

Review article

Preserving Our Last Line of Defense: A Deep Dive into Antibiotic Stewardship in Bangladesh

Rokya Sharmin Huda Fariha,¹ Nur Mohammad Khan²

Abstract

Antibiotic resistance (AMR) has emerged as a critical global health threat, particularly in low- and middle-income countries (LMICs) like Bangladesh, where the misuse and over-prescription of antibiotics have exacerbated this issue. Widespread AMR has led to treatment failures, prolonged hospital stays, and increased healthcare costs. In response, antibiotic stewardship programs (ASPs) have been implemented in Bangladesh to promote the appropriate use of antibiotics, improve patient outcomes, and curb the growing threat of AMR. This review examines the current status of ASPs in Bangladesh, exploring their objectives, implementation strategies, key stakeholders, and challenges. Despite the establishment of ASP initiatives, significant limitations persist, such as inadequate resources, insufficient training for healthcare providers, and a lack of public awareness regarding antibiotic misuse. Moreover, the healthcare infrastructure—particularly in rural areas—is often insufficient to support effective stewardship practices. These challenges are compounded by socio-economic barriers, including poverty and limited access to healthcare, which further hinder the adoption of ASPs in rural and underserved regions. The article provides data on current AMR trends in Bangladesh, including resistance rates for common pathogens, hospital data on treatment failures, and the economic burden of AMR on the healthcare system. These statistics underscore the urgency of addressing the issue. Additionally, the review highlights case studies that illustrate the complexities faced by healthcare professionals and institutions in implementing ASPs, as well as the unintended consequences of antimicrobial use, such as the emergence of new resistance patterns. While antibiotic stewardship programs have made some progress, there are notable gaps in their effectiveness, particularly in rural areas where healthcare resources are scarce. These areas face unique challenges, such as a lack of trained personnel and poor access to diagnostic tools. The article proposes several strategies to enhance ASPs, including the integration of digital technologies for better monitoring and reporting of antibiotic use, as well as targeted community engagement to raise awareness and promote responsible antibiotic use. In conclusion, this review emphasizes the need for a balanced approach to antibiotic stewardship—one that not only addresses AMR but also ensures the overall health and safety of patients. By fostering collaboration among healthcare providers, policymakers, and the public, Bangladesh can strengthen its ASPs and make meaningful progress in combating antibiotic resistance. This article provides actionable recommendations for enhancing antibiotic stewardship and closing existing gaps in the response to AMR, ensuring a more sustainable and effective approach to safeguarding public health in Bangladesh.

Keywords: Antibiotic stewardship programs (ASPs), Antimicrobial resistance (AMR), Antibiotics.

Introduction

Antibiotic resistance (AR) is emerging as one of the most critical public health challenges worldwide, with significant

implications for global healthcare systems.¹ It threatens to reverse decades of medical progress, leading to increased morbidity and mortality, higher healthcare costs, and the

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Address of correspondence: Dr. Rokya Sharmin Huda Fariha, Lecturer, Department of Microbiology, Bashundhara Ad-din Medical College, Dhaka. Email: sharmin.fariha111@gmail.com

