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Policy and practice

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Abstract

Background: Antimicrobial resistance is a rising problem worldwide and it poses a serious risk to public health. In Pakistan, about 70.0% of the Acinetobacter group of bacteria were resistant to all antibiotics and were responsible for high mortality among neonates within the first week of life.

Aim: To evaluate the pattern of antibiotic prescription in the Ear, Nose and Throat (ENT) Department of Shalamar Hospital, Lahore, Pakistan, using the WHO AWaRe 2021 classification.

Methods: We collected prescription data from the ENT outpatient department of Shalamar Hospital from October to December 2021. We compared the quantitative analysis of antibiotics with the WHO AWaRe classification. We analysed the data using SPSS version 26 and discussed the results with the ENT Department for possible improvements.

Results: Some 862 (12.1%) of the total 7126 entries were assessed. Others were excluded because they had some missing data or had no antibiotic prescription. Of all the antibiotics prescribed, around 54.9% belonged to the access category. The WHO 13th General

Programme of Work 2019–2023 recommends a country-level target of at least 60% of the total antibiotic consumption in the access group antibiotics.

Conclusion: The outpatient department of the ENT did not prescribe any reserve or not recommended antibiotics. The use of watch antibiotics was higher than recommended by the WHO AWaRe classification. More efforts should be made to increase prescriptions from the AWaRe access group to achieve the 60% minimum target recommended by WHO for the country.

Keywords: antimicrobial resistance, AMR, AWaRe, antibiotic, prescription, ENT, tertiary hospital, outpatient, Pakistan

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Background

Antimicrobial resistance (AMR) is a rising problem worldwide and poses a serious risk to public health (1). The US Centres for Disease Control and Prevention (US CDC) 2019 data suggests that 2.8 million people in the United States of America (USA) are affected by antibiotic-resistant infections that are directly responsible for 35 000 deaths each year (2). In a study conducted in Pakistan, it was found that 70% of Acinetobacter bacteria were pan-resistant to all antibiotics (3).

The hazard of developing AMR is increasing at an alarming rate, particularly in developing countries because of the injudicious use of antimicrobials (4). Inappropriate antibiotic

prescriptions contribute to

AMR. In a study in the USA, sinusitis, which is predominantly of viral etiology, received the most antibiotic prescriptions (5). A study conducted in Pakistan revealed that more than 50% of patients were prescribed the wrong antibiotic. Almost 63.5% received a wrong dose of antibiotic or the indication was not justified (6). Developing countries, such as Pakistan, spend the lowest amount of funds on healthcare. There is poor health education, malpractice, and inappropriate prescription of medicines, which poses a serious threat. Pakistan and other developing countries can face serious repercussions and increased morbidity and mortality rates due to this negligence (7).

Several initiatives have been taken in Pakistan to combat the problem of injudicious use of antibiotics. In 2017, the World Health Organization (WHO) Expert Committee on the Selection and Use of Essential Medicines developed a tool to support antibiotic stewardship at local, national, and international levels; known as the AWaRe classification of antibiotics. AWaRe classifies antibiotics into 3 groups; access, watch and reserve, based on their impact, resistance, and class, in order to outline their appropriate use. The WHO 13th General Programme of Work 2019–2023 includes a country-level access group antibiotics target of at least 60% of total antibiotic consumption (8).

In Pakistan, the progress is slow but some stewardship programmes have gained popularity by assessing the attitudes of healthcare workers towards AMR (9).

Research objective

The objective of this research was to evaluate the pattern of antibiotic prescription in the ENT Department of Shalamar Hospital, Lahore, by using the WHO AWaRe 2021 classification.

Methods

We prepared a research report on the pattern of prescription of antibiotics. The health management information system was accessed after approval from the Institutional Review Board (IRB). The duration of the research was 6 months, i.e. October 2021 to March 2022. The prescriptions from 1 October to 31 December 2021 were obtained from the ENT Department of Shalamar Hospital, Lahore. Only OPD prescriptions were included in this research. Data collected included patient demographics (age, gender), diagnosis, and the medication prescribed during the 3 months.

We assessed 7126 prescriptions over the period of 3 months. Some 6264 (87.9%) records were excluded from the study either because of missing data or no antibiotic prescription. A total of 862 (12.1%) records were analysed (Figure 1).

