

Overuse of Antibiotics Causes Serious Adverse Effects in the Body: A Literature Review

Ashwin Singh Chouhan

B N University, Department of Pharmacology, Udaipur, Rajasthan, India

Corresponding author

Ashwin Singh Chouhan, B N University, Department of Pharmacology, Udaipur, Rajasthan, India.

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ABSTRACT

Background: Antibiotics are medicines that fight bacterial infections in living and non-living. Antibiotic overuse can cause serious adverse effects in our bodies. Antibiotics increase cases of fatal diarrhea in children.

Objective: This review compiles inconsistent data found in the literature regarding overuse of antibiotics in the human body. The study aims to find out how to prevent unnecessary prescribing of antibiotics to patients in daily life.

Material and Method: Academic Journals, Ethnobotany, Google Scholar, PubMed, Science Direct, Web of Science, and library searches were used to assemble all of the information currently accessible on overuse of antibiotics in daily routine life.

Conclusion: We were able to conclude that overuse of antibiotics can cause serious adverse effects on our body. There are many reasons why doctors prescribing patients before using antibiotics because antibiotics increase the incidence of fatal diarrhea in children. Our research suggests that where children are given antibiotics for routine upper respiratory infections, they may be infected with *Clostridium difficile* bacteria are more susceptible to aggressive antibiotic-resistant strains of bacteria, antibiotics can irritate the sensitive gut flora or protect the body from good health and kill the bacteria.

Keywords: Antibiotics, Overuse, Bacterial Resistance, Microbiota, Adverse Effect etc.

Introduction

Antibiotics are medicines that fight bacterial infections in people and animals. They work by killing the bacteria or by making it hard for the bacteria to grow and multiply.

Antibiotics can be taken in different ways:

- Orally (by mouth). This could be pills, capsules, or liquids.
- Topically. This might be a cream, spray, or ointment that you put on your skin. It could also be eye ointment, eye drops, or ear drops.
- Through an injection or intravenously (IV). This is usually for more serious infections [1].

Antibiotics are medicines used to prevent and treat bacterial infections. Antibiotic resistance occurs when bacteria change in response to the use of these medicines [2]. Antibiotics are drugs that fight infections caused by bacteria. Although antibiotics

have many beneficial effects, their use has created the problem of antibiotic resistance which is the ability of bacteria to resist the effects of an antibiotic. When resistance occurs, bacteria change, survive, and multiply, causing more harm, which can make you sicker. Fighting resistance requires stronger drugs and more health care, which may cause a longer recovery time [3]. Take antibiotics when they are needed because they can cause side effects and can contribute to antibiotic resistance. Antibiotic resistance happens when the bacteria change and become able to resist the effects of an antibiotic. This means that the bacteria continue to grow [1]. Antibiotic overuse is when antibiotics are used when they're not needed. Antibiotics are one of the great advances in medicine. But overprescribing them has led to resistant bacteria (bacteria that are harder to treat)[4]. Taking antibiotics for colds and other viral illnesses doesn't work and it can create bacteria that are harder to kill. Taking antibiotics too often or for the wrong reasons can change bacteria so much that antibiotics don't work against them. This is called bacterial resistance or antibiotic resistance. Some bacteria are now resistant to even the most powerful antibiotics available.

Antibiotic resistance is a growing problem. The Centers for Disease Control and Prevention (CDC) calls it “one of the world’s most pressing public health problems.” It’s especially a concern in low-income and developing countries. That’s because:

- Health care providers there often lack quick, helpful diagnostic tools that can identify which illnesses are caused by bacteria and which are not.
- Many of the areas only recently got widespread access to antibiotics.
- Lack of clean water, poor sanitation, and limited vaccine programs contribute to the infections and illnesses that antibiotics are prescribed for.

Antibiotics are often the indispensable drug of neonatal clinical care to prevent and treat bacterial infections that impose a considerable socio-economic burden on society. This is mainly due to the challenges faced in the accurate diagnosis of neonatal sepsis. There is a growing awareness of the serious consequences of antibiotic use in infants. Antibiotics promote changes in the microbial ecology, which are involved in altered immune responses against pathogens and vaccines, and increased susceptibility to infection in later life. Understanding how antibiotic treatments during infancy shape the microbiota and immunity to design better prognostic and therapeutic strategies. It is not clear whether antibiotics can directly modify the immune function of the baby. Recent studies involving germ-free adult mice have provided interesting findings that demonstrate how antibiotics can modulate host immunity, including pathogen defense, in a microbiota-independent fashion [5,6]. But these findings await confirmation in infants. We investigated associations of life-stage and duration of antibiotic use during adulthood with risks of all-cause and cause-specific mortality [7].