1. Dr. Rokya Sharmin Huda Fariha, Lecturer, Department of Microbiology, Bashundhara Ad-din Medical College, Dhaka

2. Dr. Nur Mohammad Khan, Assistant Professor, Department of Microbiology, Bashundhara Ad-din Medical College, Dhaka

possibility of returning to a pre-antibiotic era where simple infections could again become life-threatening.² The rise of resistant pathogens is primarily driven by the misuse and overuse of antibiotics in both human medicine and agriculture, a trend that is especially pronounced in low- and middle-income countries like Bangladesh.³ In Bangladesh, the burden of AR is exacerbated by a range of factors, including limited healthcare access, inadequate regulatory frameworks, and insufficient public awareness regarding the appropriate use of antibiotics.⁴ Reports show that many healthcare providers prescribe antibiotics without proper diagnosis, contributing to unnecessary exposure and accelerating the development of resistance.⁵ The situation is further complicated by the widespread availability of antibiotics over the counter, allowing patients to self-medicate without professional oversight.⁶ As a result, Bangladesh is facing an alarming increase in antibiotic-resistant infections, which not only complicate treatment but also drive up healthcare costs.⁷ Antibiotic stewardship programs (ASPs) are essential tools in curbing the spread of antibiotic resistance.⁸ These programs typically include strategies for appropriate antibiotic prescribing, training for healthcare providers, and monitoring of antibiotic use and resistance patterns.⁹ In countries like Bangladesh, where healthcare resources are limited and the burden of AR is high, ASPs are crucial in ensuring the continued effectiveness of antibiotics for future generations.¹⁰ By promoting rational antibiotic use, these programs can improve clinical outcomes, reduce healthcare costs, and enhance patient safety.¹¹ These gaps include limited evidence on the full scope of AR in Bangladesh, insufficient exploration of socioeconomic and cultural factors that drive antibiotic misuse, and a lack of comparative studies across different regions or healthcare settings within the country.¹²

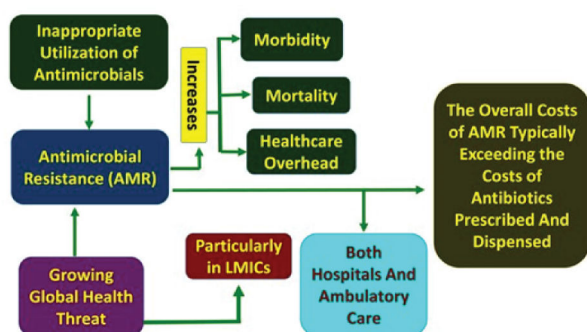


Figure 1 : Cycle of Causes of Antibiotic Resistance: Interconnected Factors and Consequences¹³

Additionally, the role of antibiotics in agriculture remains under-researched, and there is a need for clearer identification of key stakeholders and their roles in implementing ASPs. Policy and regulatory gaps, coupled with infrastructure challenges, further hinder the effective implementation of stewardship programs.¹⁴ Public and

healthcare provider awareness is also limited, and the potential for technological and innovative solutions to enhance ASPs has not been fully explored.¹⁵ This review aims to provide a comprehensive overview of the current state of antibiotic stewardship in Bangladesh, highlighting the challenges and proposing recommendations to strengthen these efforts, ultimately safeguarding public health and curbing the growing threat of antibiotic resistance.

Overview of Antibiotic Stewardship Programs in Bangladesh

Antibiotic Stewardship Programs (ASPs) are coordinated interventions designed to improve and measure the appropriate use of antibiotics, thereby enhancing patient outcomes, reducing adverse effects, and decreasing the emergence of antibiotic-resistant bacteria.¹⁶ In the context of Bangladesh, where the burden of antibiotic resistance is particularly acute, the establishment of effective ASPs has become critical to preserving the efficacy of existing antibiotics and ensuring public health safety.¹⁷

The primary objectives of ASPs in Bangladesh include:

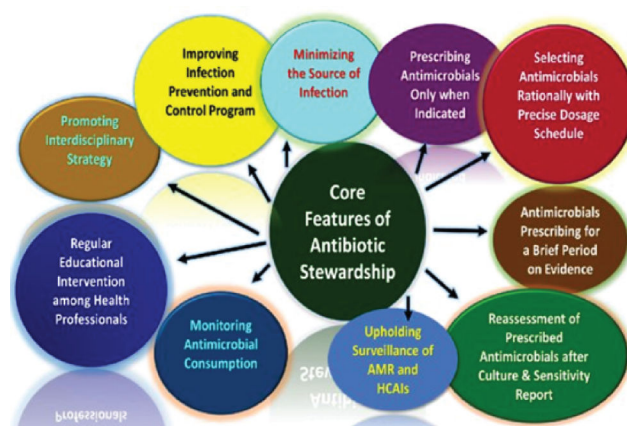


Figure 2 :Overview of an Antibiotic Stewardship Program: Key Components and Strategies¹⁸