Antibiotics were recorded as their generics in the WHO Aware list of antibiotics and grouped as “access”, “watch”, “not recommended”, or “reserved”. Prescriptions of more than 1 antibiotic were grouped according to their respective classes separately. For combination drugs such as amoxicillin/clavulanic acid, they were grouped and considered together as amoxicillin. The frequency of antibiotics prescription from the various categories was calculated as a percentage of the total antibiotics prescribed. The most frequent ENT diagnoses were included and the antibiotics prescribed against these diseases were recorded. Frequencies and percentages were calculated for the variables and the data was analysed using SPSS version 26. Diagnoses and antibiotics were coded and grouped. We also checked whether the antibiotics prescribed were in the WHO model lists of essential medicines (EML). Results of this research were shared with the ENT Department; suggestions were made for improving treatment outcomes and various antibiotic adherence guidelines discussed.

Results

A total of 7126 prescriptions, from the ENT Department of Shalamar Hospital, Lahore, were analysed during a 3-month period from 1 October to 31 December 2021. Only 12.1% of the patients were prescribed an antibiotic and only these were included in the study. Among the participants included, 571 (66.2%) were female and the remaining 291 (33.8%) were male. The mean age of the participants was 19.2 years. The most common diagnoses for which antibiotics were prescribed included pharyngitis (46.5%), acute suppurative otitis media (ASOM) (32.9%), tonsillitis (5.2%), and sinusitis (2.3%). Of the total 12 prescribed antibiotics, the most commonly prescribed antibiotic was amoxicillin (42.9%), followed by cefixime (29%) (Figure 2). Three prescribed antibiotics, levofloxacin, moxifloxacin, and cefradine, were not included in the WHO EML for 2021.

More than half of the antibiotics (54.9%) were in the WHO access group. Among those, amoxicillin (78.1%) was the most commonly prescribed, followed by metronidazole (20.6%), cefradine (0.9%), cefalexin (0.2%), and doxycycline (0.2%). The other prescribed antibiotics (45%) were in the WHO watch group; cefixime (64.6%), levofloxacin (10.0%), ciprofloxacin (9.1%), clarithromycin (8.8%), moxifloxacin (3.3%), ceftriaxone (2.4%), and azithromycin (1.7%) (Figure 3). There were no prescriptions from the reserve or not recommended groups (Table 1).

Discussion

The analysis of antibiotic prescriptions for OPD patients of the ENT Department of our hospital showed that all antibiotics prescribed were in the access (54.9%) and watch groups (45.01%) of the WHO AWaRe classification. No prescriptions were found to be from the reserve or not recommended groups. The WHO 13th General Programme of Work 2019–2023 includes an access group antibiotics country-level target of at least 60% of total antibiotic consumption (8). Access antibiotics include essential, widely available, and affordable antibiotics such as penicillin, macrolides etc. According to our analysis, the prescription of antibiotics from the access group was below the target level (54%).

Almost half of the prescribed antibiotics in our study were in the watch group. This group includes antibiotics with a high resistance potential as compared to the access group, i.e. 3rd generation cephalosporins, fluoroquinolones, and carbapenems, but they are often recommended as first-line antibiotics against infections. Similarly, an analysis of pharmaceutical data from March 2019 highlighted that the majority of antibiotics sold in Pakistan were in the watch group (1,2). Prescriber stress due to the high availability of watch antibiotics contributes to their excessive use in Pakistan (10). Resistance to these antibiotics in various infections is rising in Pakistan. Evidence of the emerging resistance of cefixime by typhoid bacteria has been verified in Pakistan (11). Similarly, a fall in sensitivity to penicillins, macrolides, and 3rd generation cephalosporin in Streptococcus pneumoniae, a common cause of respiratory tract infections, has been seen over time in Pakistan (12). Based on available evidence, we may need to use higher doses or even stronger antibiotics against these infections in the future.

While our research did not find any outpatient-based prescriptions of reserved or not recommended antibiotics, a global comparison shows that Pakistan consumes a relatively higher amount of antibiotics from the not recommended group. An international study comparing antibiotic sales data for the years 2000 to 2015 from more than 76 countries found the consumption of not recommended antibiotics to be higher in Pakistan (4%), Egypt (9.6%), and India (7.5%) than in other countries (less than 3% in all) (13). Marketing practices, excessive availability, and over-the-counter dispensing of these combination drugs may account for the higher consumption of reserved antibiotics. A study of more than 350 pharmacies in Punjab, Pakistan, reported that 96.9% of the pharmacies dispensed antibiotics, even reserved ones, without a prescription (14).

