



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Research Article

**CHALLENGES IN IMPLEMENTATION OF ANTIMICROBIAL
STEWARDSHIP PROGRAMS IN SAUDI HOSPITALS**

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Article Received: December 2022 **Accepted:** December 2022 **Published:** December 2022**Abstract:**

Rising AMR rates, widespread antibiotic abuse, and concerns about the development of resistance to life-saving antibiotics have all been reported by Saudi hospitals in recent years. Appropriate antimicrobial use must be reduced, and so must the rates of antimicrobial resistance, immediately. Improving patient health outcomes, decreasing drug usage, and halting the spread of AMR all result from antimicrobials being used correctly. As such, the Saudi Arabian Ministry of Health's Pharmacists' Strategic Plan included the launch of the country's national antibiotics stewardship program (ASP) in 2014. There is some evidence that ASPs have been implemented in different Saudi tertiary hospitals and medical cities. Some of these implementations include developing antibiotics prescribing policies through drug classification and the target demographics. However, full implementing the ASP guidelines are major issues in Saudi hospitals. Common challenges that clog the wheel of this implementation present as systemic problems. They include patients factors such as the need for patient satisfaction, prescribe factors which include the desire to maintain trusts, hierarchy issues among prescribes, poor team work among healthcare team, etc. Other factors are administrative and facility-based issues which are linked to poor training programs, lack of personnel and poor coordination. These challenges could be effectively overcome if there's a superior surveillance mechanism from the central ministry of health. At the hospital levels, close monitoring and attention in addition to collaboration will provide solutions to ASP guidelines implementation problems.

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Please cite this article in press Saber . M . Alshahrani *et al*, *Challenges In Implementation Of Antimicrobial Stewardship Programs In Saudi Hospitals...*, *Indo Am. J. P. Sci*, 2022; 09(12).

INTRODUCTION:

Antimicrobial resistance (AMR) is a result of inappropriate antimicrobial use, which has been linked to higher rates of illness, death, and healthcare expenditures (Baraka *et al.*, 2019). Rare and multidrug-resistant bacterial strains tend to appear alongside the rise in AMR. These multidrug-resistant conditions pose serious risks to public health. (Alghamdi *et al.*, 2019). Antibiotics were found to be the most frequently prescribed drugs in a study conducted in Saudi Arabia between 2010 and 2015 (AlKhamees *et al.*, 2015). Certain types of drugs, like chemotherapeutic agents and antipsychotics, can only be prescribed by specialists. On the other hand, antibiotics are eagerly prescribed by all clinicians and allied healthcare workers, no matter how much they know or have been trained about antibiotics (Edgar *et al.*, 2008). Zowawi conducted a review in which he brought attention to the alarming incidence of carbapenem-resistant *Acinetobacter baumannii* and extended-spectrum β -lactamase-producing isolates among *Escherichia coli* and *Klebsiella pneumoniae* (Zowawi, 2016). Rising AMR rates, widespread antibiotic abuse, and concerns about the development of resistance to life-saving antibiotics have all been reported by Saudi hospitals in recent years (Alghamdi *et al.*, 2019; Zowawi, 2016). Appropriate antimicrobial use must be reduced, and so must the rates of antimicrobial resistance, immediately. Improving patient health outcomes, decreasing drug usage, and halting the spread of AMR all result from antimicrobials being used correctly (Vickers, 2011). As such, the Saudi Arabian Ministry of Health's Pharmacists' Strategic Plan included the launch of the country's national antibiotics stewardship program (ASP) in 2014 (Alomi, 2017). The initiative first launched in public hospitals, and then two years later it was extended to the private sector. There has been a call for antimicrobial stewardship programmes (ASPs) to be implemented in Saudi hospitals in an effort to reduce AMR rates and improve the efficiency with

which antibiotics are used. The Saudi Ministry of Health (MoH) has recognized the potential of these treatments by implementing a national antimicrobial stewardship plan as part of the Arab Gulf regional effort to lessen the danger of AMR (Alomi, 2017). Still, obstacles exist in hospitals as they try to apply ASP rules. It's worth noting that systemic problems, rather than resource limitations or a lack of mandate, are often the source of difficulty.