Optimizing antibiotic use involves ensuring that antibiotics are prescribed only when necessary and that the correct drug, dose, route, and duration are selected, guided by evidence-based guidelines.¹⁹ By promoting rational antibiotic use, stewardship programs aim to minimize selection pressure and the spread of resistant bacteria.²⁰ These programs also focus on improving patient outcomes by facilitating timely and effective treatment of infections, thereby reducing the rates of treatment failure and complications. Additionally, educating healthcare professionals and the public is crucial for raising awareness about antibiotic resistance and emphasizing the importance of appropriate antibiotic use among both providers and the general population.²¹

Monitoring and Surveillance

Effective ASPs incorporate mechanisms for monitoring antibiotic use and resistance patterns, allowing for data-driven decision-making and adjustments to stewardship strategies in Bangladesh, the implementation of these objectives is particularly challenging due to a variety of factors, including inadequate healthcare infrastructure, a lack of regulation in the pharmaceutical sector, and widespread self-medication practices.²²

Key Stakeholders and Initiatives

The successful implementation of ASPs in Bangladesh requires collaboration among various stakeholders, including government bodies, healthcare institutions, professional organizations, and international agencies. Below are some of the key stakeholders involved in antibiotic stewardship in Bangladesh.²³

Government Agencies

The Ministry of Health and Family Welfare (MoHFW) is the primary governmental body responsible for public health in Bangladesh. It has initiated several policies aimed at combating antibiotic resistance and promoting ASPs, such as the National Policy for Antimicrobial Resistance Control.²⁴

Healthcare Institutions

Hospitals and healthcare facilities play a crucial role in implementing ASPs. Many institutions in urban areas have begun to establish their own stewardship programs, focusing on education, guidelines for antibiotic use, and monitoring practices. The involvement of both public and private healthcare sectors is vital for a comprehensive approach.²⁵

Academic Institutions

Universities and research institutions contribute to ASPs through research, education, and training programs. They play a key role in developing evidence-based guidelines and conducting studies on antibiotic use and resistance in the country.²⁷

International Organizations

Global health agencies, including the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), have been instrumental in providing technical support and resources for the development and implementation of ASPs in Bangladesh (WHO, 2015).

Pharmaceutical Companies

While pharmaceutical companies can be a source of antibiotic overuse, they can also play a role in ASPs by engaging in responsible marketing practices and supporting education initiatives aimed at both healthcare providers and the public.²⁸

Non-Governmental Organizations (NGOs)

Various NGOs are active in promoting public health initiatives, including antibiotic stewardship. They often engage in awareness campaigns to educate the public about the risks of antibiotic misuse and the importance of adhering to prescribed treatments.²⁹

Initiatives and Programs

Several initiatives aimed at promoting antibiotic stewardship have been launched in Bangladesh, reflecting a growing recognition of the issue of antibiotic resistance. Key initiatives include:

National Action Plan on Antimicrobial Resistance

Launched in 2017, this plan outlines a comprehensive strategy for combating antibiotic resistance in Bangladesh. It includes specific objectives related to the surveillance of antibiotic use and resistance, improving infection prevention and control, and raising awareness among healthcare professionals and the public (MoHFW, 2017).

