

COMMUNITY PHARMACY INTERVENTIONS IN ANTIBIOTIC STEWARDSHIP: A NARRATIVE OVERVIEW AND EDUCATIONAL PERSPECTIVES

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Abstract

Antibiotic stewardship is crucial in combating the growing threat of antibiotic resistance. Community pharmacies, being accessible healthcare providers, play a vital role in promoting appropriate antibiotic use. This narrative overview examines various community pharmacy interventions aimed at enhancing antibiotic stewardship and explores their implications for pharmacy education. Through patient education, adherence monitoring, and collaboration with healthcare providers, community pharmacies have demonstrated effectiveness in improving antibiotic use and reducing resistance. However, significant barriers such as limited resources, inadequate training, and lack of awareness persist. This review highlights the need for integrating antibiotic stewardship principles into pharmacy curricula to better prepare future pharmacists. By addressing educational gaps and enhancing training programs, pharmacy education can equip pharmacists with the necessary skills and knowledge to contribute effectively to antibiotic stewardship efforts. The findings underscore the importance of policy support and continued research to optimize the role of community pharmacies in antibiotic stewardship. This article provides a comprehensive overview of the current state of community pharmacy interventions, identifies challenges, and offers recommendations for educational improvements to ensure pharmacists are well-prepared to combat antibiotic resistance in their practice.

Keywords: Antibiotic Stewardship, Community Pharmacy, Pharmacy Interventions, Antibiotic Resistance, Patient Education, Pharmacy Education, Healthcare Collaboration

Introduction

Antibiotic resistance poses a significant threat to global health, with the potential to render common infections untreatable and increase morbidity and mortality rates. The World Health Organization (WHO) has identified antibiotic resistance as one of the top ten global public health threats facing humanity (WHO, 2020). Antibiotic stewardship programs are essential in mitigating this threat by promoting the appropriate use of antibiotics, thereby reducing resistance and preserving the efficacy of these vital medications (CDC, 2019).

Community pharmacies, due to their accessibility and frequent patient interactions, are uniquely positioned to play a crucial role in antibiotic stewardship. These pharmacies serve as critical points of contact for patients seeking medication and healthcare advice, making them ideal settings for implementing stewardship interventions (Jorgenson et al., 2020). By engaging in activities such as patient education, adherence monitoring, and collaboration with other healthcare providers, community pharmacies can significantly contribute to the prudent use of antibiotics (Schwartzberg et al., 2018). Despite the potential impact of community pharmacy interventions, there are notable barriers to their effective implementation. These include limited resources, insufficient training, and a lack of awareness among pharmacists and patients alike (Pollack et al., 2016). Addressing these challenges requires a multifaceted approach, including the integration of antibiotic stewardship principles into pharmacy education.

The purpose of this article is to provide a narrative overview of community pharmacy interventions in antibiotic stewardship and explore the implications for pharmacy education. By reviewing existing literature, this article aims to highlight the effectiveness of these interventions, identify challenges, and offer recommendations for enhancing pharmacy curricula to better prepare future pharmacists. This comprehensive overview seeks to underscore the critical role of community pharmacies in antibiotic stewardship and the importance of educational reforms to support this role.

Literature Review

Antibiotic stewardship refers to coordinated interventions designed to improve and measure the appropriate use of antibiotic agents by promoting the selection of the optimal antibiotic drug regimen, dose, duration of therapy, and route of administration (Dyar et al., 2017). The primary goal of antibiotic stewardship is to achieve the best clinical outcomes related to antibiotic use while minimizing toxicity and other adverse events, thereby reducing the selection of pathogenic organisms and preventing the development of resistance (Baur et al., 2017).

Antibiotic resistance has become a global crisis, with resistance mechanisms emerging in various pathogens, leading to limited treatment options for common infections. According to the WHO, antibiotic resistance could lead to 10 million deaths annually by 2050 if no significant action is taken (WHO, 2015). This crisis underscores the urgent need for effective antibiotic stewardship programs across all healthcare settings, including community pharmacies (Laxminarayan et al., 2013).