Implementation Measures Already in Place

Alghamdi *et al.* (2019) categorized antimicrobials into three groups to better understand how they are used in hospitals' ASPs (A, B and C). Amoxicillin, metronidazole, and nystatin are examples of category A antimicrobials because they can be purchased without a prescription and are freely distributed. Getting your hands on an antibiotic in the "category B" is difficult because you need a specialist's okay before you can have it. Consultants, or the specialists or residents they assign to work under their direction, typically write the prescriptions. These antibiotics include common drugs including azithromycin, gentamicin, and rifampicin. Category C antimicrobials, on the other hand, can be used only in extreme cases, like sepsis or MRSA-related bloodstream infections. A justification form must be filled out whenever a consultant writes a prescription for one of these. Colistin, meropenem, and micafungin are just a few examples of these antimicrobials.

In these healthcare facilities, this categorization serves as a policy guideline for antibiotic prescriptions. Moreover, standard treatment protocols for frequent illnesses are implemented. The duration of treatment and the mode of administration are typically determined by the treating physician, but there are no set guidelines for when to convert from intravenous to oral administration of antimicrobials (Alghamdi *et al.*, 2019).

Demerits of the Current State of ASP Implementation in Saudi Hospitals

There is some evidence that ASPs have been implemented in different Saudi tertiary hospitals and medical cities (Alawi & Darwesh, 2016; Alghamdi et al., 2018, 2019; Al-Tawfiq et al., 2015; Amer et al., 2013; Haseeb et al., 2020), but there have been very few studies to assess the status of ASPs implementation in MOH hospitals and explore the factors that may (Alghamdi et al., 2021). This is significant because hospitals of different types often implement national regulations in different ways, such as the Saudi antimicrobial stewardship plan based on factors such as funding, reputation, local leadership, etc (Alghamdi et al., 2021). There is, in fact, scant data on ASP uptake in facilities and locations outside of major metropolitan areas and the state capital of Riyadh (Alghamdi et al., 2021). Furthermore, hospital administrators, who are typically involved in adoption decisions, are not included in the published studies on the adoption of ASPs in Saudi hospitals (Alghamdi et al., 2021). Adoption of ASPs in healthcare facilities has been shown to be greatly aided by the backing of senior management (Pulcini et al., 2019). To better understand what elements may help or impede ASP implementation in hospitals, it is helpful to examine the opinions of senior management (Alghamdi et al., 2021).

Identified Challenges to Implementing the ASP in Saudi Hospitals

Need to satisfy the patients

Unfortunately, reports indicate that doctors frequently face indirect pressure to keep their patients' trust (Mathew et al., 2020). Antibiotics are often considered by doctors and their patients to be the first line of treatment for any infection. They believe that prescribing antibiotics is the only way to ensure a patient's happiness. Antibiotics have a bad reputation for being an instant fix for infectious diseases. There is a common belief that prompt antibiotic treatment can save lives or improve a patient's prognosis (Mathew et al., 2020).

Lack of access to healthcare facilities

It may be necessary to provide antibiotics in advance of an adequate illness status analysis if the patient's location is far from a hospital. In cases where the patient is elderly, the breadwinner of the family, or has other particular circumstances that make it difficult to do thorough diagnostics before prescribing antibiotics, this is very important to remember. Also, the natural course of disease is often ignored in favor of prescribing antibiotics until a clinical response is seen.

Empirical treatments

Some doctors prescribe antibiotics to patients solely on the basis of their symptoms (Mathew et al., 2020). An rise in antibiotic consumption has been linked to seasonal illness outbreaks (Mathew et al., 2020). Antibiotics are often prescribed as a preventative measure by doctors, particularly when underlying comorbidities are present. In particular, this pattern is connected to the rise of antibiotic-resistant illnesses. It is commonly believed that by administering an antibiotic promptly, a patient can be saved or made to feel better.

Prescribers have a knowledge gap on antibiotic use, and there aren't enough Continued Medical Education sessions to close it.

In low- and middle-income nations, some research suggests that senior resident doctors have a knowledge gap (Mathew et al., 2020). It has been reported that senior residents still use the same methods they learned in medical school whereas junior residents are more likely to pursue advanced education in antimicrobial stewardship. When most of these experienced physicians were in medical school in the 1980s and 1990s, antibiotics were the only hope for saving lives, and antibiotic resistance was not yet a major problem (Mathew et al., 2020). So, these seasoned physicians who completed their training in the 1980s and 1990s continue to advocate for antibiotics as the gold standard of care. It has also been common practice to routinely prescribe antibiotics for no good scientific or clinical justification. These high-ranking physicians' arrogant ignorance stems from the fact that they rely solely on briefings given to them by medical representatives of pharmaceutical corporations, from whom they may not have received accurate information regarding the spectrum of antibiotics (Mathew et al., 2020).