In our study, the most commonly prescribed antibiotic was amoxicillin, followed by cefixime. The same trend was observed in another single-centered study in Quetta, Pakistan, in 2021 where penicillin (amoxicillin) was the most frequently prescribed drug for upper respiratory tract infections (URTIs) in primary care (15). This could account for the frequent use of penicillin for

the treatment of URTI. Another multi-centered study in Punjab in 2017, reported that the most common prescriptions of penicillin were followed by cephalosporins. Amoxicillin remains the first-line drug of choice for many international and national guidelines for respiratory tract infections such as pneumonia, rhinosinusitis, acute otitis media (AOM) etc. (16).

Our study reported a 12.1% rate of antibiotic prescription in the OPD of the ENT Department in a tertiary care hospital in Lahore. Higher rates of antibiotic prescription were observed in primary healthcare settings (81.5%) across Pakistan. This difference could be due to the unavailability of standardized guidelines in primary healthcare centres and the use of multiple antibiotics in combinations. The study also reported that antibiotic prescriptions were more likely to be appropriately prescribed at centres running under specialist supervision, as compared to those run by medical officers with a bachelor's degree (17).

A cross-sectional study across various hospitals in Pakistan assessed the knowledge of physicians regarding the prescribing patterns for URTIs. A majority of the physicians (84.8%) agreed that inappropriate use of antibiotics has led to a global health problem of AMR, and 71.2% acknowledged the irrational use of penicillin and cephalosporins. While most physicians recognise that the majority of URTIs are viral rather than bacterial in origin, many are still likely to prescribe an antibiotic based on the presence of a fever or a patient's persistence (6).

Saleem et al. assessed the appropriateness of doctors' prescription patterns against the British National Formulary (BNF). The study revealed that the highest number of inappropriate antibiotics were prescribed for skin and soft tissue infections (78.5%), followed by respiratory tract infections (68.2%) (18). Sinusitis, the inflammation of the paranasal sinuses, is an important reason to seek medical care. The most commonly prescribed antibiotics for sinusitis in our study was cefixime (31%), followed by amoxicillin (18%). Practicing guidelines from the American College of Otolaryngology and the National Institute for Health and Care Excellence (NICE) advise that amoxicillin alone or in combination should be used as first-line treatment. This difference in prescriptions can be because our study was conducted in a specialised centre where complicated cases and treatment failures are usually referred. The guidelines recommend changing antibiotics in case of treatment failure. A total of 11 patients with diagnosis of allergic rhinitis received an antibiotic. Both NICE and the American College of Allergy, Asthma and Immunity do not recommend the use of antibiotics for allergic rhinitis management (19).

We are aware of the limitations of this study. First, the consumption of antibiotics could not be found using indices like Defined Daily Dose (DDD), as the prescription indicators (such as dose, duration, route) were not available. Second, we were unable to find the appropriateness of the

antibiotics used as the clinical indications were not recorded and the International Classification of Diseases (ICD) codes of diagnosis were not available. This study only included one specialty and may not reflect the same pattern of antibiotic prescriptions in other departments or for in-patient prescriptions in the hospital. Despite these challenges, the study identified the pattern of antibiotics prescribed in the ENT Department using the WHO AWaRe classification, which was its main aim.

To combat the growing AMR, it is important to regulate the use of antimicrobials through antibiotic stewardship and national policy making. Physicians should be appropriately trained about the use of antimicrobials and the sale of antibiotics should be regulated (14). The national action plan on AMR needs to address the lack of a strategic framework, shortage of trained professionals, low quality of education, and poor public awareness about the use of antibiotics, although we still have a long battle ahead in combatting AMR. It may be necessary to modify the health system, train professionals, and above all offer them guidelines in accordance with the pathology of disease. Planning is needed for the national action plan on AMR to address the lack of a strategic framework. Standard treatment guidelines are required in hospitals to maintain the prevention of irrational use of antibiotics (20-22).

Conclusion

There were no prescriptions of reserved or not recommended antibiotics in the OPD of the ENT Department at this tertiary care hospital in Lahore. The use of AWaRe classification watch group antibiotics was higher than the use of antibiotics in the access group. More antibiotic prescriptions should come from the access group in order to achieve the 60% country-level target set by WHO.

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Conflict of Interest: None declared.

Évaluation des habitudes de prescription d’antibiotiques à l'aide de la classification AWaRe de l'OMS

Résumé

Contexte : La résistance aux antimicrobiens représente un problème croissant dans le monde entier et constitue un risque sérieux pour la santé publique. Au Pakistan, près de 70,0 % des bactéries du groupe Acinetobacter étaient résistantes à tous les antibiotiques et étaient

responsables d'une mortalité élevée chez les nouveau-nés au cours de la première semaine de vie.