Initiatives and Programs

Several initiatives aimed at promoting antibiotic stewardship have been launched in Bangladesh, reflecting a growing recognition of the issue of antibiotic resistance. Key initiatives include:

The Bangladesh Antimicrobial Resistance Surveillance (BARS)

This initiative aims to establish a national surveillance system for monitoring antibiotic use and resistance patterns. By collecting and analyzing data from various healthcare facilities, BARS seeks to inform policy decisions and improve stewardship efforts.³⁰

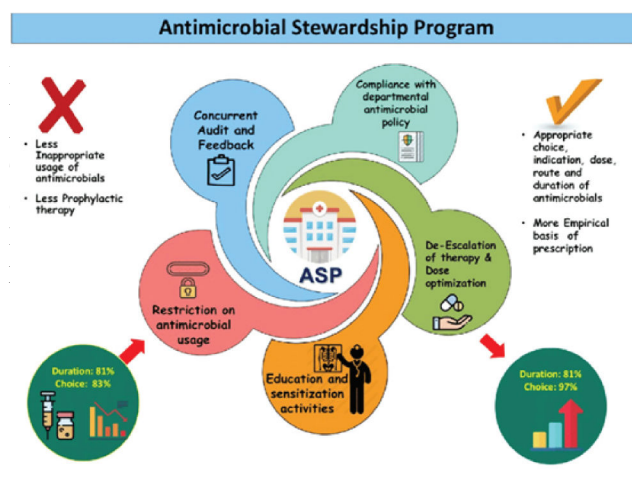


Figure 3 :Strategies for Effective Antibiotic Stewardship: Best Practices and Approaches¹³

Public Awareness Campaigns

Efforts to educate the public about antibiotic resistance and the importance of appropriate antibiotic use have been undertaken by both governmental and non-governmental organizations. These campaigns aim to change public perceptions and behaviors regarding antibiotic use, particularly self-medication practices.³²

Collaboration with International Organizations

Bangladesh has engaged with global health organizations to implement best practices in antibiotic stewardship. Collaborations with the WHO and CDC have provided valuable resources and guidelines that have been adapted to the local context (WHO, 2015).

Research Initiatives

Academic institutions are increasingly focusing on research related to antibiotic use and resistance in Bangladesh. This research informs local guidelines and contributes to the global understanding of resistance patterns, thereby supporting evidence-based stewardship efforts.³³

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Current Status of Antibiotic Stewardship in Bangladesh

Antibiotic stewardship programs (ASPs) are gaining traction in Bangladesh as a vital strategy to combat the growing threat of antibiotic resistance.³⁴ Despite facing numerous challenges, the country is making strides in implementing these programs across various healthcare settings.³⁵ This section examines the current status of antibiotic stewardship in Bangladesh, focusing on the implementation of ASPs in healthcare settings, government policies and guidelines, and the role of educational institutions.³⁶

Implementation in Healthcare Settings

The implementation of ASPs in healthcare settings across Bangladesh is still in its nascent stages, but progress is being made, particularly in urban hospitals and medical centers. Many institutions are recognizing the need for systematic approaches to improve antibiotic prescribing practices and enhance patient care.³⁷

Hospital Initiatives

Major hospitals in Dhaka and other urban areas have initiated ASPs that focus on training healthcare providers, establishing guidelines for antibiotic use, and monitoring antibiotic prescriptions. For instance, several tertiary care

hospitals have developed protocols that require justification for antibiotic prescriptions, particularly for broad-spectrum agents.³⁸

Multidisciplinary Teams

Successful ASPs typically involve the formation of multidisciplinary teams comprising infectious disease specialists, pharmacists, microbiologists, and clinical staff. These teams collaborate to assess antibiotic use, provide feedback to prescribers, and educate healthcare staff on best practices. Some hospitals have begun to adopt this team-based approach, facilitating a culture of stewardship within their institutions.³⁹

Monitoring and Surveillance

Effective ASPs rely on robust monitoring and surveillance systems to track antibiotic prescribing patterns and resistance trends. Some healthcare facilities in Bangladesh are now implementing surveillance programs that collect data on antibiotic use and resistance, enabling data-driven decision-making. However, these initiatives are often limited by insufficient infrastructure and resources.⁴⁰

Challenges in Rural Areas

While urban hospitals are making progress, rural healthcare facilities face significant challenges in implementing ASPs. Limited access to healthcare professionals, lack of resources, and a high prevalence of self-medication hinder effective stewardship in these regions. Addressing these disparities is crucial for the nationwide success of ASPs.⁴¹

Government Policies and Guidelines

The Bangladesh government has recognized antibiotic resistance as a critical public health issue and has initiated several policies aimed at promoting antibiotic stewardship.⁴²

National Action Plan

In 2017, the Ministry of Health and Family Welfare (MoHFW) launched a National Action Plan on Antimicrobial Resistance, outlining strategies for surveillance, prevention, and control of antibiotic resistance (MoHFW, 2017). This plan emphasizes the need for comprehensive ASPs across all healthcare settings, including hospitals, clinics, and community pharmacies.

