices, and infectious disease management is critical for promoting optimal antimicrobial use. Educational strategies, such as didactic presentations and electronic messaging, have shown effectiveness, particularly when paired with corresponding stewardship interventions and outcomes measurements.

Issues of Concern

The evolving spectrum of infectious diseases presents significant challenges, including the emergence of highly virulent, resistant pathogens that increase morbidity, mortality, and healthcare costs. It is projected that antimicrobial resistance (AMR) could lead to ten million deaths annually by 2050 [13]. The CDC's 2019 Antibiotic Resistance Threat Report highlighted the severity of the issue, reporting over 2.8 million antibiotic-resistant infections annually in the United States, resulting in more than 35,000 deaths. Additionally, 223,900 cases of *C. difficile* were recorded in 2017, leading to 12,800 fatalities. The report categorizes threats into four tiers based on their impact on human health [14].

Urgent Threats: Carbapenem-resistant *Acinetobacter baumannii*, *Candida auris*, *C. difficile*, carbapenem-resistant Enterobacteriaceae, and drug-resistant *Neisseria gonorrhoeae*.

Serious Threats: Drug-resistant *Campylobacter*, *Candida*, extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae, vancomycin-resistant enterococci (VRE), multidrug-resistant *Pseudomonas aeruginosa*, drug-resistant *Salmonella*, and others.

Concerning Threats: Erythromycin-resistant group A streptococcus and clindamycin-resistant group B streptococcus.

Watch List: Includes azole-resistant *Aspergillus fumigatus*, drug-resistant *Mycoplasma genitalium*, and *Bordetella pertussis*. Similarly, the World Health Organization (WHO) has categorized priority pathogens into three tiers: critical, high, and medium, with a special emphasis on multidrug-resistant tuberculosis [15][16].

Clinical Significance

Antibiotics have revolutionized healthcare, enabled the treatment of life-threatening infections and facilitated advances such as organ transplants and chemotherapy. Timely antimicrobial initiation, especially in sepsis cases, has substantially reduced morbidity and mortality. However, approximately 30% of antibiotics prescribed in hospitals are unnecessary or inappropriate. Antimicrobials differ from other medications because emerging resistance diminishes their effectiveness over time. Unlike other drugs that remain static, antibiotics require continuous innovation. Adverse effects, such as *C. difficile*-associated complications, highlight the risks to patient health, even among those not directly exposed to antibiotics.

Severe adverse reactions, including renal and bone marrow toxicity, are common in hospitalized patients [17][18]. A retrospective study by Baggs et al. linked broad-spectrum antibiotic use to a 50% increased risk of hospital readmission within 90 days post-sepsis treatment. Additionally, Roberts et al. estimated the cost of treating AMR infections to range between $18,000 and $29,000 per patient, with prolonged hospital stays and increased mortality [19].

Stewardship Program Outcomes

The overarching goal of antimicrobial stewardship is to enhance patient care while reducing unnecessary antibiotic use and associated costs. Stewardship programs have demonstrated numerous benefits, including reduced *C. difficile* incidence, improved infection cure rates, decreased mortality, and cost savings. A meta-analysis by Davey et al. confirmed that interventions targeting excessive antibiotic use can reduce AMR and nosocomial infections, while those promoting guideline-adherent prescribing improve clinical outcomes. According to the CDC's 2019 report, deaths attributed to AMR declined by 18% overall and by 28% among hospitalized patients compared to 2013. Notable reductions were observed in VRE (41%), carbapenem-resistant *Acinetobacter* (33%), multidrug-resistant *Pseudomonas aeruginosa* (29%), *Candida* (25%), and MRSA (21%). However, the report also noted concerning increases in erythromycin-resistant invasive group A streptococcus (315%), drug-resistant gonorrhea (124%), and ESBL-producing Enterobacteriaceae (50%) [14]. The 2018 CDC outpatient antibiotic prescription report revealed that 249.8 million antibiotic prescriptions were dispensed in the U.S., equating to 763 prescriptions per 1,000 people. Dermatologists were the highest prescribers, followed by physician assistants, nurse practitioners, and emergency medicine practitioners. The overuse and misuse of antibiotics, coupled with increasing resistance and limited options, necessitate urgent action to optimize antimicrobial use.