Issues with Rank

Junior doctors may have a wealth of information on antibiotics, but they will be powerless to disobey senior doctors' directives due to the hierarchical nature of the medical system. When younger doctors refuse to prescribe antibiotics, they risk a reprimand from their superiors (Mathew et al., 2020). When asked why they prescribe antibiotics, doctors often cite their fear of legal action rather than patients' low socioeconomic status. They worry that an outpatient's mistakes would lead to a worsening of their condition, such as the disintegration of a surgical wound (Mathew et al., 2020).

Commercial factors

People believe that pharmacies will lose money if they sell less antibiotics because a sizable portion of their revenue is derived from this practice (Mathew et al., 2020). Institutional commercial considerations may take into account the hospital's category and degree of care. Antibiotics sales are a significant source of income for tiny hospitals that focus on emergency care. Pharmaceutical industry marketing campaigns also contribute to the rise in antibiotic consumption. Overly enthusiastic promotion can result in overlap in coverage, as was indicated above. When offering a new antibiotic to a doctor, the medical personnel may not have given the full picture. Because of this, doctors will likely prescribe an additional antibiotic, resulting in unnecessary duplication of treatment (Mathew et al., 2020). And when they succeed in persuading a doctor to prescribe their brand, and the doctor promotes the new brand, the new brand quickly becomes the default choice for all prescriptions. The salespeople's financial incentives may play a role in the consumers' decisions to purchase certain brands.

Competitions among prescribers

When they are unable to persuade challenging coworkers, they are more likely to give up. For fear of losing patients and being accused for withholding critical treatments, doctors will often give quite flimsy excuses for not providing treatment (Mathew et al., 2020). When it comes to the responsible use of antibiotics, doctors have not yet reached a point of unity.

Ineffective Regulation Enforcement

Since the patient may acquire these antibiotics at the pharmacy, and the pharmacist will give them anything they ask for or what they think is best, a hospital-only policy or program is unnecessary (Mathew et al., 2020). They may also have their old medications on hand in case they suffer the same symptoms again and need to restock on the antibiotics that were previously recommended. In any case, there are numerous alternatives for obtaining prescription drugs. National surveys show that the majority of pharmacies offer antibiotics for sale without a prescription, which poses a problem for AMS implementation (Aljadhey et al., 2015; Bin Abdulkhak et al., 2011). Dealing with this problem in a way that doesn't leave people in far-flung areas without access to antibiotics is tricky.

Poor Coordination amongst Departments

Effective management is required for the successful introduction of antimicrobial stewardship programs. As a result, everyone from the drugstore to the executive office should be held accountable (Mathew et al., 2020). Antimicrobial stewardship is being delivered by healthcare professionals, yet their disjointed structure prevents them from working together effectively as a team (Alghamdi et al., 2019). Additionally, it appears that the pharmacy department and pharmacists are needed to coordinate antimicrobial stewardship activities among physicians and nurses (Alghamdi et al., 2019). Another issue that healthcare professionals have identified as preventing ASP adoption is a lack of communication among the key players in antimicrobial stewardship (Alghamdi et al., 2019). Antimicrobial stewardship communication appears to be spearheaded and coordinated by pharmacists in particular. It's not clear whether this communication is the cause or effect of the broken up teams.

Few Assisting Infrastructure Pieces

Many community and teaching hospitals lack automated pharmacies. Since counting and recording antibiotic usage is typically a labor-intensive manual process, it can be challenging to get accurate results.

Lack of adherence to existing ASP policies

Lack of adherence to antimicrobial policies and guidelines has been cited as a major obstacle to ASP adoption and implementation in Saudi hospitals, despite the fact that an ASP strategy already exists on paper (Alghamdi et al., 2019). There are three primary causes of noncompliance with ASP policies and guidelines. To begin, doctors aren't always made aware of the existence of such policies because they aren't included in the standard orientation curriculum. Second, only a select few employees have electronic access to the ASP standards and rules because they are often disseminated throughout departments (by the Infection Control Department, the Pharmacy, or both) in paper format. Third, a big reason why ASP isn't widely used is because of the way in which its policies are enforced and carried out.