Regulatory Frameworks

The government has also established regulatory measures to control the sale and distribution of antibiotics. These include restrictions on over-the-counter sales and guidelines for appropriate antibiotic prescribing. However, enforcement of these regulations remains a significant challenge, as many pharmacies continue to sell antibiotics without prescriptions.⁴³

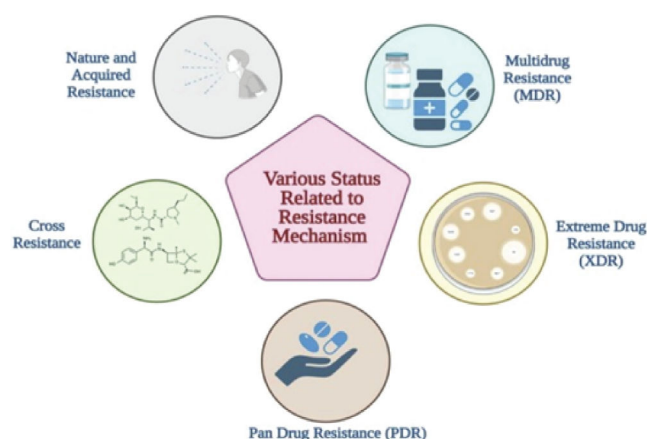


Figure 4: Summary of different statuses associated with antibiotic resistance conditions.

Guidelines for Healthcare Providers

The MoHFW has developed guidelines for healthcare providers to promote rational antibiotic use. These guidelines provide recommendations for appropriate prescribing based on local epidemiology and resistance patterns. However, widespread adherence to these guidelines is still lacking, primarily due to limited awareness and training among healthcare providers.

Public Awareness Campaigns

The government, along with NGOs, has initiated public awareness campaigns aimed at educating the general population about the dangers of antibiotic misuse and the importance of adherence to prescribed treatments. These campaigns play a critical role in reducing self-medication and promoting responsible antibiotic use.⁴⁴

Role of Educational Institutions

Educational institutions are pivotal in the advancement of antibiotic stewardship in Bangladesh. They play a crucial role in training future healthcare professionals and conducting research to inform best practices.⁴⁵

Medical Education

Medical schools in Bangladesh are beginning to incorporate antibiotic stewardship into their curricula. This education aims to equip future healthcare providers with the knowledge and skills necessary to prescribe antibiotics judiciously. Courses on infectious diseases often include modules on antibiotic resistance and stewardship principles.⁴⁶

Continuing Medical Education (CME)

Many professional organizations, such as the Bangladesh Medical Association (BMA) and the Infectious Diseases Society of Bangladesh (IDSb), are organizing CME programs focused on antibiotic stewardship. These programs offer healthcare professionals opportunities to update their knowledge and skills regarding antibiotic use and resistance.⁴⁷

Research Initiatives

Academic institutions are also engaged in research on antibiotic use and resistance patterns in Bangladesh. Studies conducted in collaboration with local and international partners contribute valuable data that inform local guidelines and practices. This research helps identify gaps in antibiotic stewardship and areas for improvement.⁴⁸

Community Engagement

Educational institutions often partner with NGOs to conduct outreach programs aimed at raising awareness about antibiotic resistance in local communities. These initiatives emphasize the importance of proper antibiotic use and the dangers of self-medications.⁴⁹