Other Issues

Antibiotic resistance represents a significant global health challenge, exacerbated by contributions from both the human population and the food industry, including food animals. Animals harbor bacteria in their gastrointestinal tract, which can encompass antibiotic-resistant strains. Human exposure to resistant bacteria may occur through handling or consuming contaminated meat or food, contact with animal waste, or inadequate hygiene after interacting with animals. Antibiotics are extensively utilized in livestock farming for therapeutic purposes and are also employed at subtherapeutic levels to promote growth and productivity. According to the World Health Organization (WHO), antimicrobial use in livestock can be categorized into three main practices [20]:

1. **Therapeutic Use:** This involves treating animals clinically diagnosed with infections. For example, the United States Department of Agriculture (USDA) reported that in 2014, approximately one-fourth of dairy cows were diagnosed with clinical mastitis, and 87% of these cases were treated primarily with cephalosporins.

2. **Disease Prevention:** Antibiotics are administered to healthy animals considered at risk of infection or as a preventive measure before disease onset.

3. **Growth Promotion:** Subtherapeutic doses of antibiotics are used to enhance weight gain or improve feed efficiency. Theories explaining this practice include altering gut microbiota, reducing competition for nutrients, and improving nutrient absorption, particularly in overcrowded livestock environments.

Research by Boeckel et al. highlighted that global livestock antibiotic consumption was 63,151 tons in 2010, with a projected 67% increase by 2030. In the United States, 65% of medically important antibiotics are used in food animals, while humans account for 35%. Medically important antibiotics, commonly utilized for human treatments, are increasingly found in animal-derived products such as meat, milk, and eggs, leading to antibiotic residues that pose health risks. These residues contribute to the emergence of resistant bacterial strains, therapeutic failures, and the proliferation of antibiotic-resistant pathogens, including *E. coli*, *Campylobacter*, *Enterococci*, and *Salmonella*. These pathogens, linked to food-borne illnesses, account for 600 million cases and 420,000 deaths annually [21][22]. The U.S. Food and Drug Administration's 2019

report revealed that over 6.1 kilograms of medically important antibiotics were sold and distributed to American farmers. Usage statistics indicated that cattle and swine accounted for the majority (41% and 42%, respectively), followed by turkeys (10%) and chickens (3%). Tetracyclines (67%) were the most widely used antibiotics, followed by penicillin (12%) and macrolides (8%). Notably, sales increased by 4% from 2018.

In response to the growing crisis, the Centers for Disease Control and Prevention (CDC) established the One Health initiative in 2009. This multisectoral, transdisciplinary approach aims to optimize health outcomes by acknowledging the interconnectedness of people, animals, and the environment. One Health advocates stringent restrictions on the use of medically important antibiotics in livestock, particularly for disease prevention and growth promotion [20][21].

Opportunities for antimicrobial stewardship exist on farms, encompassing a range of measures [20]:

- Farmers should eliminate routine antibiotic use for growth promotion and disease prevention, opting for non-antibiotic strategies.
- Grocers and restaurants can prioritize sourcing antibiotic-free meat and establish clear labeling standards.
- Medical and veterinary professionals should educate communities about antibiotic resistance, collect prescription data, and set stewardship standards.
- Consumers can support establishments committed to antimicrobial stewardship.
- Federal and local governments must enhance surveillance of antibiotic sales and use, implement dosing guidelines, and regulate therapeutic practices in the livestock industry.

Enhancing Healthcare Team Outcomes

The Agency for Healthcare Research and Quality (AHRQ) provides resources for antimicrobial stewardship, emphasizing best practices across healthcare settings. One prominent tool for prescribers is the "Four Moments of Antibiotic Decision Making" [23]:

1. **Moment 1:** Assess whether the patient has an infection that necessitates antibiotic treatment. Prescribers often order antibiotics based on abnormal clinical signs or lab results, such as isolated fever or leukocytosis. This moment encourages clinicians to pause, critically evaluate the likelihood of infection, and avoid unnecessary antibiotic use. The COVID-19 pandemic serves as a pertinent example of antibiotic overuse in non-bacterial infections.

2. **Moment 2:** Identify appropriate cultures and the best empirical treatment. Obtaining culture data before administering antibiotics is essential, though clinicians may default to prolonged broad-spectrum therapies when specific data is unavailable. Localized antibiotic guidelines can help streamline empirical treatment decisions, such as avoiding IV vancomycin for low-risk *MRSA* urinary tract infections.

3. **Moment 3:** Reassess the antibiotic regimen after initial administration, determining whether to stop, narrow, or transition therapy from intravenous to oral. For instance, patients with community-acquired pneumonia often stabilize by day three, providing an opportunity to switch to oral antibiotics. Antibiotic "time-outs," facilitated by nurses, pharmacists, and IT systems, can aid in this process by incorporating prompts into electronic health records.

