REVIEW ARTICLE

The Barriers in the Implementation of Antimicrobial Stewardship Programs

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Abstract

The resistance to antimicrobial is considered one of the most important risks that affect public health and health care. Antimicrobial stewardship programs (ASPs) contain a series of interventions that decrease the inappropriate use of antimicrobials. There are many barriers to the implementation of ASPs. To improve the use of antibiotics, it is important to overcome these barriers. In the present study, we searched for articles about the barriers of implementing ASPs using the keyword "ASPs" in the PubMed database. The present study found that the most common hurdles are lack of training, knowledge, interprofessional conflict, interspecialty conflict, and lack of resources.

Key words: Antimicrobial stewardship, antimicrobial stewardship programs, barriers, implementation

INTRODUCTION

The resistance to antimicrobials is considered as one of the most important risks that affect the public healthcare. CDC reported that approximately 20–50% of antibiotic use is inappropriate.[1] The misuse of antibiotics has contributed to the growing problem of antibiotic resistance.[1] The practice of antimicrobial stewardship programs (ASPs) in hospitals results in improving the use of antibiotics as well as decreasing of the antibiotic resistance.[2] In addition to that, the effective antibiotic stewardship can help in decreasing the treatment cost due to inappropriate prescriptions.[3]

The World Health Organization (WHO) defined ASPs as an organizational or system-wide health-care strategy to promote appropriate use of antimicrobials through the implementation of evidence-based interventions.[4] ASPs apply a series of interventions that lead to provide an evidence-based approach in using antimicrobials.[5] These programs are designed to encourage the proper use of antimicrobials by optimizing the selection of the antimicrobial agent in addition to optimizing the use of suitable dose, route, and duration of the treatment.[6]

The successful implementation of ASPs needs careful attention to its main barriers.[7] There are many hurdles for ASPs which lead to the inappropriate prescription. It is important to know and overcome these shortcomings to improve the use of antibiotics.

METHODOLOGY

The published literature on the barriers of implementing ASPs is limited. We searched for the relevant articles using the keyword "ASPs" in the PubMed database. PubMed is a free resource supporting the search and retrieval of biomedical and life sciences literature and contains more than 32 million citations and abstracts of biomedical literature.

We identified 672 studies and limit the search to the full-text articles that were published between 2011 and 2017, which further decreased the total number of articles to 617. Further screening process confined the literature search to studies on human only and decreased the number of articles to 417. We finally limit the search accordingly to our manuscript title,

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"ASPs AND Barriers" and included 30 studies. Summary of the published studies in PubMed regarding ASPs barriers is shown in Table 1 and the flow diagram for a literature search is shown in Figure 1.

RESULTS AND DISCUSSION

The barriers in the implementation of ASPs include

The erratic clinical workflow in specific settings such as workload, time constraints, and decision fatigue

The erratic clinical workflow is found in specific settings, especially in the emergency department because of the rapid pace in it, which can lead to decrease patient and family participation in the care plan, decrease the communication between the health care providers with their patients, and limit the time available for a health-care provider for reading and making researches.[5,8-10]

Another obstacle is the increasing workload. If the health-care providers are getting tired, the quality of *their decisions will be worsened.*[8]

Patient pressure and satisfaction

Physicians sometimes prescribe antibiotics for patients, despite disagreeing with the need for antibiotics, to increase patients' satisfaction and to prevent losing patients to other prescribers.[8,11]

Diagnostic barriers

Another barrier for ASPs implementation is diagnostic barrier, for example, if there is difficulty in determining the causative organism for the infection if it is viral or bacterial, this incorrect diagnosis can lead to excess antibiotic use.[12] In addition to that, many long-term care facilities do not have onsite microbiology laboratories and it will delay the results of organism identification and susceptibility tests.[11] Lack of microbiology services is also reported in another study as a barrier.[13]

Social barriers, logistic, and ethical concerns

Social barriers such as the perception of resistance, the mistrust in antibiotic guidelines, and the skepticism of antimicrobial stewardship importance also affect the application of ASPs.[7,12,16] Other studies reported that sociocultural beliefs, logistic barriers, and ethical concerns put impact on the implementation of ASPs.[9,14]