Figure 5: Building a Successful Antimicrobial Stewardship Program

Complications Associated with Antibiotic Stewardship

Antibiotic stewardship programs (ASPs) are essential for combating antibiotic resistance and improving patient care. However, the implementation of these programs in Bangladesh has led to several complications that impact patient outcomes, resistance patterns, and public compliance. This section explores these challenges in detail.⁵⁰

Impact on Patient Care and Outcomes

One of the primary goals of ASPs is to enhance patient care by ensuring appropriate antibiotic use.⁵¹ However, the transition to stewardship practices can sometimes have unintended negative effects on patient outcomes.⁵² Stringent stewardship protocols can sometimes delay the administration of necessary antibiotics, as providers may need to justify their choices or seek approval, potentially worsening patient conditions and increasing mortality rates, especially in sepsis cases.⁵³ The complexity of clinical guidelines and algorithms associated with ASPs can confuse healthcare providers, particularly in resource-limited settings, leading to difficulties in making timely prescribing decisions.⁵⁴ Resistance to changing established prescribing habits among healthcare providers can hinder effective ASP implementation, as cultural

attitudes towards antibiotic use are often deeply ingrained, making behavior shifts challenging despite educational efforts.⁵⁵ Additionally, changes in prescribing practices may affect patient satisfaction, as patients expecting immediate symptom relief may feel dissatisfied with watchful waiting or delayed antibiotic therapy, which can undermine the patient-provider relationship and treatment adherence.⁵⁶

Resistance Patterns and Their Implications

While the ultimate aim of ASPs is to reduce antibiotic resistance, the transition to stewardship practices can inadvertently influence resistance patterns.⁵⁷ The implementation of Antibiotic Stewardship Programs (ASPs) can lead to increased use of specific antibiotics as alternatives to restricted ones, creating selective pressure that may allow resistant strains of bacteria to thrive.⁵⁸ Additionally, guidelines based on local resistance data can be ineffective in areas with scarce or inconsistent data, leading to inappropriate antibiotic choices that further exacerbate resistance.⁵⁹ The resistance patterns in Bangladesh can have global implications, as local prescribing practices contribute to worldwide resistance trends, complicating international efforts to manage infectious diseases.⁶⁰ As resistance patterns evolve due to suboptimal antibiotic use, the incidence of infections caused by resistant organisms may increase, resulting in longer hospital stays, higher medical costs, and greater mortality, which can strain healthcare resources.⁶¹

Challenges in Public Compliance and Education

Public compliance and education are vital for the success of Antibiotic Stewardship Programs (ASPs) in Bangladesh, yet several challenges hinder effective engagement.⁶² Many individuals remain unaware of the risks associated with antibiotic misuse, with self-medication being common and complicating ASP implementation.⁶³ Cultural beliefs often treat antibiotics as quick fixes for various ailments, creating expectations for their use even when unnecessary, which requires coordinated efforts from healthcare providers and community organizations to change.⁵⁹ Misinformation from unverified sources further contributes to public confusion, highlighting the need for clear, accurate educational initiatives.⁶⁴ Designing effective engagement strategies are challenging, as outreach must consider local contexts and literacy levels to resonate with diverse populations.⁶⁵ Finally, sustained public health campaigns and community engagement are essential for maintaining awareness and adherence to stewardship principles over time.⁴⁴

Case Studies and Examples

Antibiotic stewardship programs (ASPs) in Bangladesh have seen varying levels of success and challenges. By examining specific case studies, we can identify successful implementations and glean valuable lessons from failures.⁶⁶ This section explores notable examples of ASPs in Bangladesh, highlighting both achievements and setbacks.³⁷

Successful Implementations

Dhaka Medical College Hospital (DMCH) Initiative

The DMCH implemented a comprehensive ASP that focused on enhancing antibiotic prescribing practices through educational interventions and the establishment of clinical guidelines. The program involved a multidisciplinary team that included infectious disease specialists and pharmacists. Initial data showed a significant reduction in the prescription of broad-spectrum antibiotics, along with improved patient outcomes, such as decreased length of hospital stays for patients with infections.⁶⁷ This initiative demonstrates the effectiveness of teamwork and education in achieving stewardship goals.⁶⁸

