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Review Article

**ANTIBIOTIC OVER PRESCRIBING AND THEIR COMPLICATIONS IN
FAMILY PRACTICE**

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Abstract:

Introduction: Antimicrobial resistance (AMR) is known as one of the biggest risks to human beings globally. methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most dangerous organisms. It is estimated to kill more people than emphysema, HIV/ AIDS, Parkinson's disease and homicide yearly in the US. Worldwide, it is estimated that about three percent of new cases and twenty percent of previously treated cases of tuberculosis are estimated to be caused by types that are resistant to isoniazid and rifampicin. For years, these antituberculosis agents have been excellent medications against tuberculosis, however, recently the effect is inadequate.

Recently, about one-half of multidrug-resistant tuberculosis is successfully managed by the existing medications. Widely drug-resistant tuberculosis has been recognized in more than eighty countries worldwide.

Carbapenem-resistant Enterobacteriaceae spp. and extended-spectrum beta-lactamase-producing Enterobacteriaceae have been recognized in recently. There is a remarkable lack of advancement of new medications active against these multidrug-resistant Gram-negative bacteria, especially those producing carbapenemases, and none of the antibiotics are available are now useful.

In this review, we will discuss the most recent evidence regarding antibiotic over prescribing and their complication.

Aim of work: In this review, we will discuss antibiotic over prescribing and their complication

Methodology: We did a systematic search for Antibiotic over prescribing and their complications using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). We only included full articles.

The terms used in the search were: antibiotic, over prescribing, complications.

Conclusions: There is no goal to clarify why antibiotic prescribing in respiratory tract infections (the most frequent primary care) is so great. Physicians must have to benefit and not harm, while respecting the ethical principles of autonomy and justice. But, in the case of ethical conflict, nonmaleficence and justice (at a public and obligatory level) take precedence. We know that we are able to decrease antibiotic prescribing in several of the infections that are needlessly managed without compromising our patients' health. By achieving this, we will do less damage. Furthermore, we know that antibiotics can halt being effective in the short and medium term. The use of the tactics discussed in this paper will help GPs to reduce prescribing of antibiotics.

Key words: antibiotic, over prescribing, complications.

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INTRODUCTION:

Antimicrobial resistance (AMR) is known as one of the biggest risks to human beings globally. Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most dangerous organisms. It is estimated to kill more people than emphysema, HIV/AIDS, Parkinson's disease and homicide yearly in the US [1]. Worldwide, it is estimated that about three percent of new cases and twenty percent of previously treated cases of tuberculosis are estimated to be caused by types that are resistant to isoniazid and rifampicin. For years, these antituberculosis agents have been excellent medications against tuberculosis; however, recently the effect is inadequate.

Recently, about one-half of multidrug-resistant tuberculosis is successfully managed by the existing medications [2]. Widely drug-resistant tuberculosis has been recognized in more than eighty countries worldwide [3].

Carbapenem-resistant Enterobacteriaceae spp. and extended-spectrum beta-lactamase-producing Enterobacteriaceae have been recognized in recently [4,5].

There is a remarkable lack of advancement of new medications active against these multidrug-resistant Gram-negative bacteria, especially those producing carbapenemases [6], and none of the antibiotics are available are now useful. [7].

In this review, we will discuss the most recent evidence regarding antibiotic over prescribing and their complication.

METHODOLOGY:

We did a systematic search for Antibiotic over prescribing and their complications using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). We only included full articles.

The terms used in the search were: antibiotic, over prescribing, complications.

Antibiotic Resistance Worldwide

Though antibiotic resistance has mainly been a clinical challenge in hospitals, recently data has shown resistant organisms have also been found in patients in primary care settings [8]. In a recent article from the World Health Organization (WHO), it stated clearly that this is not a trend happening in only developing countries; the problem of AMR is now discovered all over the world. Illnesses associated with AMR in primary care include

tuberculosis, gonorrhea (specifically *Neisseria gonorrhoeae*), and typhoid fever and Group B streptococcus [9]. Community-acquired AMR is of special importance because these infections are common and easily spread. Recent data from the European Antibiotic Surveillance Reports discovered that antibiotic resistance rates of *Escherichia coli* and/or *Klebsiella pneumoniae* differ significantly worldwide.

Rates of resistant *E. coli* are different eighteen-fold between Sweden (one percent) and Greece (eighteen percent) and for *K. pneumoniae* the differences were more evident, ranging from less than one percent in Sweden to sixty four in Greece¹⁰. But, antibiotic resistance of *E. coli* and *Klebsiella* spp. is highest in Asia (more than sixty percent), with rates of between ten to thirty percent in Southern Europe, and five to ten percent in Northern Europe, Australasia and North America [11].

In the setting of few pioneering antibiotics in the medication advancement, the WHO defines a hope of a post-antibiotic world and advises that not only will this eradicate the innovations in healthcare made over the past one hundred years, which have confirmed longer life in most parts of the developed and developing worlds, however it may also lead to in simple infections becoming fatal [12]. The UK Chief Medical Officer has emphasized on the urgent need for doctors to maintain the effectiveness of antibiotics by giving strong evidence on their proper use.

Most of the antibiotics utilized in medicine are recommended by general practitioners (GP). Primary care accounts for more than eighty percent of all antibiotic prescriptions in Europe and they are most commonly given for respiratory tract infections [13]. The utilization of antibiotics is highly important topic for example, about eighty percent of antibiotics in the US are consumed in agriculture, farming and aquaculture [14]. Data has shown a direct relationship between the use of antibiotics and resistance. Countries with a higher consumption of antibiotics show increased rates of resistance [15]. Antibiotic prescribing varies deeply from one European country to the next, though there is no evidence of differences in the prevalence of infectious diseases.