4. **Moment 4:** Determine the appropriate duration of antibiotic therapy. Emerging studies advocate for shorter treatment durations than previously prescribed. Adherence to local and national guidelines can standardize therapy durations.

Antimicrobial stewardship requires coordinated efforts among interprofessional teams, including clinicians, nurses, pharmacists, microbiologists, infection prevention specialists, and patient safety experts. Multidisciplinary interventions and clearly defined goals significantly improve clinical and economic outcomes, advancing public health and combating antibiotic resistance.

Nursing, Allied Health, and Interprofessional Team Interventions

The effectiveness of antimicrobial stewardship programs is intricately linked to the core components outlined by the Centers for Disease Control and Prevention (CDC). These programs are significantly bolstered by effective interdepartmental communication and collaboration among various healthcare teams, whose contributions are essential for optimal antibiotic stewardship. Clinicians are critical stakeholders as they are involved in prescribing antibiotics at various stages of patient care. To ensure effective antimicrobial stewardship, clinicians must actively engage in optimizing antibiotic use. Hospitalists and primary care physicians, in particular, play a pivotal role as they constitute the majority of antibiotic prescribers. Clinicians can enhance stewardship practices by adhering to the five "D"s: selecting the right Drug, determining the correct Dose, choosing the appropriate Drug-route, ensuring a suitable Duration of therapy, and timely De-escalation to pathogen-specific treatment. Specific actions may include making accurate diagnoses, following institutional antimicrobial guidelines, and regularly reviewing the necessity of ongoing therapy [4].

Pharmacists, as part of the pharmacy and therapeutics committees, are integral to the development and implementation of policies that improve antibiotic use. They contribute by integrating stewardship into order sets and educating patients about their medications. Additionally, pharmacists provide valuable support to prescribers during the decision-making process regarding antibiotic selection and dosing [10]. Nurses are indispensable to the success of antimicrobial stewardship through their roles in diagnostic stewardship and patient education. They are instrumental in triaging patients for isolation, ensuring the timely collection of culture samples prior to antibiotic administration, and educating patients on appropriate antimicrobial use upon discharge [4]. Microbiology laboratory staff play a significant role in diagnostic stewardship by ensuring the proper utilization of diagnostic tests and contributing to the creation of local antibiograms. These resources help clinicians make informed decisions regarding antimicrobial prescriptions.

Infection prevention teams and epidemiologists are responsible for monitoring, analyzing, and reporting trends related to antimicrobial resistance and adverse drug reactions. Meanwhile, quality improvement and patient safety teams advocate for the allocation of resources to support stewardship initiatives. Information technology (IT) personnel are crucial to the operational success of antimicrobial stewardship programs. They contribute by developing electronic health record prompts to review antimicrobial prescriptions, incorporating order sets, and facilitating protocol implementation within electronic systems. At the individual level, patients also have a role to play in antimicrobial stewardship. Responsible use of prescribed antibiotics, avoiding the use of leftover medications, and adhering to prescribed regimens are critical behaviors. Similarly, producers and farmers can support stewardship by refraining from using antibiotics as growth promoters within the community.

Nursing, Allied Health, and Interprofessional Team Monitoring

In the United States, approximately 15% of hospitalized patients report a penicillin allergy, although fewer than 1% experience severe allergic reactions to the drug [24]. It is essential not to rely solely on the documentation in electronic medical records (EMRs) regarding antibiotic allergies. Healthcare providers must reassess the details of the reported allergic event directly with the patient to differentiate between genuine allergic reactions and non-immunologic side effects. Research indicates that up to 50% of documented antibiotic allergies are either non-immunologic reactions or misclassified adverse effects. The mislabeling of antibiotic allergies often results in the substitution of alternative drug classes, which can lead to the increased use of broad-spectrum antimicrobials. This inappropriate use has several adverse consequences, including limited therapeutic options, higher toxicity, elevated hospital costs, and prolonged hospital stays. A study by Charneski et al. involving 11,872 inpatients found that 11.2% of patients with antimicrobial allergy labels experienced extended hospital stays, greater antimicrobial use, higher intensive care unit admissions, elevated readmission rates, and increased mortality [24][25]. To address this issue, a comprehensive evaluation involving detailed patient history, physical examination, skin testing, and challenge dosing can help clarify true allergies. Nurses play an essential role in evaluating and documenting

drug allergies accurately, while pharmacists contribute by updating patients' EMRs with precise medication lists and identifying potential drug interactions [26].

