The Importance of Using Antibiotics as Prescribed by Professionals

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ABSTRACT

Many decades after the first patients were treated with antibiotics, the assistance given by this type of antimicrobial drug has been losing effectiveness due to the excessive and imprudent use of the drugs which significantly contributes to the rapid emergence of resistant bacteria\(^{(3)}\). Even supposing a breakthrough antibiotic active is to be discovered, the antibiotic resistance has the potential to emerge anew in one way or another unless there is a change in whether the patients use the antibiotics appropriately.
INTRODUCTION
Antibiotics or antibacterials are chemotherapeutic agents which are used to annihilate bacterial infections by either extirpating the life of bacterias or restricting them from reproducing and advancing to other parts of the human body\(^1\)(\(^2\)). They have not only facilitated us to conquer deadly diseases, but also played a vital role in major advances in medicine and surgery, an aspect which is less often emphasized yet has preeminent significance\(^4\).

Antibiotics are the only class of medicinal agents whose leading purpose is not the human tissue nor its products but instead the bacteria that impacts the physical wellness of the human body. Antibiotics disturb the natural ecological harmony by way of exerting an evolutionary pressure on bacteria\(^6\). The avalanche of uncovering of several antimicrobials alongside with the leading-edge of semi-synthetic drugs originally escorted to exhilaration that any infectious disease could be treated using antibiotics.

EMERGENCE OF ANTIBIOTIC RESISTANCE
In spite of the euphoria that antibiotics could heal any infectious diseases, the propagation of bacterial strains, resistant to almost all the therapeutically useful antibiotics during the past few decades revealed the limitation of antibiotics which is the antibiotic resistance. Antibiotic resistance happens when bacteria change and become resistant to the antibiotics used to treat the infections they cause\(^13\). Behind this obstacle, the disproportionate use of antibiotics is emphasized as a major causative factor\(^7\).
From the microbiological point of view, the resistance is defined as a phenotype which makes the microorganism less susceptible than other members of the same species irrespective of any level of resistance\textsuperscript{(12)}. Because of the rapid dissemination of antibiotic resistance in pathogens, many of the antibiotics, which were highly effective earlier, became obsolete during the past few decades\textsuperscript{(8)}. This warrants the discovery of newer and more promising antibiotics with long-term efficacy against various life-threatening infections.

Despite the fact that bacterial resistance is a growing threat, too few progressive antibiotics against multiresistant bacteria are currently being developed due to the urgent need for funding\textsuperscript{(5)}. In the last two decades, only one new antibiotic class viz the oxazolidinone was introduced in the year 1990 and all other entrants were just the variation of the existing one\textsuperscript{(8)}. The omnipresent apprehension that we might be moving toward a situation similar to the pre-antibiotic era—or in this case, the post-antibiotic era—cannot be dismissed as a far-extending supposition.

**CAUSES OF ANTIBIOTIC RESISTANCE**

The overuse of antibiotics clearly drives the evolution of antibiotic resistance\textsuperscript{(9)(10)}. An immediate connection has been proven to exist between antibiotic consumption and the emergence of resistant bacteria strains\textsuperscript{(11)}. Antibiotics exterminate drug-vulnerable bacterias, leaving drug-resistant bacteria behind to reproduce as a result of natural selection\textsuperscript{(10)}. Despite warnings regarding overuse, antibiotics are overprescribed worldwide\textsuperscript{(11)}.

Erroneously prescribed antibiotics also contribute to the promotion of resistant bacteria\textsuperscript{(2)}. Incorrectly prescribed antibiotics have a questionable therapeutic benefit and expose patients to potential complications of antibiotic therapy\textsuperscript{(14)}. Changes in antibiotic-induced gene expression can
increase virulence, while increased mutagenesis and HGT promote antibiotic resistance and spread\(^{(5)}\). Low levels of antibiotics have been shown to contribute to strain diversification in organisms such as *Pseudomonas aeruginosa*\(^{(5)}\).

**IMPORTANCE OF APPROPRIATE ANTIBIOTIC USAGE**

To muddle through antibiotic resistance, sustained attempts on educating people about prudent antibiotic use are important. Thus far, most educational efforts have been fixed on medical professionals and to the adult public\(^{(16)}\). However, because medical professionals and adults have by then established their comprehension about antibiotic use, it is rather impenetrable to change their deeply established views and behaviors. These educational attempts aimed at medical professionals, the adult public, and children are equitably efficacious in unraveling consequential misconceptions about antibiotics and correcting its usage\(^{(5)}\).

Novel antibiotics which are currently in development are still rare and pathogenic bacterias are adapting quickly to existing antibiotics\(^{(5)(17)}\). Therefore, instead of relying on the development of stronger antibiotics, educational efforts to rectify antibiotic use must be our foremost focus for the time being. In this review, public’s realization of the importance of using antibiotics as prescribed by professionals is the fundamental aspect to achieve the aim of eradicating the emergence of antibiotic resistance.

That being the case, there are several antibiotics usage regulations for the public to follow to achieve the minimization of antibiotic resistance emergence:

1. Using antibiotics only when prescribed by a certified health professional.\(^{(20)(17)}\)
2. Completing the full prescription of antibiotics even when a better condition has been achieved because stopping treatment early promotes the growth of drug-resistant bacteria.\cite{20,15}
3. Discarding any leftover antibiotics to avoid the use of remaining antibiotics.\cite{20,19}
4. Never sharing antibiotics with other patients.\cite{20}

CONCLUSION

The emergence of antibiotic resistance generates a consequential challenge for populace health, and the development of novel antibiotics can not solely be the solution for this matter. Therefore, the public shall play part in decreasing the risks of the spread of antibiotic resistance by prudently using antibiotics in accordance with prescriptions of health professionals.

In the long run, if all elements of society convey the responsibility for maintaining the efficacy of antibiotics and perform their part, minimization of antibiotic resistance can be successful. Antibiotics act as a remarkably valuable drug to treat bacterial infections, and using them responsibly now will help guarantee their effectiveness in the time to come.
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REFERENCES