Why are there such differences in antibiotic consumption?

There are differences that could not be described by a separate pattern of infectious diseases worldwide. The major worry is clear which includes the

avoidance of the under-treatment¹⁶. No one needs to be seen to have withheld treatment from a patient who subsequently worsens, particularly if the patient is hospitalized. Though rare, it could harm the doctor-patient relationship and result in complaints and medical-legal consequences. But, most of the respiratory tract infections attended by GPs are self-limiting. In Europe, upper respiratory tract infections account for more than fifty percent of the antibiotics used, with a further thirty percent for lower respiratory tract infections. Contrary to the next most common condition is urinary tract infections at about seven percent [17].

Socioeconomic status plays a major role. It has been associated with variability of antibiotic prescription. Features like the way in which healthcare is funded or reimbursed, the percentage of generic drugs in the market, the economic incentives or the pressure of pharmaceutical businesses can affect antibiotic prescription by clinicians. Disparities could also be explained by the variability of antimicrobial usage. Furthermore, Kirby and Herbert noted a moderate correlation between AMR and income inequality with the use of data from fifteen large European countries [18].

Other factors related to the professional care system of antibiotics are perhaps essential, like care coordination, professional's collaboration, and communication. Misunderstandings and uncertainties regarding the role of antibiotics are present among patients [19]. Such as a European study reported that around half of the patients believed antibiotics were effective in treating viruses, cold and flu, with considerable differences across countries.

Prescribing fewer antibiotics is needed

A decreased in antibiotic utilization results in a decrease of resistance. The traditional Finnish study focusing on macrolide resistant *Streptococcus pyogenes* found how a decrease in macrolide use may result in a decrease in AMR. Antibiotic resistance decreased from nine percent in 1997 to seven percent in 2000, with a statistically significant association between regional macrolide resistance and consumption rates. Several studies have been conducted to govern the efficacy of various types of intervention in supporting a more rational use of antibiotics.

Enforcement of governmental laws prohibiting over-the-counter sale of antibiotics

Self-medication with antibiotics is not uncommon in many countries. In many countries, antibiotics are sold, illegally, without a prescription. This is

especially common in several countries in Asia, Africa, South and Central America, and even in Southern European countries like Italy, Spain, Greece and Malta [20].

Antimicrobial stewardship programmes, campaigns and audits

In several countries, there have been learning campaigns that take aim to alter healthcare professional and patient behavior in antibiotic use. Interventions involve the publication of guidelines, educational sessions on appropriate prescribing of antibiotics, educational sessions on the diagnosis and management of infectious diseases, review of prescribing data for practices, local interviews by pharmacists, messages included on TV, radio and other mass media, etc. though the consequences of these public campaigns and primary-care projects are positive, they are not sufficient to decrease the problem of AMR. An analysis of twenty two national- or regional-level campaigns in high-income countries from 1990 to 2007 did find a decrease in antibiotic use. But, as all but one campaign targeted the patient and healthcare professional simultaneously.

Promoting the use of valid point-of-care tests

When the patient visit a primary-care consultation in a Scandinavian country and compare it with a similar consultation in a Southern European country, they can realize that the most important difference is the number of diagnostic tools available in Scandinavia. GPs in Northern countries usually use rapid antigen detection testing for the diagnosis of streptococcal pharyngitis, C-reactive protein (CRP) devices for ruling out serious respiratory tract infections, equipment capable of determining the number and type of leukocytes and agar plates for urine culture and susceptibility testing of bacteria (e.g. Flexicult plates, Petri plates that give doctors knowledge about the bacterial aetiology of a urinary tract infection and the susceptibility pattern of the involved microorganisms in less than 24 hours).

Promoting delayed prescribing of antibiotics

Deferred antibiotic prescribing implies that the prescriber provides an antibiotic prescription, however advises the patient not to redeem it the same day. The prescription should only be redeemed if the patient feels worse within a few days. If symptoms reduce spontaneously, the prescription should be removed. Deferred antibiotic prescribing is a practice in the UK and its use is required by national guidelines, however it has been hard to apply in other countries. However, recent evidence from Norway also indicates that delayed prescribing may lead to a

decrease in antibiotic use, primarily for sinusitis and otitis media [21].

Enhancing communication skills with patients

Enhanced communication in primary care could assist to bridge this gap between doctors and patient prospects. This could be realized using various methods. In a pragmatic trial carried out in the Netherlands the authors observed that GPs assigned to CRP testing prescribed fewer antibiotics than those in the control group (30.7% versus 35.7%) and those trained in communication skills treated twenty six percent 26.3% of all episodes of respiratory tract infection with antibiotics compared with thirty nine percent treated by family physicians without[22].

CONCLUSION:

There is no goal to clarify why antibiotic prescribing in respiratory tract infections (the most frequent primary care) is so great. Physicians must have to benefit and not harm, while respecting the ethical principles of autonomy and justice. But, in the case of ethical conflict, nonmaleficence and justice (at a public and obligatory level) take precedence. We know that we are able to decrease antibiotic prescribing in several of the infections that are needlessly managed without compromising our patients' health. By achieving this, we will do less damage. Furthermore, we know that antibiotics can halt being effective in the short and medium term. The use of the tactics discussed in this paper will help GPs to reduce prescribing of antibiotics.

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