Conclusion:

The escalating threat of antimicrobial resistance (AMR) necessitates urgent and sustained global action. This article underscores the pivotal role of antimicrobial stewardship (AMS) in mitigating the risks associated with AMR, a crisis that threatens the efficacy of antibiotics crucial for treating infections and supporting medical advancements such as organ transplants and cancer chemotherapy. AMS programs are fundamental to optimizing antibiotic use, ensuring effective treatments while minimizing adverse effects and the emergence of resistant strains. Key findings from AMS implementation highlight its substantial benefits, including reductions in inappropriate antibiotic prescriptions, improved infection cure rates, decreased incidence of healthcare-associated infections, and significant cost savings. Evidence-based interventions, such as pre-authorization policies, targeted audits, and syndrome-specific treatment protocols, have demonstrated success in various healthcare settings. Educational initiatives complement these efforts by fostering awareness and behavioral changes among healthcare professionals, patients, and the public. The collaborative involvement of pharmacists, nurses, and epidemiologists is critical to the success of AMS programs. Pharmacists, for instance, contribute by optimizing antibiotic dosages and identifying potential drug interactions, while nurses play a vital role in patient education and adherence to treatment protocols. Epidemiologists enhance AMS efforts by analyzing resistance patterns and guiding data-driven decision-making. Despite these advancements, significant challenges remain. The slow pace of new antibiotic development, coupled with the high costs and risks associated with drug innovation, underscores the importance of conserving existing antimicrobial resources. Additionally, the integration of AMS principles into the animal and agricultural sectors is essential to achieving a comprehensive approach to AMR mitigation. In conclusion, antimicrobial stewardship is not merely a healthcare initiative but a global imperative. Strengthening AMS programs through leadership, accountability, and continuous monitoring will ensure the sustained efficacy of antibiotics, protect public health, and secure the future of modern medicine. Robust international collaboration and adherence to AMS principles across sectors are indispensable for overcoming the challenges posed by AMR.

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الملخص:

الخلفية :يشكّل ظهور مقاومة مضادات الميكروبات **(AMR)** أزمة صحية عالمية كبيرة، حيث يقوّض فعالية المضادات الحيوية الضرورية للتحكم في العدوى، وعلاج السرطان، والإجراءات الجراحية المتقدمة. ورغم التقدم السابق في تطوير المضادات الحيوية، إلا أن التقدم في هذا المجال تباطأ، مما يبرز الحاجة الملحة إلى الإشراف على المضادات الحيوية.(AMS)

الهدف :تستكشف هذه المقالة أهمية الإشراف على المضادات الحيوية في التخفيف من مقاومة مضادات الميكروبات وتبرز أدوار الصيادلة ومهني التمريض وعلم الأوبئة في هذا المجال.

الطرق :تم إجراء مراجعة شاملة لأطر الإشراف على المضادات الحيوية والاستراتيجيات والتدخلات، مع التركيز على العناصر الأساسية للبرامج مثل القيادة، والمساءلة، والتعليم، والإجراءات المستهدفة. كما تم تقييم المقاييس الرئيسية مثل استخدام المضادات الحيوية وأنماط المقاومة لتحديد فعالية الإشراف.

النتائج :كانت برامج الإشراف على المضادات الحيوية فعّالة في تقليل الاستخدام غير المناسب للمضادات الحيوية، وتحسين نتائج المرضى، والحد من مقاومة مضادات الميكروبات. يلعب الممارسون الصحيون دورًا محوريًا في هذه المبادرات من خلال تنفيذ استراتيجيات مثل الموافقات المسبقة، والمراجعات الاستباقية، والبروتوكولات العلاجية المصممة خصيصًا. تظهر البيانات من منظمات مثل مركز السيطرة على الأمراض (CDC) تأثير برامج الإشراف على تقليل العدوى المقاومة للمضادات الحيوية والوفيات المرتبطة بها بشكل كبير.

الخاتمة :يُعد الإشراف على المضادات الحيوية أمرًا ضروريًا للحفاظ على فعالية المضادات الحيوية، وتقليل تكاليف الرعاية الصحية، ومكافحة مقاومة مضادات الميكروبات. يعتمد النجاح على التعاون متعدد التخصصات، والتعليم المستمر، والقيادة القوية. إن تعزيز مبادرات الإشراف على المضادات الحيوية عبر قطاعات الرعاية الصحية والزراعة أمرٌ حيوي لحماية الصحة العالمية.

الكلمات المفتاحية :الإشراف على المضادات الحيوية، مقاومة مضادات الميكروبات، الصيادلة، التمريض، علم الأوبئة، الرعاية الصحية، المضادات الحيوية، الصحة العامة.