



The Threat of Antibiotic Resistance and Super Bugs - A National and Global Perspective

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Abstract

Now a day's Antibiotic resistance (AR) has been called one of the world's most important public health problems. From discovery, scientists also gave warning about its misuse & resistance. Every time a person take's antibiotic, sensitive bacteria are killed and resistant one may be left to grow & multiply. Repeated & improper uses of antibiotic are the primary causes of the increasing in population of multi drug resistant bacteria (superbugs). Moreover excess use and misuse of antibiotic threatened' the usefulness of these important drugs. AR in children is particularly concerns because they have the highest rate of antibiotic use often have fewer antibiotic choices since some antibiotics cannot be safely given to children. When antibiotic s does not work, infection often last longer, cause more severe illness, required more doctors visit or extended hospital stays and involve more expensive and toxic medication. Some resistance infection may even cause death. These scenarios prevailing globally as well as in Bangladesh. WHO realized this dreaded situation and declared campaign for observing ' world antibiotic awareness week."(WAAW)from 16th -22nd November with a view to increase the awareness of global antibiotic resistance and to encourage best practice among the general public, health worker and policy maker to and further emergence and spread of antibiotic resistance. The theme of the campaign:-Antibiotic: Handle with care-reflects the overarching message that antibiotics are a precious resource and should be preserved. The government media and the doctors in practice should take initiatives to aware the mass people on antibiotic resistance and the harm of self medication.

Keywords: Antibiotic resistance; Super bugs; Pathogens

Abbreviations: AR: Antibiotic Resistance; CDC: Centers for Disease Control and Prevention; WHO: World Health Organization; ICDDR-B: International Centre of Diarrhoeal Disease of Bangladesh

Introduction

Antibiotic resistance is now one of the biggest and serious health threats- a national and global issue today. World health leaders have described antibiotic resistant micro-organisms as "Nightmare bacteria" that pose a catastrophic threat to people in every country in the world. Antibiotics are the

miracle of modern science. Ninety years have gone since Sir Alexander Fleming discovered penicillin, the first antibiotic in the world. Antibiotics significantly reduced the number of deaths attributable to different infections which have lessened the global burden of infectious disease. With the wide spread use of Antibiotics, mostly in the low and middle income countries the world is now facing the threat of Antibiotic resistance [1]. In the Nobel Prize speech, Sir Alexander Fleming warned the scientific community about the injudicious use of penicillin's and what it might bring about. He foresaw the danger of antibiotic

resistance and might have realized that a world full of Antibiotics resistance bacteria is no different from a world without antibiotics.

Discussion

The purpose of this review article is to increase awareness of the threat that antibiotic resistance poses and to encourage immediate actions to address the threat. CDC of USA states that more than two million people are sickened every year with antibiotic resistance infections with at least 23,000 dying as results [2]. According to WHO prediction the estimated death for antibiotic resistance in 2050 will be higher than cancer [3]. Most of these are caused by 'super bug's'- strains of bacteria that are resistant to multiple types and class of antibiotics. The loss of effective antibiotics will decrease our ability to fight infectious diseases and infection complications Common particularly in patients undergoing chemotherapy, dialysis and organ transplantation for which the ability to treat secondary infection is crucial. When first line and then second line antibiotic treatment options are limited by resistance or non-availability, health care providers are forced to use antibiotics that may be more toxic to the patient and frequently more expensive and less effective one. Even when alternative treatment exists, research has shown that patient with resistant infections are often much more likely to die and survivors have significantly longer hospital stays, delayed recovery and long term disability.

Antibiotics have widely been overused, under used or abused in the countries without any structured policy on controlling the injudicious prescribing attitude of different health care professional [4]. In many countries the marketing of Antibiotics is not regulated by law and order which makes these groups of drugs readily available and doctors in many countries do not take the 'evidence based practice approach' before prescribing an antibiotic. More over the lack of social awareness regarding the widespread use of antibiotic and after effect of these inappropriate consumption behaviors is not well-addressed. All these together contribute to the "Anti microbial resistance epidemic".- A term coined by the world health organization (WHO) which is a significant threat towards global health [5]. In Geneva on 27th February, 2017. WHO for the first time published a list of antibiotic resistant pathogens that possesses great threat to human. The shorts lists are as follows.

- List of antibiotic resistant pathogens that possesses great threat to human (World Health Organization on 27th February 2017/Geneva) [6]
- i. *Acinetobacter baumannii*, carbapenem-resistant
 - ii. *Pseudomonas aeruginosa*, carbapenem-resistant
 - iii. *Enterobacteriaceae*, carbapenem-resistant, ESBL-producing
 - iv. *Enterococcus faecium*, vancomycin-resistant
 - v. *Staphylococcus aureus* methicillin-resistant, vancomycin- intermediate and resistant
 - vi. *Helicobacter pylori*, clarithromycin-resistant
 - vii. *Campylobacter spp*, fluoroquinolone-resistant
 - viii. *Salmonellae*, fluoroquinolone-resistant
 - ix. *Neisseria gonorrhoeae*, cephalosporin—resistant, fluoroquinolone-resistant
 - x. *Streptococcus pneumoniae*, penicillin-non susceptible
 - xi. *Haemophilus influenzae*, ampicillin-resistant.
 - xii. *Shigella spp*, fluoroquinolone-resistant.

One of the reports of International centre of diarrhoeal disease of Bangladesh (ICDDR-B) shown that "*Salmonella typhi*" expresses high level resistance to ciprofloxacin in Bangladesh [7].

In Bangladesh, antibiotics are the most prescribed medicine [and the overall situation related to antibiotic resistance is not inspiring [8]. Most of the antibiotic prescriptions in the country target upper respiratory tract infections which are mostly caused by viruses rather than bacteria and these unnecessary prescriptions heighten up country's health-related expenditure. The perception of good prescribing attitude amongst the medical students and junior doctors in Bangladesh is poor. A 2016 Bangladeshi study revealed that the term 'Antibiotic Stewardship' was known to only 6% of the surveyed 342 undergraduate medical students across different medical colleges [9]. Moreover, not enough emphasis has been given on the antibiotic education in undergraduate medical education, and when the fresh graduates go to practice in Bangladesh, they mostly learn by observing the prescribing pattern of the senior doctors and from the information provided by the pharmaceutical companies. Currently, there is no training program on Antibiotic Stewardship both at the undergraduate and postgraduate level which indicates towards the unpreparedness of the nation to fight antibiotic resistance. Lack of optimum knowledge and practical training programs on Antibiotic Stewardship is making the battle against antibiotic resistance very hard to fight, hence to shape the attitude and behaviour of the future antibiotic prescribers, training and education should be commenced at the earlier stages of undergraduate medical education [10].

Conclusion

So to fight the current antibiotic resistance nationally and globally, all clinicians, nurses, microbiologist, pharmacist need to be well educated and self- motivated about the rational use of antibiotics. The Government media and the doctors in practice should take initiatives to aware the mass people on antibiotic resistance and the harm of self-medication, and at the same time, the proper law should be instigated to control the market so that not a single antibiotic table could get sold without an appropriate prescription from a registered physician. Moreover Pharmacologist should come forward to give more attention to develop new antibiotic to kill the super bugs that already existing. So that we can fight against antibiotic resistance in the twenty-first century.

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