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Commentary

Appropriate use of antimicrobials in primary healthcare facility: a long way to go

Jiuyang Xu [1, 2], Bin Cao [1, 2, *]

[1)] Department of Pulmonary and Critical Care Medicine, Center of Respiratory Medicine, National Center of Respiratory Medicine, National Clinical Research Center for Respiratory Diseases, China-Japan Friendship Hospital, Beijing, China
[2)] Institute of Respiratory Medicine, Chinese Academy of Medical Sciences, Beijing, China

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Antimicrobials are powerful tools for managing infectious diseases and provide a safe cornerstone for breakthroughs in other medical practices (surgery, chemotherapy, immunomodulatory treatments, etc.) Since the discovery of penicillin, antimicrobials have revolutionized modern medicine. However, the emergence of antimicrobial resistance (AMR) has threatened to reverse the advancement [1]. Inappropriate use of broad-spectrum antimicrobials promotes the emergence of AMR through the selection of resistant mutants. Facing the challenge of AMR, various antimicrobial stewardship (AMS) programmes have been implemented to promote appropriate and responsible antimicrobial use [2], but the current situation is still challenging, especially in the primary healthcare facility (PHF).

In this issue of *Clinical Microbiology and Infection*, Fu et al. [3] conducted a nationwide survey on outpatient prescriptions in 269 PHFs in 31 cities in China. They found that up to 70.5% of the antibiotic prescriptions were inappropriate, in which upper respiratory tract infections, acute bronchitis, and non-infectious gastroenteritis accounted for most of the prescriptions. Among all outpatients who received antibiotics, 82.2% were prescribed broad-spectrum antimicrobials, including third-generation cephalosporins and fluoroquinolones. The authors highlight the excessive and inappropriate use of antimicrobials in PHFs and call for multidimensional efforts in AMS in these settings.

Inappropriate use of antimicrobials in PHFs is a serious problem. Previous studies have revealed high percentage of inappropriate antibiotic prescriptions in PHFs in China, especially in economically underdeveloped areas [4,5]. The underlying reasons are several-fold. First, microbiology testing capability and physicians' ability to interpret such test results was insufficient in PHFs. Ideally, initial empirical antimicrobials are administered on the basis of clinical judgement and possible pathogen spectrum (clinical or possible diagnosis), which will be later tailored on the basis of microbiology and susceptibility testing results (proven diagnosis) later. Without sufficient information to guide appropriate antibiotic treatment or scaling down from the initial therapy, broad-spectrum antimicrobials are used routinely. This is especially true in PHFs, where microbiologists and relevant training are not sufficient. Although the capacity for PCR testing has been quickly developed during the COVID-19 pandemic, there is still a long way for the training of traditional pathogen diagnosis. Second, high patient expectations for antimicrobial treatment during medical visits add to inappropriate use [6]. Primary care physicians may prescribe antimicrobials or broad-spectrum antibiotics to fulfil the patient's need. This may explain the higher antibiotic prescribing rate in children [3], as it would be difficult to satisfy parents if they ‘go away with empty-handed’. Third, the problem may be compounded by the easy availability of some antimicrobials through the public media (self-prescribing) and direct-to-consumer sales by pharmaceutical companies [7].

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* Corresponding author. Bin Cao, Department of Pulmonary and Critical Care Medicine, China-Japan Friendship Hospital, No 2, East Yinghua Road, Chaoyang District, Beijing. China.
E-mail address: caobin_ben@163.com (B. Cao).

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According to this manuscript, 45.4% of all antibiotic prescriptions were given by injection, which is consistent with previous reports from China [5,8]. Injectable antimicrobials are generally not indicated in primary care settings and are not supported by guidelines for management of community-acquired infections. Injecting of drugs may be complicated by adverse events, such as local infection, phlebitis, and bleeding. According to the national surveillance report in China, injection accounts for 55.3% of all reported drug adverse events, and the number is as high as 76.3% for antimicrobials [9]. There is a question as to why injected antimicrobials were favoured if they were not clinically indicated and there existed an additional risk. In many PHFs in China, antibiotics, particularly in the injected from, are regarded as the cure-for-all [10]. The high patient expectation for immediate resolution of symptoms also promotes the use of injected antimicrobials. Recently, regulations have been imposed in many provinces to reduce injected therapy in outpatient settings [11]. The effect still waits for further observations.

It is also noted that penicillin is not the most prescribed antibiotics in China [3]. Instead, cephalosporins and quinolones are among the top choices for primary healthcare physicians. Fu et al. [3] attributed the avoidance of penicillin to the inconvenience and unreliable results of penicillin skin testing. Indeed, skin testing is mandatory for all oral and injected penicillin use in China, as required by the drug inserts and expert consensus [12], although it is not required for cephalosporins. Therefore, penicillin is generally not favoured in the outpatient settings where skin testing is inconvenient and first-aid for allergy is not accessible enough. In addition, falsely-labelled penicillin allergies (most of which come from skin test results) have prevented its use, although the percentage of genuine penicillin allergies in China is similar to other countries [13–15]. To avoid potential medical disputes, physicians usually accept the self-reported allergy labels and avoid prescribing penicillin without further verification. However, 86% of patients with a positive skin test were not genuinely allergic to penicillin [14]. It is well recognized that penicillin allergy de-labelling should be practiced as a part of antibiotic stewardship. However, time is needed to gradually change stereotypes.

Appropriate antimicrobial use consists of '4Rs': right patient, right antibiotic, right dose, and right duration. Although the AMS programme has been implemented for more than two decades, the current situation is still challenging. The problem revealed by this and many other studies focuses on the choice of right patient and right antibiotic. However, the right dosage and treatment duration is also worth considering for future stewardship programmes. There is still a long way to go for responsible antimicrobial use. This requires joint efforts from policy makers, healthcare providers, patients, and pharmaceuticals companies.

Author contributions

B.C. conceived the article and reviewed and edited the manuscript. J.X. wrote the original draft.

Transparency declaration

The authors declare that they have no conflicts of interest.

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