MawlanaBhashani Medical College ASP

Another successful case was at Mawlana Bhashani Medical College, where an ASP was developed focusing on continuous education and feedback mechanisms. The program included training sessions for healthcare staff and the implementation of a real-time monitoring system for antibiotic use.⁶⁹ By utilizing local resistance data, the program effectively adjusted prescribing practices, resulting in a notable decline in resistant infections. The success of this initiative underscores the importance of data-driven approaches and regular staff engagement.⁷⁰

Bangladesh Institute of Tropical and Infectious Diseases (BITID)

BITID launched an ASP that emphasized community outreach alongside hospital-based interventions. The program conducted awareness campaigns about antibiotic resistance and proper usage in nearby communities.⁷¹ The integration of community education not only improved antibiotic stewardship in the hospital but also fostered a culture of responsible antibiotic use among the public. The hospital reported improved compliance with antibiotic guidelines and a significant reduction in self-medication practices within the community. This case illustrates how outreach can amplify the impact of ASPs beyond clinical settings.⁷²

National Action Plan on Antimicrobial Resistance (NAP)

The NAP, established by the Ministry of Health and Family Welfare, represents a national-level commitment to combating antibiotic resistance. Through this initiative, various healthcare facilities across the country received support to implement ASPs tailored to local contexts. Reports indicate that hospitals adopting these guidelines have experienced improvements in antibiotic prescribing and reductions in resistance rates, highlighting the effectiveness of coordinated national strategies (MoHFW, 2017).⁷³

Lessons Learned from Failures

Several Antibiotic Stewardship Programs (ASPs) in

Bangladesh have encountered challenges that provide important lessons for future implementations. One notable failure occurred in a rural hospital lacking adequate resources, where the absence of trained personnel and diagnostic facilities limited the initiative's impact on prescribing practices.³⁷ In urban hospitals, some healthcare providers resisted changing established prescribing habits despite new guidelines, highlighting the need for cultural change and ongoing education.⁷⁴ Additionally, a lack of monitoring systems in a regional hospital meant that providers received no feedback on their prescribing patterns, contributing to ongoing misuse of antibiotics.⁷⁵ A community education pilot aimed at reducing misuse fell short due to low public awareness, underscoring the necessity for tailored public health campaigns.⁷⁶ Fragmentation of efforts among ASPs limited coordination and sharing of best practices, which undermined their overall effectiveness.⁷⁷ Finally, implementing generic guidelines without adapting them to local resistance patterns resulted in continued high rates of resistance, emphasizing the importance of tailoring ASPs to local epidemiological data.⁷²

Future Directions and Recommendations

As antibiotic resistance continues to pose a significant threat to public health in Bangladesh, enhancing antibiotic stewardship programs (ASPs) is crucial for effective management. This section outlines future directions and recommendations, focusing on strategies for improving ASPs, the role of technology and data analytics, and the importance of community engagement.⁵²

Strategies for Enhancing Stewardship Programs

Developing standardized, evidence-based guidelines tailored to local resistance patterns is crucial for promoting uniformity in prescribing practices; collaboration with health organizations can facilitate this.⁷⁸ Continuous education and training for healthcare providers through workshops and online courses enhances knowledge of antibiotic resistance and stewardship principles, addressing misconceptions and emphasizing guideline adherence.⁷⁹ Interdisciplinary collaboration among infectious disease specialists, pharmacists, microbiologists, and nursing staff can improve ASP effectiveness by fostering a culture of stewardship and enhancing guideline adherence through regular case discussions and data reviews.⁸⁰ Implementing regular audits of antibiotic prescribing practices, along with feedback mechanisms, can help hospitals monitor usage and resistance patterns, encouraging improvements and adherence to guidelines.⁸¹ Strengthening regulations on antibiotic sales and prescriptions, including enforcing prescription-only practices and conducting inspections, is essential for ensuring compliance and reducing misuse.⁸²