Inadequate management and administrative backing

It has been hypothesized that one barrier to the effective adoption and implementation of ASPs in hospitals is a lack of management awareness of ASPs and methods (Alghamdi et al., 2019). The administration also has doubts about whether or not antibiotic stewardship programs (ASPs) actually help lower AMR incidence and improve patient outcomes.

This is crucial since one of the main obstacles to ASP adoption and implementation in Saudi MoH hospitals is a lack of support and commitment from upper management. Here, leadership can, among other things, raise awareness of the hospital's ASP strategy and ensure that its policies are followed.

Lack of personnel in antimicrobial stewardship programmes

A significant hurdle to ASP acceptance and implementation in Saudi MoH hospitals has been indicated to be the paucity of ASP team members (Alghamdi et al., 2019). Low rates of ASP adoption among the participating hospitals have been mostly attributed to a shortage of clinical pharmacists. In particular, participants emphasized the importance of clinical pharmacists' ability to provide advice on antibiotic use, monitor policy implementation, and improve prescribing practices. Not all MoH hospitals are able to hire ID consultants, and those that do are routinely let go or overworked because of case allocations from other hospitals in the area. This has been linked to lower rates of ASP adoption and implementation. There may also be difficulties in implementing ASPs due to a dearth of microbiologists and appropriate laboratory equipment. However, participants acknowledged that simply hiring specialists is not enough, as they would need to collaborate as a team to successfully adopt and deploy ASPs in hospitals.

DISCUSSION:

The goal of antimicrobial stewardship (AMS) programs is to reduce the prevalence of antibiotic-resistant infections by standardizing the selection, administration, and monitoring of antimicrobials and optimizing antibiotic use (Baraka et al., 2019). Effective implementation of the AMS program necessitates a dedicated team leader and continuous financial backing from the medical center's upper echelons. Clinical pharmacists with expertise in infectious disorders are also an integral part of AMS. Adoption of AMS treatments relies on consistent, individualized antibiotic teaching for each clinical service (Cunha, 2018). Effective hospital AMS programs require participation from a wide range of medical professionals.

The literature suggests that in Saudi Arabia, general practitioners, rather than specialists or residents, are the ones that prescribe the most antibiotics (Alghamdi et al., 2018; Baraka et al., 2019). It was also stated that the prescription of antimicrobials was affected by a

number of factors, including the physician's experience, in particular that of general practitioners, the demand of patients or parents, and the cost of the medication (Baraka et al., 2019). Without being more critical in diagnosis, many doctors would rather treat the infections rather than the colonization that could lead to AMR (Baraka et al., 2019). Clinicians have highlighted in a recent study that hospitals are not properly using AMS (Baraka et al., 2019).

Antimicrobial resistance (AMR) rates and the appearance of new, highly drug-resistant bacterial strains are both on the rise in Saudi Arabia (Al-Tawfiq et al., 2020; Farman et al., 2019). Antimicrobials will soon no longer be able to treat infections that were previously treatable, hence immediate action is essential to control the growth in resistance rates and protect the use of antimicrobials (Al-Tawfiq et al., 2020).

Misuse of antimicrobials (Almeleebia et al., 2021; Alrasheedy et al., 2020) and the absence of antimicrobial stewardship programs (ASPs) to ensure their appropriate use are major contributors to the widespread problem of antimicrobial resistance (Alghamdi et al., 2018, 2019; Baraka et al., 2019). Antimicrobial Stewardship Programs (ASPs) are designed to enhance antimicrobial stewardship in hospitals by optimizing the treatment of infections and decreasing the occurrence of adverse effects (Alghamdi et al., 2021). Correct prescribing of antimicrobials for treatment and prophylaxis can be improved through these programs, as can the rate at which infections are cured (Alghamdi et al., 2021).

They also have a major role in lowering antibiotic resistance and *Clostridium difficile* infection rates in hospitals (Davey et al., 2017). As part of the Arab Gulf regional strategy to lessen the danger of AMR, the Saudi Ministry of Health (MOH) developed a national antimicrobial stewardship plan in 2014, which included the adoption and implementation of ASPs in MOH and private institutions (Alomi, 2017).

ASPs in Saudi tertiary hospitals are mostly driven by infectious diseases (ID) consultants, with limited participation from microbiologists and hospital pharmacists (Al-Tawfiq et al., 2015; Amer et al., 2013; Alghamdi et al., 2018). As a result, these antimicrobial stewardship efforts face sustainability issues in tertiary care and are less likely to be implemented in secondary care, where adoption rates (Alghamdi et al., 2018).

