

Antimicrobial resistance or increased antimicrobial resistance rates. which one is reality?

Introduction

Antimicrobial resistance (AR) is the responses of microorganisms by varying mechanisms against antimicrobials to survive and to ensure the continuation of their species. Antimicrobial resistance is a challenge for humanity, but essential for microorganisms to survive. Microorganisms establish resistance by exchange or receiving resistance genes from other microorganisms or environment. Antimicrobial resistance mechanisms, such as serine and metallo- β -lactamases, some serine β -lactamases, were reported to have been presented four billion years.^{1,2} Therefore, antimicrobial resistance will exist in the future as well. The real problem has increased antimicrobial resistance rates through the worldwide, not the existence of antimicrobial resistance. Why have the antimicrobial resistance rates steadily been increasing? This problem is associated with multifactor. With the antibiotic containing sewage and antibiotic based drugs that are used to grow animal and plants, AR has been not only in hospitals, but also everywhere recently. Only antimicrobial stewardship cannot solve this problem, just decreases the rates little. Hospitals, long-term care facilities, nursing home facilities where antibiotics are often and excessively used antimicrobials have a local flora that is being formed by resistant organisms. Two main problems about AR are the emergence of resistant microbial flora at the first step, and then spreading of those bacteria by living and inanimate objects. So, what should be done? Antimicrobial stewardship decreases selection of resistant microorganisms. Most of the physicians are pressed to prescribe an antibiotic by patients or their relatives due to upper respiratory tract infections that commonly occur by virus, bacteriuria that is generally colonization secondary to invasive intervention and not needed antibiotic, and broader spectrum and expensive antibiotics justifications of resistance rates of other regions. Physicians do not feel comfortable for fear of malpractice, lawsuits, and inadequate treatment. Pediatricians commonly feel themselves under pressure of families of children to prescribe an antibiotic to relief their concerns about infections. A leukocyte in the urine test or simple symptom of upper respiratory tract infection pushes the doctor to prescribe a third-generation cephalosporin antibiotic that is effective in the urinary system infections. Founder and organizer of the health care system should provide antimicrobial stewardship by guidelines and supporting physicians to prescribe narrower spectrum antibiotics and law enforcement that helps them to feel more comfortable in writing prescriptions for fewer antibiotics. In the data analysis of the Truven Health Market Scan Hospital Drug Database that comprised data from approximately 300 hospitals and more than 34 million discharges, from January 1, 2006, to December 31, 2012 in the United States, overall antibiotic use did not change significantly over time, 55.1% of patients received at least one dose of antibiotics during a hospital stay, and the overall days of therapy was 755 per 1000 patient-days. The significant decreases were recorded in the use of fluoroquinolones, aminoglycosides, first and second generation cephalosporins, sulfa antibiotics, metronidazole, and penicillins, with the greatest decrease seen among fluoroquinolones.

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The significant increases were recorded in the use of third and fourth generation cephalosporins, macrolides, glycopeptides, β -lactam/ β -lactamase inhibitor combinations, carbapenems, and tetracyclines.³ This study also reveals that antimicrobial stewardship is not at the aimed level.

At hospitals, long-term care facilities, nursing home facilities where antibiotics are often and excessively used antimicrobials, infection control measures should be performed strictly, and cohort should be made for people colonized with resistant microorganisms. Cleaning staff should be educated about resistant microorganisms, healthcare associated infections, appropriate cleaning at patient rooms, glove changing for each patient room. This step is important for spreading of microorganisms in the settings. It was reported that 70 and 76% of environmental sites were unacceptable after cleaning.⁴ Cleaning should be monitored by microbiological culture or ATP bioluminescence. Cleaning staff should be trained about the cleansing and the importance of appropriate and exact cleansing with infection control measure. They also should be monitored about whether they officiate appropriately. A utopian idea that people with obsessive-compulsive cleanliness receiving psychotherapy as cleansing of very dirty places and houses can be recruited at such critical sections, and even those people think that it would be of benefit to patients. They are very sensitive to germs and diseases. However, healthcare workers, especially doctors are not sensitive to hand hygiene. Hands of healthcare workers are the most important step transmission of bacteria to patients. Even if health workers are follow-up for hand hygiene, it is not possible to provide one hundred percent compliance. There are many barriers to achieve compliance. In particular, employees feel free for hand hygiene in outside of the working hours with the reduction of the number of employees. All healthcare workers, especially doctors should be motivated for hand hygiene, and be informed about transmission of bacteria that cause death of patient and turn waste their work and effort.

Antibiotics are the components used not only in hospitals, particularly in animal breeding. Although their use is limited in many countries, there are some countries or regions where it cannot be achieved by the use of antibiotics or drugs that are similar structure of

antibiotics drug. This problem is increasing colonization of resistant bacteria in animals and the soil. Control of antibiotic use should be provided not only in hospitals, especially in animal husbandry and agriculture. Hospital waste water containing antibiotics also increase the resistant bacteria colonization in the environment and soil. It was reported that there is an association between antibiotic resistance genes and antimicrobial chemicals in dust. Especially, there was reported an increasing evidence that triclosan resistance does merge and makes the bacteria resistant to antibiotics in other classes.⁵

Consequently, the development and increasing of antimicrobial resistance is dependent on many factors. The only restriction of antibiotic use does not solve this problem. It is obvious that there are more projects and implementations that are performed in cooperation of all determinants including health workers, hospital administrators, national health institutes, international health policy determinants, the agriculture and livestock sectors, the pharmaceutical industry. Illustrious persons, including actors, actresses, sportsmen, etc. should also be considered in awareness of this problem. Movies and TV series may benefit in the description of this problem through the worldwide.

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Conflict of interest

The author declares no conflict of interest.

References

1. Hall BG, Barlow M. Evolution of the serine beta-lactamases: past, present and future. *Drug Resist Updat.* 2004;7(2):111–123.
2. Garau G, Di Guilmi AM, Hall BG. Structure-based phylogeny of the metallo-beta-lactamases. *Antimicrob Agents Chemother.* 2005;49(7):2778–2784.
3. Baggs J, Fridkin SK, Pollack LA, et al. Estimating national trends in inpatient antibiotic use among us hospitals from 2006 to 2012. *JAMA Intern Med.* 2016.
4. Griffith CJ, Cooper RA, Gilmore J, et al. An evaluation of hospital cleaning regimes and standards. *J Hosp Infect.* 2000;45(1):19–28.
5. Hartmann EM, Hickey R, Hsu T, et al. Antimicrobial chemicals are associated with elevated antibiotic resistance genes in the indoor dust microbiome. *Environ Sci Technol.* 2016;50(18):9807–9815.