Community pharmacies are strategically positioned to impact antibiotic use due to their accessibility and the frequency with which patients consult pharmacists for health advice and medication (Van Hecke et al., 2017). Research has shown that community pharmacists can effectively contribute to antibiotic stewardship by providing patient education on the appropriate use of antibiotics, monitoring adherence to prescribed regimens, and advising on non-antibiotic treatments for viral infections (Schwartzberg et al., 2018). Studies indicate that educational interventions in community pharmacies can significantly reduce inappropriate antibiotic use, thus contributing to the broader goals of antibiotic stewardship programs (Wright et al., 2019).

However, the implementation of antibiotic stewardship interventions in community pharmacies faces several challenges. Limited resources, including time and financial constraints, often hinder pharmacists' ability to engage fully in stewardship activities (Dunne et al., 2020). Additionally, there is often a lack of comprehensive training and continuing education opportunities for pharmacists on the principles and practices of antibiotic stewardship (Pollack et al., 2016). The need for enhanced education and training is crucial, as it equips pharmacists with the necessary knowledge and skills to effectively participate in and advocate for antibiotic stewardship (Dyar et al., 2018).

Educational perspectives on antibiotic stewardship have highlighted significant gaps in current pharmacy curricula. Many pharmacy programs do not adequately cover the principles of antibiotic resistance and stewardship, which limits the preparedness of graduates to engage in these critical activities (Cox et al., 2017). Integrating comprehensive antibiotic stewardship education into pharmacy curricula is essential to prepare future pharmacists for their role in combating antibiotic resistance (Wong et al., 2020). This integration should include both theoretical knowledge and practical skills, such as patient communication strategies and collaboration with other healthcare professionals (Fleming-Dutra et al., 2016).

Addressing these educational gaps requires a concerted effort from academic institutions, professional organizations, and policymakers. By enhancing the focus on antibiotic stewardship in pharmacy education, future pharmacists can be better prepared to contribute to public health efforts aimed at preserving the efficacy of antibiotics (Goff et al., 2017). Continued research and policy support are also needed to facilitate the implementation of effective stewardship programs in community pharmacies and other healthcare settings (Baur et al., 2017).

Methods

This narrative review utilized a comprehensive approach to gather and synthesize existing literature on community pharmacy interventions in antibiotic stewardship and their educational implications. The review was conducted using several electronic databases, including PubMed, Scopus, and Google Scholar, to identify relevant peer-reviewed articles, reviews, and reports published between 2010 and 2020. Search terms included "antibiotic stewardship," "community pharmacy," "pharmacy interventions," "antibiotic resistance," and "pharmacy education."

Inclusion criteria encompassed studies that discussed the role of community pharmacies in antibiotic stewardship, detailed intervention strategies, and provided insights into the effectiveness of these interventions. Studies focusing on the educational aspects of antibiotic stewardship within pharmacy curricula were also included. Articles not written in English, opinion pieces, and those lacking substantial empirical data were excluded from the review.

The selected studies were assessed for quality and relevance, with data extracted on intervention types, outcomes, challenges, and educational recommendations. The extracted data were then thematically analyzed to identify common patterns and insights. This analysis aimed to provide a comprehensive overview of the current state of community pharmacy interventions in antibiotic stewardship and to highlight gaps and opportunities in pharmacy education to better prepare future pharmacists for their role in combating antibiotic resistance.

Results

The review identified a variety of intervention strategies implemented by community pharmacies to promote antibiotic stewardship. These strategies included patient education, adherence monitoring, point-of-care testing, and collaboration with other healthcare providers.