Risks of antibiotic overuse and overprescribing

Risks of antibiotic overuse or overprescribing include not only increases in antibiotic resistance, but increases in disease severity, disease length, health complications and adverse effects, risk of death, healthcare costs, re-hospitalization, and need for medical treatment of health problems that previously may have resolved on their own [8]. Monitoring, early detection, and discontinuation of the offending agent is essential for antibiotics that have the potential for neuropsychiatric adverse effects. Antibiotics have the potential to cause neuropsychiatric adverse events, which can complicate the treatment of infections in patients who have a preexisting psychiatric disorder [9].

Meaning of antibiotic overuse

There are many reasons why doctors (and patients) should think twice before using antibiotics.

Antibiotics increase cases of fatal diarrhea in children.

Since most common colds are viral, using antibiotics to treat them does nothing to prevent infection and can cause unwanted side effects. Still, studies have shown that half of the antibiotics prescribed to children are for upper respiratory infections associated with the common cold.

A recent study suggests that children given antibiotics for routine upper respiratory infections are more susceptible to aggressive antibiotic-resistant strains of the bacteria *Clostridium difficile*, commonly known as C-diff. found in the human gut, these

bacteria can cause severe diarrhea and is responsible for 250,000 infections in hospitalized patients and 14,000 deaths each year in children and adults.

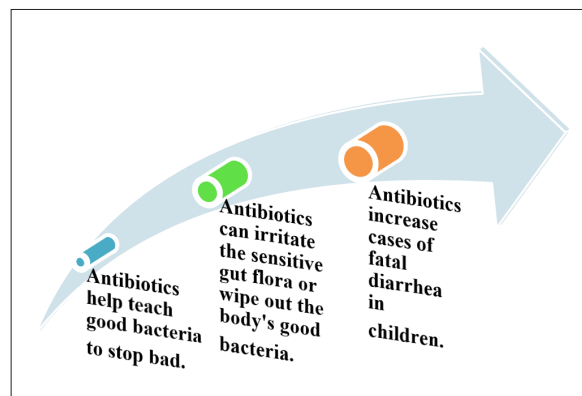


Figure 1: Doctors (and patients) should think before using antibiotics.

Antibiotics can irritate the sensitive gut flora or wipe out the body’s good bacteria.

Your intestines contain about 100 trillion bacteria of different strains. While some can be fatal, there is a natural balance in the gut that can be flushed out with antibiotics. The good bacteria in the gut, known as gut flora, help people in many ways, including helping to make vitamins, boosting immunity, and supporting proper digestion. Some researchers think that killing them with antibiotics may exacerbate chronic health conditions such as obesity, asthma and cancer. Aggressive antibiotics, while helpful if you have a serious infection, can eliminate many of the good gut bacteria, while leaving resistance to antibiotics to thrive.

Antibiotics help teach good bacteria to stop bad.

Bacteria have evolved protection against antibiotics through the process of horizontal gene transfer. Essentially, bacteria do not need to be passed along with their genetic protection from antibiotics to reproduce.

Overuse of antibiotics can cause bacteria to either learn to protect themselves from the drug, or neutralize the drug. Any bacterium that survives antibiotic treatment can multiply and pass on its resistant properties, or transfer the drug resistant properties to other bacteria. When a certain type of bacteria develops this type of defense against an antibiotic, those bacteria are said to be antibiotic resistant. As a result, medications used as standard treatment for bacterial infections are no longer effective or do not work at all [10].

Antibiotic Resistance

- Antibiotic resistance is one of the biggest threats to global health, food security, and development today.
- Antibiotic resistance can affect anyone, of any age, in any country
- Antibiotic resistance occurs naturally, but misuse of antibiotics in humans and animals is accelerating the process
- A growing number of infections such as pneumonia, tuberculosis, gonorrhoea, and salmonellosis - are becoming harder to treat as the antibiotics used to treat them become less effective.
- Antibiotic resistance leads to longer hospital stays, higher medical costs and increased mortality.