Role of Technology and Data Analytics

Integrating Antibiotic Stewardship Programs (ASPs) into Electronic Health Records (EHR) can streamline

prescribing by providing alerts and reminders for guidelines, facilitating timely interventions.⁸³ Data analytics for predictive modeling of antibiotic usage and resistance trends offers valuable insights, allowing healthcare providers to anticipate resistant infections and adjust practices, ultimately improving patient outcomes.⁸⁴ Telemedicine and mobile health (mHealth) applications enhance access to healthcare and stewardship education, especially in rural areas, enabling providers to consult specialists and educate patients on responsible antibiotic use.⁸⁵ Robust surveillance systems are essential for monitoring antibiotic resistance in real-time, enabling rapid responses to emerging threats through a national database that integrates data from hospitals and laboratories.⁸⁶

Importance of Community Engagement

Community engagement is crucial for reducing antibiotic misuse and enhancing stewardship efforts. Public awareness campaigns play a key role by educating the population about antibiotic resistance and responsible use, utilizing diverse platforms such as social media and community events.⁸⁷ Involving community health workers can further enhance this engagement, as they serve as trusted sources of information, especially in rural areas where healthcare access is limited.⁸⁸ Collaboration with local organizations, including schools and NGOs, can amplify outreach and facilitate community initiatives that promote responsible antibiotic use while gathering feedback on community needs.⁷⁶ Empowering patients to take an active role in their healthcare are also essential; educating them about their rights regarding prescriptions fosters a culture of accountability.¹⁸ Finally, establishing feedback mechanisms, such as surveys and focus groups, provides valuable insights into public perceptions, allowing strategies to be tailored to meet community needs.⁸⁹

Conclusion

The growing threat of antibiotic resistance in Bangladesh necessitates robust antibiotic stewardship programs (ASPs) to safeguard public health. This review highlights several critical findings. While there have been successful implementations of ASPs in various healthcare settings, challenges such as inadequate resources, resistance to change among healthcare providers, and lack of community awareness hinder their effectiveness. Complications associated with ASPs, including delays in treatment, increased resistance patterns, and public non-compliance, underscore the complexity of managing antibiotic use, emphasizing the need for comprehensive approaches that consider both clinical and community aspects. Successful case studies from institutions like Dhaka Medical College and Mawlana Bhashani Medical College demonstrate the potential for improved prescribing practices through interdisciplinary collaboration, continuous education, and community outreach. Future directions for enhancing ASPs involve standardizing guidelines, utilizing technology and data analytics, and fostering community engagement.

Public awareness campaigns, training for healthcare workers and effective regulatory frameworks are essential for promoting responsible antibiotic use. To effectively combat antibiotic resistance in Bangladesh, a collaborative effort from all stakeholders is crucial. Healthcare providers must commit to adhering to evidence-based guidelines, participating in training programs, and collaborating with interdisciplinary teams to ensure responsible antibiotic prescribing. Government and policymakers should strengthen regulations on antibiotic sales, invest in surveillance systems for monitoring resistance, and support national initiatives that facilitate the implementation of ASPs across healthcare facilities. Educational institutions need to integrate antibiotic stewardship principles into curricula and offer continuing education opportunities for healthcare professionals to stay updated on best practices. Local organizations should engage in public awareness campaigns to educate communities about the dangers of antibiotic misuse and the importance of responsible use. Finally, patients and the general public must be empowered to understand their rights regarding antibiotic prescriptions and encouraged to seek clarity from healthcare providers about their treatment options. By taking collective action and prioritizing antibiotic stewardship, stakeholders can significantly reduce the impact of antibiotic resistance, ultimately safeguarding the health of current and future generations in Bangladesh.

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Conflict of interest

The authors declare that no conflict of interest exists.

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