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To assess the antibiotic prescription analysis of inpatients at a tertiary care hospital

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Abstract
Aim: The purpose of this research is to assess the antibiotic prescription analysis of inpatients at a tertiary care hospital.
Methods: The Department of Pharmacology conducted this prospective investigation. We examined the source of information for relevant features such as antimicrobial dose, frequency, and duration of antimicrobial usage, as well as whether or not such use was indicated by recorded culture sensitivity reports. A possible infective aetiology was evaluated if the patient showed any of the following symptoms prior to study inclusion: fever, elevated leukocyte count, signs and symptoms of infection of a specific organ system, and sepsis.
Results: Antimicrobials were prescribed to 100 (43.48 percent) of the 230 patients. The referral note was the most often utilised source for obtaining information on antibiotic prescription. The prescription habits of these individuals were studied further. 59 patients (59%) were males, whereas 41 patients (41% were women). The research participants' mean (SD) age was 48.25 12.55 years. The most patients were between the ages of 35 and 45. (40 percent). 58 patients (58%) were recommended by public sector healthcare facilities, whereas 42 (42%) were referred by private clinics. Ceftriaxone and amoxicillin-clavulanic acid were the most often given medications (21 percent and 17 percent, respectively). Piperacillin-tazobactam was then administered to 12 (12%) of the patients. More than 57 percent of patients were given four antibiotics. Antibiotics with a broad range of action accounted for 70 percent of prescriptions.
Conclusion: The results of this research aided in the development of several modules of an educational intervention tailored for healthcare settings with limited or no access to antimicrobial stewardship training.

Keywords: Antibiotic prescription, inpatients

Introduction

Antibiotics are medications that are used to treat bacterial infections, and they have saved many lives [1]. Antibiotics are the most widely given medications in hospitals across the globe [2, 3]. However, incorrect antibiotic usage leads to the development of bacterial resistance, hastening the establishment and dissemination of resistant germs and having a major influence on treatment outcome [1]. Antibiotic resistance (ABR) occurs when potentially hazardous bacteria adapt in a manner that diminishes or eliminates the antibiotic's efficacy. Although ABR is a widespread problem, the incorrect use and misprescribing of antibiotics is increasing its prevalence [4]. ABR has been found in all corners of the globe; it is one of the most serious threats to global public health today, and the issue is spreading [3]. During the last two decades, the fast rise and spread of ABR has become a global problem [1, 5, 6]. The Centers for Disease Control and Prevention (CDC) now advises health practitioners to concentrate on improving antibiotic prescription practise and usage in human health care, and advocates the formation of an Antibiotic Stewardship Program (ASP) [7]. Changing prescription habits may be challenging, but there are tried-and-true ways for optimising antibiotic treatment for individuals while limiting damage to the patient and lowering ABR in the community. As a result, prudent antibiotic usage is a critical public health issue [2].
ASP is now more important than ever as a means of optimising antibiotic usage in order to avoid the establishment of resistance and enhance patient treatment results [8]. As a result, the phrase "antibiotic stewardship" has been more popular in recent years, often referring to

programmes and treatments aimed at optimising antibiotic usage [8, 9]. ASP interventions include measures to avoid drug-resistant bacterial infections, to focus antibiotic treatment to susceptible or resistant bacteria, and to limit wasteful or inappropriate antibiotic administration and usage [10, 11]. In clinical practise, ASP focuses on coordinated interventions that promote the timely selection of the best antibiotic regimen of dosage, length of treatment, and mode of administration in order to enhance and monitor the appropriate use of antibiotic medicines [12].

There is little question that antibiotics play critical roles in global health-care systems and are essential in all health-care settings. Although antibiotics are an essential tool in hospital health-care delivery and save many lives, up to half (20-50%) of prescription antibiotics are misused globally [13, 14]. This has a significant impact on health-care system quality and therapy costs, as well as increasing the risk of adverse medication events. 2 Inappropriate antibiotic usage is common, leading in ABR, which is a major social concern [1]. Incorrect usage of these medicines may be hazardous and result in ABR. Antibiotic-resistant infections are more likely to result in inadequate treatment, recurrent illness, delayed recovery, or even death in patients [9, 15]. Antibiotic misuse accounts for around 6.5 percent of hospital admission morbidity and death, despite the fact that the vast majority of these occurrences are avoidable [16].

Methods and Materials

After receiving clearance from the protocol review committee and the institutional ethics committee, this prospective research was carried out at the Department of Pharmacology. Data extraction forms were used to record demographic information, provisional/final diagnosis, and antibiotics received by patients from the moment of referral. The following information was obtained from the patient or his or her attendant: a short description/referral note of the current disease, presenting complaints, past investigations, prior interventions, and the name of the city/hospital of the referring facility/doctor. We next examined the source of information for relevant features such as antimicrobial dose, frequency, and duration of antimicrobial usage, as well as whether or not such use was indicated by recorded culture sensitivity reports. A possible infective aetiology was evaluated if the patient showed any of the following symptoms prior to study inclusion: fever, elevated leukocyte count, signs and symptoms of infection of a specific organ system, and sepsis.

As needed, descriptive statistics were used to summarise the acquired data. The mean and standard deviation of continuous variables were calculated. Proportions and percentages were used to represent discrete variables. We also calculated the proportion of people who received antibiotics at the site of treatment notwithstanding the probability of an infectious aetiology, as indicated by the four criteria listed above.