- **Patient Education:** Numerous studies highlighted the effectiveness of community pharmacists in educating patients about the appropriate use of antibiotics. Pharmacists provided information on the difference between bacterial and viral infections, the importance of completing prescribed antibiotic courses, and the dangers of misuse and overuse of antibiotics. These educational interventions were associated with increased patient knowledge and reduced inappropriate antibiotic use (Wright et al., 2019; Schwartzberg et al., 2018).
- **Adherence Monitoring:** Community pharmacies also played a significant role in monitoring patient adherence to antibiotic regimens. Pharmacists utilized follow-up consultations and reminder systems to ensure patients completed their antibiotic courses as prescribed. This intervention was shown to improve adherence rates and treatment outcomes (Jorgenson et al., 2020).
- **Point-of-Care Testing:** Some community pharmacies implemented point-of-care testing to differentiate between bacterial and viral infections. This approach helped reduce unnecessary antibiotic prescriptions by providing immediate diagnostic information. Studies reported a decrease in antibiotic prescriptions when point-of-care testing was employed (Van Hecke et al., 2017).
- **Collaboration with Healthcare Providers:** Collaboration between community pharmacists and other healthcare providers, such as general practitioners and nurses, was found to enhance the effectiveness of antibiotic stewardship programs. These collaborative efforts included shared decision-making, coordinated care plans, and referral systems, leading to more appropriate antibiotic use and better patient outcomes (Schwartzberg et al., 2018).

Despite the positive impact of these interventions, several barriers to effective implementation were identified. Limited resources, such as time and financial constraints, were commonly cited challenges. Additionally, a lack of comprehensive training in antibiotic stewardship for community pharmacists was noted, highlighting the need for improved educational programs (Dunne et al., 2020; Pollack et al., 2016).

The review also revealed significant gaps in pharmacy education regarding antibiotic stewardship. Many pharmacy curricula lacked dedicated courses or modules on this critical topic, limiting the preparedness of graduates to engage in stewardship activities. The integration of antibiotic stewardship principles into pharmacy education was recommended to address these gaps and equip future pharmacists with the necessary knowledge and skills (Cox et al., 2017; Wong et al., 2020).

Overall, the findings underscore the essential role of community pharmacies in antibiotic stewardship and the need for enhanced educational strategies to support this role. Effective interventions in community pharmacies can significantly contribute to the reduction of antibiotic resistance, and well-prepared pharmacists are crucial for the success of these initiatives.

Discussion

The results of this narrative review highlight the critical role community pharmacies can play in antibiotic stewardship. The various intervention strategies—patient education, adherence monitoring, point-of-care testing, and collaboration with healthcare providers—demonstrate the potential impact of community pharmacists in promoting appropriate antibiotic use. These interventions have shown significant effectiveness in reducing inappropriate antibiotic prescriptions and improving patient outcomes, thereby contributing to the broader goals of combating antibiotic resistance.

Community pharmacists' educational efforts have proven particularly effective in increasing patient awareness about the proper use of antibiotics and the risks associated with misuse. This increased awareness has translated into better patient behaviors, such as completing prescribed antibiotic courses and avoiding antibiotics for viral infections, which are critical steps in reducing the development of resistance (Wright et al., 2019). Adherence monitoring and point-of-care testing further support these efforts by ensuring that antibiotics are used appropriately and only when necessary (Van Hecke et al., 2017).

Table 1: Summary of Key Community Pharmacy Interventions in Antibiotic Stewardship

Intervention Type	Description	Key Findings
Patient Education	Educating patients about appropriate antibiotic use and resistance	Increased patient knowledge and reduced inappropriate antibiotic use (Wright et al., 2019; Schwartzberg et al., 2018)
Adherence Monitoring	Follow-up consultations and reminder systems to ensure completion of antibiotic courses	Improved adherence rates and treatment outcomes (Jorgenson et al., 2020)
Point-of-Care Testing	Diagnostic testing to differentiate between bacterial and viral infections	Decreased unnecessary antibiotic prescriptions (Van Hecke et al., 2017)
Healthcare Collaboration	Working with general practitioners and other healthcare providers	Enhanced effectiveness of stewardship programs and better patient outcomes (Schwartzberg et al., 2018)

Despite these successes, the review identified several barriers that hinder the full implementation of antibiotic stewardship programs in community pharmacies. Limited resources, including time constraints and financial limitations, were frequently mentioned as significant obstacles. Community pharmacists often face heavy workloads and may lack the time needed to engage in comprehensive stewardship activities (Dunne et al., 2020). Financial constraints also limit the ability of pharmacies to invest in additional staff training or new technologies such as point-of-care testing.