Success in adopting and implementing an ASP has been linked to education and training, according to participants (Alghamdi et al., 2019). Antimicrobial stewardship (the responsible use of antibiotics) and education and training about antimicrobial policies and guidelines should be a part of the plan for adoption and implementation. It has been hypothesized that the lack of health IT in Saudi MoH hospitals is a major impediment to the widespread use of ASPs. Data collection on antibiotic consumption and prescription monitoring is hindered by the lack of computerized prescribing. Furthermore, the lack of a specialized electronic antimicrobial approval system hampers the adoption of antimicrobial stewardship even if health IT is incorporated in hospitals. For antimicrobial stewardship to function smoothly, there must be an advanced IT system in place to facilitate communication between the many groups of people and departments involved. Teams may be able to stay together and communicate better as a result of this.

It is possible that hospitals' ability to adopt ASPs and the quality of their implementation could be enhanced by collaboration and the development of ASP teams comprised of microbiologists, hospital pharmacists, physicians, nurses, and infection control practitioners (Kapadia et al., 2018). Data from healthcare systems like Saudi Arabia, where ASP teams are novices, remain scarce, despite numerous research exploring ASP team members' opinions on programme uptake and implementation in healthcare systems where members' responsibilities are well developed. The implementation of ASPs in Saudi hospitals could be improved by a better understanding of the experiences and viewpoints of physicians, pharmacists, microbiologists, infection control practitioners, hospital management, nurses, and MoH officials (Alghamdi et al., 2019).

Despite the Saudi Ministry of Health's (MoH) establishment of a national ASP strategy in 2014, uptake and implementation have been delayed and low (Alghamdi et al., 2019)..

Also, as highlighted by Alghamdi (Alghamdi et al., 2019), the lack of national surveillance for antimicrobial use and AMR rates in Saudi Arabia reduces motivation at hospital levels to reduce inappropriate antimicrobial usage and marginalizes the issue of resistance. The government should establish an antibiotics policy that is followed by every hospital and clinic. It would be much less of a hassle to put into action if the government took the initiative

to enact policies that are feasible and doable. Regarding the market availability, sales, and who should prescribe, the policy should also be clear on the stance taken on reserved pharmaceuticals like Linezolid or drugs which are kept as last option like carbapenems or polymyxins. Second, hospitals who lead the way in antibiotic stewardship should be rewarded for their efforts. This will inspire similar establishments to follow in the trail's footsteps. Additionally, all prescribers, healthcare providers, and patients should be urged to share in the responsibility of antibiotic stewardship. Consumer education about antibiotics is necessary for their safe and effective usage. By drawing attention to the dangers of antibiotic overuse in a manner as strong as the "smoking kills" campaign, patients' perspectives may shift. The messaging should be carefully constructed in a way that encourages people to take personal responsibility for their antibiotic use.

CONCLUSION:

Better use of antimicrobials in hospitals and less antimicrobial resistance are dependent on laws requiring the implementation of ASPs and compliance with ASPs regulations and advice. For ASPs to be successfully implemented in hospitals and for their outcomes to be reported and monitored as KPIs for care quality, the MOH must actively support and oversee ASP implementation. This will allow medical facilities and the Ministry of Health to evaluate whether or not ASPs are producing the desired results and develop strategies to solve any weaknesses. Second, mechanisms for ASP implementation must be created with consultation from the Ministry of Health, leading infectious disease specialists, hospital pharmacies, and microbiology departments. Those facilities that have successfully implemented ASPs should disseminate information about their experiences and lessons learned to other healthcare facilities. To make the most of scarce infectious disease specialists and microbiology laboratories, new ASP models should be tested. One option is to establish regional antimicrobial stewardship hubs where resources may be easily accessed and shared throughout numerous institutions. Finally, information technology should be used by Saudi hospitals to enhance antimicrobial prescribing procedures, antimicrobial use monitoring, and ASP outcome tracking. Using this method, progress may be measured against national and regional averages, revealing strengths and weaknesses. Policymakers and commissioners may have a clearer view of the progress made and the actions needed to attain the

outcomes of the national antimicrobial stewardship strategy if they are aware of the current status of ASP adoption and the factors that may affect ASP adoption at the national level.

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