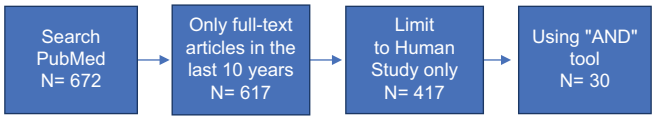

Figure 1: Literature search flow diagram

Table 1: Published studies in PubMed regarding ASPs barriers

Study	Year of Publication	Journal
Broom *et al.*	2017	American Journal of Infection Control
Chung *et al.*	2017	American Journal of Infection Control
Ravi *et al.*	2017	Indian Journal of Medical Microbiology
Skodvin *et al.*	2017	Journal of Antimicrobial Chemotherapy
Broom *et al.*	2017	Journal of Hospital Infection
Stenehjem *et al.*	2017	Clinical Infectious Diseases
Paño-Pardo *et al.*	2015	Clinical Microbiology and Infection
Micallef *et al.*	2017	Journal of Antimicrobial Chemotherapy
Broom *et al.*	2016	Journal of Hospital Infection
Principi *et al.*	2016	BMC Infectious Diseases
Nagel *et al.*	2016	Infectious Disease Clinics of North America
Bedi *et al.*	2016	Indian Pediatrics
Broom *et al.*	2016	Journal of Hospital Infection
Mack *et al.*	2016	Journal of Hospital Medicine
Broom *et al.*	2016	BMC Health Services Research
Morrill *et al.*	2016	*Journal of the American Medical Directors Association*
Enani	2016	Journal of Infection Prevention
Broom *et al.*	2015	BMJ Open
Nathwani *et al.*	2015	Clinical Microbiology and Infection
James *et al.*	2015	Journal of Antimicrobial Chemotherapy
Bryant	2015	The Medical Journal of Australia
Howard	2015	Journal of Antimicrobial Chemotherapy
Avent	2014	Australian Health Review
Pakyz	2014	American Journal of Infection Control

(Contd...)

Table 1: *(Continued)*

Study	Year of Publication	Journal
Chaves *et al.*	2014	Internal Medicine Journal
Lim *et al.*	2014	BMC Infectious Diseases
Hamilton *et al.*	2014	Infectious Disease Clinics of North America
Doron	2013	Clinical Therapeutics
Acquisto	2011	Journal of Pharmacy Practice
Tamma	2011	Infectious Disease Clinics of North America

Many pharmacists perceived a logistic barrier to provide clinical support, in particular, the limited communication with other staff, inadequate access to patient clinical information, and the logistical issues of off-site general physicians and pharmacists.[15] Lack of willingness to change and perceived loss of prescribing autonomy are other examples reported in other studies.[13,17]

Hospital hierarchies

One of the significant prescribing barriers is hierarchical structures.[7,12,18] The hospital hierarchies and consultation etiquette result in conflict between several physicians, for example, in respiratory tract infections, there are conflicts between respiratory specialists and infectious disease specialists. Another example for hierarchical structures barrier is the approval processes which may involve senior physicians to take approval from more junior antimicrobial stewardship physician which is considered as insult.[19]

Lack of training and knowledge

Lack of knowledge and training can result in inappropriate prescribing of antibiotics.[2,3,5,6,10,11,13,17,20-24] One study reported that the lack of knowledge and education for nurses working in respiratory clinics represents a major barrier for the application of ASPs.[19] Another study stated that one of the most important problems in the implementation of ASPs is the lack of knowledge regarding the fundamental rules on which antibiotics prescription is based.[25] Lack of knowledge also can be caused by the availability of many clinical guidelines so the clinicians cannot keep up with all of these guidelines.[1]

Communication between microbiology laboratories and clinical units

The poor communication between the clinical units and the microbiology laboratories is considered one of the main barriers to ASPs implementation. The problems in reporting of test results, limited provision of laboratory services, and poorly integrated information technology system are examples for this barrier.[26,27]

Interprofessional and interspecialty conflict

This conflict is one of the important barriers. Conflict regarding the responsibilities for different health-care professionals, opposition from prescribers, the communication with antagonizing colleagues, heterogeneity in the prescribing practices, refuse to accept policies and guidelines about the use of antimicrobials, and clinical misconceptions are examples for this barrier.

In addition to that, the limited contact between the health-care professionals and the relations between them may compromise the success of ASPs.[5,6,10,15,18-24,27-30]

Lack of resources

This barrier includes lack of information technology, audit feedback, guidelines, funding, and lack of human resource.

Lack of information technology included inaccurate or incomplete data access and data extraction.[20,22,31] Another barrier is the lack of ASPs electronic surveillance programs and the lack in clinical decision support tools.[9,27] Other studies reported that the lack of guidelines is also one of the important barriers.[6,10,11] Furthermore, other studies reported that barriers in the implementation of ASPs include the large volume of audits that are required to assess antibiotic use, lack of resources, enforcement, and specialist support.[13,17,27,32]

Lack of funding and human resource is another barrier reported by several studies.[11,13,16,20,22-24,27,30] Barriers also include the high level of transient staff,[13,17] the lack of dedicated pharmacy and medical staff,[16,17] and the staffing constraints.[16,27] Other barriers include lack of leadership,[13,17] pharmacy resources, and microbiology resources.[17,23,27]

CONCLUSION

ASPs play a significant role to decrease bacterial resistance and to improve antibiotics use. Unfortunately, there are many barriers that affect the implementation of these programs. According to the studies included in this review article, there are 10 major barriers for ASPs. Lack of training and knowledge, interprofessional and interspecialty conflict, and lack of resources are the most common barriers. To implement these programs appropriately, we should know and overcome these barriers.

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