Table 2: Barriers to Effective Implementation of Antibiotic Stewardship in Community Pharmacies

Barrier	Description	Reference
Limited Resources	Time constraints and financial limitations	Dunne et al., 2020
Insufficient Training	Lack of comprehensive training and continuing education opportunities in antibiotic stewardship	Pollack et al., 2016
Lack of Awareness	Limited awareness among pharmacists and patients regarding antibiotic resistance and stewardship	Pollack et al., 2016

Another major challenge identified is the lack of comprehensive training in antibiotic stewardship within pharmacy education. Many pharmacy programs do not adequately cover the principles of antibiotic resistance and stewardship, leaving graduates unprepared to effectively participate in these initiatives (Cox et al., 2017). This gap in education highlights the need for significant curricular reforms. Integrating antibiotic stewardship into pharmacy education would better equip future pharmacists with the knowledge and skills needed to engage in stewardship activities actively.

To address these educational gaps, pharmacy curricula should include dedicated courses or modules on antibiotic stewardship. These courses should cover the fundamental principles of antibiotic resistance, the importance of appropriate antibiotic use, and practical strategies for implementing stewardship interventions in community pharmacy settings (Wong et al., 2020). Additionally, incorporating hands-on training through simulations or clinical rotations focused on antibiotic stewardship could enhance pharmacists' preparedness to apply these principles in practice.

Policymakers and professional organizations have a crucial role in supporting the integration of antibiotic stewardship into pharmacy education and practice. Providing funding for training programs, developing guidelines for best practices in community pharmacy settings, and encouraging collaborative efforts between pharmacists and other healthcare providers can help overcome some of the identified barriers (Goff et al., 2017).

Future research should focus on evaluating the long-term impact of community pharmacy interventions on antibiotic resistance patterns and patient outcomes. Studies could also explore the effectiveness of different educational approaches in improving pharmacists' knowledge and skills in antibiotic stewardship. Additionally, investigating innovative models of collaboration between community pharmacists and other healthcare professionals could further enhance the effectiveness of stewardship programs.

community pharmacies are well-positioned to contribute significantly to antibiotic stewardship efforts. By addressing the identified barriers and enhancing pharmacy education, the potential of community pharmacists in combating antibiotic resistance can be fully realized. This review underscores the importance of comprehensive educational reforms and policy support to ensure that community pharmacists are prepared to play a pivotal role in antibiotic stewardship.

Conclusion

This narrative review underscores the pivotal role community pharmacies can play in antibiotic stewardship. Through interventions such as patient education, adherence monitoring, point-of-care testing, and collaboration with healthcare providers, community pharmacists have demonstrated significant potential in promoting appropriate antibiotic use and combating antibiotic resistance. These efforts contribute not only to individual patient outcomes but also to the broader public health goal of preserving the efficacy of antibiotics.

Despite the evident success of these interventions, significant barriers persist, including limited resources, insufficient training, and a lack of awareness among both pharmacists and patients. Addressing these challenges is crucial for maximizing the impact of community pharmacy-based antibiotic stewardship programs. The review also highlights substantial gaps in current pharmacy education, emphasizing the need for integrating comprehensive antibiotic stewardship training into pharmacy curricula.

Educational reforms are essential to equip future pharmacists with the necessary knowledge and skills to actively participate in antibiotic stewardship. By enhancing educational strategies, pharmacy programs can better prepare graduates to engage in and advocate for appropriate antibiotic use. This preparation includes understanding the principles

of antibiotic resistance, developing effective patient communication techniques, and fostering collaborative practices with other healthcare professionals.

Policy support and continued research are vital to overcoming the barriers identified and optimizing the role of community pharmacies in antibiotic stewardship. Policymakers should consider funding training programs, developing best practice guidelines, and encouraging interprofessional collaboration to support these efforts. Future research should focus on evaluating the long-term impact of community pharmacy interventions on antibiotic resistance patterns and exploring innovative educational approaches.

In conclusion, community pharmacies are uniquely positioned to contribute significantly to antibiotic stewardship efforts. By addressing resource limitations, enhancing educational curricula, and fostering supportive policies, the potential of community pharmacists in combating antibiotic resistance can be fully realized. This comprehensive approach will ensure that community pharmacists are well-prepared to play a pivotal role in safeguarding public health through effective antibiotic stewardship.

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