WHO EMRO | The impact of antimicrobial stewardship strategies on antibiotic appropriateness and pres

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Review

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أثر استراتيجيات الإدارة المتعلقة بمضادات الميكروبات على مدى ملا ء مة
المضادات الحيوية وسلوكيات وصفها في الشرق الأوسط : استعراض منهجي

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الخلاصة : تمثّل مقاومة مضادات الميكروبات مشكلة صحية عالمية، وتمثل إدارة مضادات
الميكروبات عنصراً أساسياً في سياسات المستشفيات في جميع أنحاء العالم، إلا أنه لا
يوجد الكثير من المعلومات بشأن استراتيجيات التنفيذ الفعّال في الشرق الأوسط . وقد
أجرينا استعراضاً للدراسات التي نُفِّذت في هذه المنطقة حيث طُبقت استراتيجيات
مختلفة لإدارة مضادات الميكروبات من أجل تقييم مدى ملاءمة مضادات الميكروبات
وسلوكيات وصفها . وأُجرى بحث على قواعد بيانات MEDLINE EMBASE والخلاصات
الصيدلانية الدولية، ومحركي البحث Google Google Scholar. واستوفى 20 مقالاً معايير
الإدراج في الاستعراض؛ فعُنيت دراستان بتقييم الاستراتيجيات التي تتضمن إجراء مراجعة
تطلّعية مع توفير تعليقات، في حين عمدت 18 دراسة أخرى إلى تقييم الاستراتيجيات التي
تتضمن مقارنة استخدام مضادات الميكروبات بالمبادئ التوجيهية . وأبرزت التوصيات
المتعلقة بتنفيذ الإشراف في الشرق الأوسط أهمية إعداد وتحديث السياسات الخاصة بوصف
مضادات الميكروبات على المستوى المحلي واستخدام نُهُج تعاونية متعددة التخصصات
لتحقيق النجاح .

ABSTRACT Antimicrobial resistance is a global health problem and antimicrobial stewardship is an essential component of hospital policies worldwide yet little is known regarding effective implementation strategies in the Middle East. We conducted a review of studies carried out in this region that deployed different antimicrobial stewardship strategies to assess antimicrobial appropriateness and prescribing behaviours. A search of MEDLINE, EMBASE, International Pharmaceutical Abstracts, Google and Google Scholar was conducted. Twenty articles met the inclusion criteria; 2 studies evaluated strategies including prospective audit with feedback, while 18 others evaluated strategies including benchmarking antimicrobial utilization against guidelines. Recommendations for implementation of stewardship in the Middle East highlighted

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the importance of developing and updating local antimicrobial prescribing policies and using collaborative interdisciplinary approaches for success.

L’impact des stratégies de gestion des antimicrobiens sur la pertinence des antibiotiques et les comportements en matière de prescription au Moyen-Orient : analyse systématique

RÉSUMÉ La résistance aux antimicrobiens est un problème de santé mondial et la gestion des antimicrobiens constitue une composante essentielle des politiques hospitalières dans le monde. Pourtant, il existe actuellement peu d’informations sur l'efficacité des stratégies de mise en œuvre au Moyen-Orient. Nous avons passé en revue des études conduites dans la région utilisant différentes stratégies de gestion des antimicrobiens afin d’évaluer la pertinence des antimicrobiens et les comportements en matière de prescription. Une recherche dans Medline, Embase, International Pharmaceutical Abstracts, Google et Google Scholar a été effectuée. Vingt articles répondaient au critère d’inclusion, deux études évaluaient les stratégies incluant des audits prospectifs avec rétro-information, tandis que 18 autres évaluaient des stratégies incluant des analyses comparatives de l’utilisation des antimicrobiens par rapport aux procédures. Les recommandations en matière de mise en œuvre de la gestion des antimicrobiens au Moyen-Orient soulignaient l’importance de développer et de mettre à jour les politiques locales de prescription des antimicrobiens, et de recourir à des approches interdisciplinaires collaboratives, si l’on veut assurer le succès des programmes.

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Received: 03/6/16; accepted: 16/11/16

Introduction

Antimicrobial resistance is known to be one of the major threats to global health, mainly due to the prevalence of injudicious and overzealous use of antimicrobials (1). The world has reached a post-antibiotic era where major and even minor injuries can lead to multidrug-resistant infections and result in mortality, as available antibiotic options may not be available for treatment (1). This is alarming, especially that resistant bacterial illnesses increases the cost of treatment and extends the course of therapy. As such, the duration of hospitalizations, the overall health care costs and the economic burden on families and societies worldwide will increase (1). In fact, the World Health Organization (WHO) states that multidrug-resistant

bacterial infections have led to more than 8 million additional hospital stays and currently cost the health care system in excess of US$ 20 billion (2).