Results

Antimicrobials were prescribed to 100 (43.48 percent) of the 230 patients. The referral note was the most often utilised source for obtaining information on antibiotic prescription. The prescription habits of these individuals were studied further. 59 patients (59%) were males, whereas 41 patients (41% were women). The research participants' mean (SD) age was 48.25 12.55 years. The most patients were between the ages of 35 and 45. (40 percent). 58 patients (58%) were recommended by public sector healthcare facilities, whereas 42 (42%) were referred by private clinics.

There were 80 different kinds of provisional diagnoses noted in the referral records. Forty percent of cases were caused by fever (with or without thrombocytopenia), acute aggravation of chronic obstructive pulmonary disease (COPD), sepsis, or pneumonia. Various patients were given a total of 25 different antibiotics. More than 78 percent of prescriptions were for 10 antibiotics. Ceftriaxone and amoxicillin-clavulanic acid were the most often given medications (21 percent and 17 percent, respectively). Piperacillin-tazobactam was then administered to 12 (12%) of the patients. Table 1 contains information on several antibiotics and their prescription frequency. More than 57 percent of patients were given four antibiotics. Antibiotics with a broad range of action accounted for 70 percent of prescriptions. Culture sensitivity data were not provided in any of the cases, indicating that the antibiotics were begun empirically and no effort was made to de-escalate the situation afterwards. There was no indication of infectious aetiology in 84 of 100 (42 percent) patients, in terms of fever, increased leucocyte counts, signs and symptoms of organ system infection, or sepsis. As a result, antibiotics were deemed unnecessary in these patients.

Table 1: Age and gender distribution of the patients

Gender	Number	%
Male	59	59
Female	41	41
Age	8	8
Below 25	5	5
25-35	12	12
35-45	40	40
45-55	25	25
Above 55	10	10

Table 2: List of antibiotics prescribed

Name of antibiotics	No.	%
Ceftriaxone	21	21
Amoxicillin- clavulanic acid	17	17
Piperacillin and tazobactam	12	12
Metronidazole	7	7
Azithromycin	4	4
Levofloxacin	4	4
Cefixime	4	4
Ciprofloxacin	4	4
Clindamycin	3	3
Amikacin	3	3
Norfloxacin	3	3
Ofloxacin	2	2
Meropenem	2	2
Vancomycin	2	2
Moxifloxacin	2	2
Rifaximin	2	2
Ethambutol	1	1
Gentamicin	1	1
Isoniazid	1	1
Rifampicin	1	1
Pyrazinamide	1	1
Imipenem	1	1
Cefuroxime	1	1
Amoxicillin	1	1

Discussion

To our knowledge, this is the first research to describe the antibiotic prescription pattern of patients referred from multiple healthcare facilities to a tertiary care hospital setting. Patients come to our emergency department from a range of healthcare settings, including stand-alone clinics, private nursing homes and hospitals, and primary and secondary level public sector health facilities and hospitals. As a result, we feel that our research sample is broadly typical of emergency scenarios in our country's tertiary care institutions. We discovered that antimicrobials were obviously not recommended in more than 43.48 percent of instances, indicating severe antimicrobial misuse. Infection diagnosis is not always straightforward. Furthermore, the terminology used to classify illnesses might vary greatly. Provisional diagnoses included fever with and without thrombocytopenia, tropical fever, pyrexia of unknown cause, fever with sepsis, fever with discomfort in the abdomen, and dengue fever. Furthermore, establishing or excluding bacterial aetiology as a cause of continuing illness may be more difficult [17, 18]. Importantly, this research was not undertaken at a time when viral diseases, such as dengue or swine flu, were prevalent. We suspect that if the research had been undertaken during the previously documented time of increasing viral infections, this proportion of improper antibiotic usage would have been much higher [19]. A significant proportion of prescriptions (70%) were for broad-spectrum antimicrobials such as amoxicillin clavulanic acid, ceftriaxone, ciprofloxacin, clindamycin, and piperacillin-tazobactam. This is understandable given that all patients in the research group were started on empirical antibiotic medication. Initially, wide range antimicrobials may be required for empiric infection therapy. Prudence may still be taken, such by using amoxicillin instead of co-amoxiclav, limiting the use of third and fourth generation cephalosporins, and lowering fluoroquinolone usage, all of which have been demonstrated to help reduce antimicrobial resistance [20]. However, the lack of cultural sensitivity studies emphasises the fact that most prescribers did not understand the need of de-escalation. This designates a target for any instructional activity that may be scheduled later as part of an antibiotic stewardship programme. Despite the widespread use of broad-spectrum antibiotics, it was fascinating to see that, contrary to common assumption, Clindamycin and Amikacin were administered to less than 3% of patients. This opens up a wide range of possibilities for empirical infection control in the emergency department. The Nationwide Centre for Disease Control (NCDC) in India has released a national antibiotic strategy for infection control at all levels of healthcare [21]. It is critical to spread these recommendations since they will aid in the sensible use of antibiotics. Such efforts in other developing nations, such as South Africa [22] and Namibia, may teach us a thing or two [23]. Other significant results were inadequate discharge summaries or referral notes, a lack of comprehensive data on antimicrobial usage (drug dose, frequency, and duration), if any diagnostic tests were performed, and a lack of data on culture and sensitivity reports. These major errors not only reveal shortcomings in patient treatment, but also make future patient management challenging. As a result, it is critical that thorough discharge and referral notes be supplied, including the therapy offered as well as any investigations and treatments performed on the patient.

Conclusion

Our research highlights certain frequent but important breaches in antibiotic prescription patterns in referred patients, emphasising the need of correct referral and antibiotic usage. The outcomes of this research aided in the development of several modules of an educational intervention tailored for healthcare settings with little or no access to antimicrobial stewardship training.

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