Steps of controlling antibiotic overuse

If we want to slow down the emergence and spread of antimicrobial resistance, we should take some necessary steps and actions as follows:

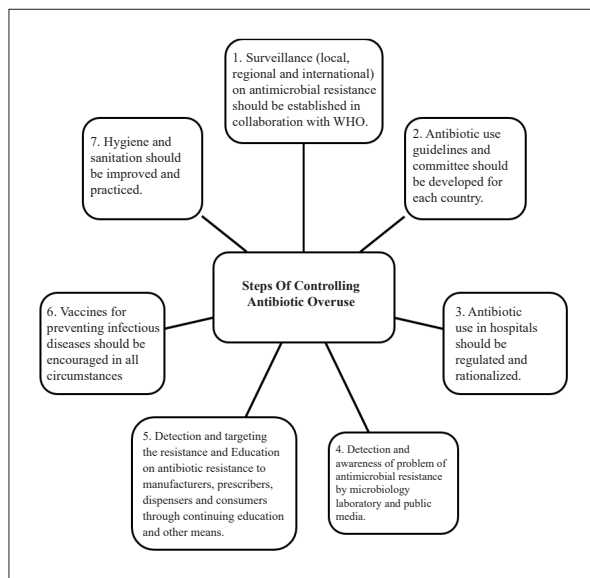
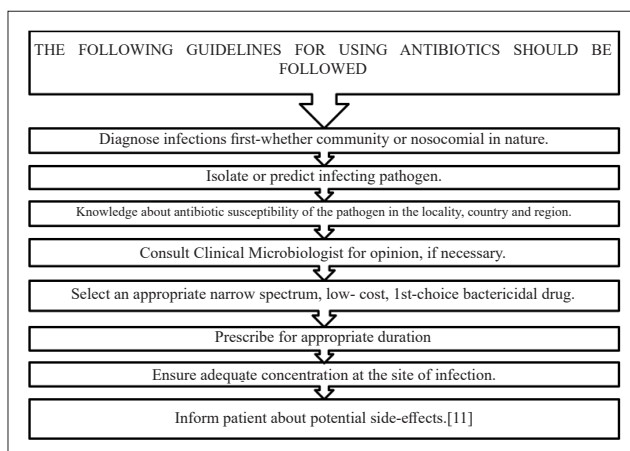


Figure 2: Step for controlling antibiotic overuse [11].

Antibiotic resistance is rising to dangerously high levels in all parts of the world. New resistance mechanisms are emerging and spreading globally, threatening our ability to treat common infectious diseases. A growing list of infections such as pneumonia, tuberculosis, blood poisoning, gonorrhoea, and food borne diseases are becoming harder, and sometimes impossible, to treat as antibiotics become less effective.

Where antibiotics can be bought for human or animal use without a prescription, the emergence and spread of resistance is made worse. Similarly, in countries without standard treatment guidelines, antibiotics are often over-prescribed by health workers and veterinarians and over-used by the public.

Without urgent action, we are heading for a post-antibiotic era, in which common infections and minor injuries can once again kill [2].



Method & Material

We conducted this research paper by observing the different types of Academic Journals, Ethnobotany, Google Scholar, PubMed, Science Direct, Web of Science, and library searches

were used to assemble all of the information currently accessible on overuse of antibiotics in daily routine life.

Future Aspect

Antibiotics are used in the future requires studies to address the underlying mechanisms by which antibiotic-driven dysbiosis in infants modulates the immune response to vaccines and infections. Antibiotics act directly on the infant’s immune system without involving the microbiota. How antibiotic management programs can be strengthened to neutralize the negative effects of antibiotic use in infants. How better animal models can be developed to study antibiotic effects on the microbiota and immunity.

Conclusion

Lastly, in our research, we were able to conclude that overuse of antibiotics can cause serious adverse effects on our body. There are many reasons why doctors prescribing patients before using antibiotics because antibiotics increase the incidence of fatal diarrhea in children. Our research suggests that where children are given antibiotics for routine upper respiratory infections, they may be infected with Clostridium difficile bacteria are more susceptible to aggressive antibiotic-resistant strains of bacteria, antibiotics can irritate the sensitive gut flora or protect the body from good health and kill the bacteria. Your intestines contain about 100 trillion bacteria of different strains. Our research found that killing antibiotics can exacerbate chronic health conditions such as obesity, asthma and cancer. Aggressive antibiotics, while helpful if you have a serious infection, can eliminate many good gut bacteria, while leaving resistance to antibiotics to thrive. Antibiotics teach good bacteria to get help from the worse. Overuse of antibiotics can cause bacteria to either learn to protect themselves from the drug, or neutralize the drug. Any bacterium that survives antibiotic treatment can multiply and pass on its resistant properties, or transfer the drug resistant properties to other bacteria. When a certain type of bacteria develops this type of defense against an antibiotic, those bacteria become antibiotic resistant. As a result, medications used as standard treatment for bacterial infections are no longer effective or do not work at all.

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