Antimicrobial stewardship refers to a set of coordinated strategies that focus on promoting appropriate antibiotic use in inpatient health care settings while improving patient outcomes, ensuring patient safety, reducing pharmacy cost for antibiotics and decreasing antimicrobial resistance and the spread of infections caused by multidrug-resistant organisms (3,4). Antimicrobial stewardship programmes are typically hospital-based programmes designed to ensure that patients receive the right antibiotic, at the right dose, at the right time and for the right duration (5–7). An effective programme is one that has committed leadership and necessary human, financial and information technology resources. The literature shows that successful programmes are those that are led by a coalition between physicians and clinical pharmacists (8–10). While most research conducted is reported from centres in North America and Europe, international guidelines are currently being developed and disseminated. However, institutions in the Middle East and the Persian Gulf region still lack firm and clear guidelines for proper antimicrobials use, which are essential for the success of local programmes due to regional variations in antibiotic utilization and prevalence of resistant organisms (10).

Antimicrobial stewardship interventions can only be successful if they meet the specific needs of the health care institution with dedicated multifaceted, multidisciplinary teams (physicians, pharmacists and nurses), administrators and policy-makers (9). These interventions include: prospective audits with intervention and feedback; implementation of formulary restriction programmes and pre-authorization requirements for specific antimicrobials within individual institutions; education; compliance with local/national guidelines and dissemination of clinical pathways; antimicrobial cycling and order forms; streamlining or therapy de-escalation; use of combination antimicrobial therapy; and dose optimization, or the switch from the intravenous route of administration to oral when indicated (7). In general, such interventions typically require essential components such as stakeholder buy-in, review of documentation systems, navigation of prescriber–pharmacist relationships and national/institutional prescribing policies (11,12).

In order to address the unique needs of individual institutions through implementation of a proactive antimicrobial stewardship programme and to provide guidance for future programme development, we conducted a review of studies that adopted different antimicrobial stewardship strategies in the Middle East region to assess antimicrobial utilization and evaluate antimicrobial prescribing behaviours within hospitals. A secondary objective was to determine core recommendations for programme development in the Middle Eastern context.

Methods

A search of MEDLINE (1948–February 2016), EMBASE (1980–February 2016), International Pharmaceutical Abstracts (1970–February 2016), Google and Google Scholar was conducted for articles assessing prescribing patterns of antibiotics and evaluating the use of antimicrobials within health care institutions in selected countries in the Middle East region. Search terms included combinations of 'antimicrobial', 'antimicrobial stewardship', 'prescribing', 'utilization', 'resistance', and 'Middle East', 'Bahrain', 'Iraq', 'Jordan', 'Kuwait', 'Lebanon', 'Oman', 'Palestine', 'Qatar', 'Saudi Arabia', 'Syria', 'United Arab Emirates' and 'Yemen'. The reference lists of the articles identified were manually searched for pertinent articles that were not identified in the electronic search. Identified abstracts were included if the study was published in English and had at least 1 antibiotic prescribing pattern or its use was assessed or evaluated in a hospital inpatient setting. All populations were included. Articles were excluded if they were done in a community setting (including health centres or primary health clinics), addressed general drug prescribing patterns with no focus on antibiotics or if they did not assess use against guidelines or defined local institutional or national policies.

After title and abstract review, the full text versions of identified articles were downloaded for review. After assessment against inclusion criteria, a total of 20 articles were included in this narrative review. Data extracted from identified studies included study design, setting, interventions, comparators and results. If provided by the article, recommendations regarding programme development or implementation were also extracted.

Results

Strategies for implementation of successful antimicrobial stewardship programmes

All 20 studies collected data through patients' chart s and medical file review, either retrospectively (11 studies) or prospectively (9 studies). All studies provided recommendations for successful programme development and/or implementation. **Table 1**(part1 , part2 , part3 , part4 , part5 , and part6) summarizes the studies in regard to the adoption by institutions of interventional strategies in order to assess and enhance antimicrobial use and prescribing behaviours by physicians (13–32).

Two studies used proactive core strategies in the form of prospective audit or point prevalence

survey followed by education and feedback (13,14) to evaluate the appropriateness of antimicrobial prescribing and utilization. Amer et al. compared the prescribing appropriateness of the empiric antibiotic therapy before and after the implementation of the antimicrobial stewardship programme at their institution in Saudi Arabia (13). The primary aim of the programme was to optimize the appropriateness of antimicrobials use and thus prevent the emergence of antimicrobial resistance associated with inappropriate use. Through targeting the 5 most commonly used broad-spectrum antibiotics (piperacillin/tazobactam, imipenem/cilastatin, meropenem, vancomycin, tigecycline) in the intensive care unit setting, they prospectively compared patients who were put under the active antimicrobial stewardship programme arm with other patients who had been admitted to the same unit at that institution before the implementation of the programme in 2011 over a 6-month period during the same season. Appropriateness of empirical antibiotics was assessed by the stewardship team and evaluated according to the institution's internally developed criteria, including formulary restrictions, and following reliable international infectious diseases clinical guidelines. Recommendations were then communicated in a verbal fashion to the intensive care unit team. The appropriateness of empirical antibiotics improved from 30.6% (15/49) in the historical control arm to 100% (24/24) in the proactive antimicrobial stewardship programme arm; the difference was statistically significant (P