Objectif : Évaluer les habitudes de prescription d'antibiotiques au sein du département d'oto-rhino-laryngologie (ORL) de l'hôpital Shalamar, dans la ville de Lahore (Pakistan) selon la classification AWaRe 2021 (accessibilité essentielle/utilisation sélective/dernier recours) de l'OMS.

Méthodes : Nous avons recueilli des données relatives aux prescriptions auprès du service de consultations externes du département ORL de l'hôpital Shalamar entre octobre et décembre 2021. Nous avons comparé l'analyse quantitative des antibiotiques à la classification AWaRe de l'OMS. Les données ont été analysées à l'aide du logiciel SPSS version 26. Les résultats ont été examinés en concertation avec le département ORL en vue d'éventuelles améliorations.

Résultats : Sur 7126 entrées, 862 (12,1 %) ont été analysées. D'autres éléments ont été exclus du fait de données manquantes ou de l'absence de prescription d'antibiotiques. Sur l'ensemble des antibiotiques prescrits, près de 54,9 % appartenaient à la catégorie d'accessibilité essentielle. Le treizième programme général de travail 2019-2023 de l'OMS recommande de porter à 60 % au minimum la proportion de la consommation d'antibiotiques dans le groupe d'accessibilité essentielle au niveau national.

Conclusion : Le service de consultations externes du département ORL n'a prescrit aucun antibiotique de dernier recours ou non recommandé. Le nombre de prescriptions d'antibiotiques à utiliser sélectivement était plus important que celui recommandé par la classification AWaRe de l'OMS. Davantage d'efforts doivent être fournis pour accroître le nombre d'ordonnances délivrées pour des antibiotiques d'accessibilité essentielle afin d'atteindre l'objectif minimal recommandé de 60 % par l'Organisation au niveau national.

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WHO EMRO | Evaluation of antibiotic prescription patterns using WHO AWaRe classification

: إن مقاومة مضادات الميكروبات مشكلة آخِذة في التفاقم في جميع أنحاء العالم .الخلفية
وتُشكِّل خطرًا جسيمًا على الصحة العامة . وفي باكستان، كان نحو 70,0% من مجموعة
البكتيريا الرَّاكِدَة مُقاوِمة لجميع المضادات الحيوية، وكانت مسؤولة عن ارتفاع
معدل الوفيات بين حديثي الولادة خلال الأسبوع الأول من الحياة .

: هدفت هذه الدراسة الى تقييم نمط وصف المضادات الحيوية في قسم طب الأنف والأذنالأهداف
والحنجرة في مستشفى شالامار، بمدينة لاهور، باكستان باستخدام تصنيف منظمة الصحة
العالمية للمضادات الحيوية، وفقًا لفئات الإتاحة والمراقبة والاحتياط لعام 2021.

: جمعنا بيانات الوصفات الطبية من قسم العيادات الخارجية لطب الأنف والأذنطرق البحث
والحنجرة بمستشفى شالامار في المدة من أكتوبر / تشرين الأول إلى ديسمبر / كانون الأول
2021. وقارنا التحليل الكمي للمضادات الحيوية مع تصنيف المنظمة للمضادات الحيوية
وفقًا لفئات الإتاحة والمراقبة والاحتياط . وخضعت البيانات للتحليل باستخدام الإصدار
26 من برنامج SPSS. ونُوقِشت النتائج مع قسم طب الأنف والأذن والحنجرة لبحث التحسينات
الممكنة .

: قُيِّم نحو 862 مدخلًا (12,1%) من إجمالي 7126 مدخلًا . واستُبعدت مدخلات أخرىالنتائج
لأن بها بعض البيانات الناقصة، أو ليس بها وصفة طبية للمضادات الحيوية . وينتمي نحو
54,9% من جميع المضادات الحيوية الموصوفة إلى فئة الإتاحة . ويُوصي برنامج العمل العام
الثالث عشر لمنظمة الصحة العالمية للمدة 2019-2023 بأن تكون الغاية القُطرية 60% على
الأقل من إجمالي استهلاك المضادات الحيوية في فئة الإتاحة .

: لم يصف قسم العيادات الخارجية لطب الأنف والأذن والحنجرة في المستشفى أيالاستنتاجات
مضادات حيوية من فئة الاحتياط أو غير مُوصى بها . وكان استخدام المضادات الحيوية من فئة
المراقبة أعلى مما يُوصَى به في تصنيف المنظمة للمضادات الحيوية وفقًا لفئات الإتاحة
والمراقبة والاحتياط . وينبغي بذل المزيد من الجهود لزيادة الوصفات الطبية من فئة
الإتاحة لتحقيق الحد الأدنى البالغ 60% من غاية المنظمة المُوصى بها لهذا البلد .

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