

The knowledge of antibiotics and their uses against various diseases among the dormitory students of a residential University in Bangladesh: A pilot study

Abstract

The study attempts to investigate the knowledge & actual condition of antibiotic uses among university students to get rid from different infectious diseases. The study was conducted in a residential dormitory of a public university of Bangladesh. About 145 (n=145) students took part in the study which was conducted in January, 2020. Among 145 students, 94.5% previously known about antibiotic which is impressive but a vast majority (46.4%) had no idea about antibiotic resistance and 51% did not know anything what will happen if bacteria become resistant to antibiotics which is alarming. We have found that the most used antibiotic was Azithromycin (46.4%), whereas amoxicillin (40%) was second highest. Those antibiotics were used to treat mostly fever (63.4%), various infections (31%), cold cough (25.4%), diarrhea (15.5%), irritable bowel syndrome (9.9%) etc. Most students (83.7%) used antibiotics as per doctor's prescription. About 50% students had knowledge about antibiotic course & resistance which was evaluated by simple yes/no question. This work highlights the basic statistics of the knowledge about antibiotics use and abuse among the students of a residential dormitory of a public University of Bangladesh.

Keywords: Antibiotic, Fever, Antibiotic resistance, Self-medication.

Introduction

The discovery of antibiotic is undoubtedly one of the most important discoveries in the 20th century¹. Alexander Fleming discovered modern day penicillin which leads the way to discover antibiotics. Antibiotics are the most important type of antibacterial agents for fighting against bacterial infections and antibiotic medications are widely used in the treatment and prevention of various infections. Though antibiotics were very effective in the starting periods but later it was found that some antibiotics lost their effectiveness due to microbial resistance¹. This antimicrobial resistance is a serious threat for the public health and it is increasing day by day. To fight against the antimicrobial resistance, WHO (World Health Organization) has taken several steps² which steps should be followed to minimize antibiotic resistance.

Bangladesh, a developing country in South Asia, has high degree of antibacterial resistance which is both local and global threat³. Antibacterial resistance (ABR) is a term which defines when antibiotic doesn't work against bacteria. There are some factors which can be the vital cause of ABR like misconceptions regarding antibiotic use, self-medication of antibiotics, in-completion of the recommended doses, unwanted uses of antibiotics by the physicians etc⁴. The less developed and low income countries have been reported with high incidents of infectious diseases and high usage of antibiotics and/or unwanted usage of antibiotics can increase the possibility of increased bacterial resistance. Due to some specific factors like overcrowding, poor sanitation, and warm humid climate, the resistant bacteria spread rapidly in Bangladesh as like others middle income countries. University students are the most educated person in the society as well as

country. In this study, we tried to find out the knowledge of antibiotics together with antibacterial resistance and their uses among the students of a residential dormitory of a public university of Bangladesh. We also tried to gather information of which type of antibiotics are commonly used among these students. Another aim of this survey study was to make awareness among students about the usage of antibiotics and give them some knowledge about bacterial resistance and what might happened if antibacterial resistance increases day by day.

Materials & Methods

To reach the goal of the current study, a cross sectional survey was conducted in one of the residential hall of a public University of Bangladesh. Inclusion criteria for the selection of participants of the study were their full permission to participate in the survey. Written consent was taken from each of the participants during data collection. We collected data through a questionnaire. The questionnaire was composed of three segments. The first section was basic demographic information such as name, age, etc. In the second part, questions were set about their knowledge of antibiotics. They had to answer the questions with yes or no mostly. If the answer of a specific question was yes, participants were asked more questions on that specific answer. Third part was about the attitudes of the participant toward the usage of antibiotics.

Data analysis

All the collected data were analyzed by using Microsoft Excel (2010) software and results are represented either as percentages in tables or Pie chart.

Results

The results of the second part of our study were given in the table 1. The study demonstrated that 94.5% of the participants had previous knowledge about antibiotics which is satisfactory and the same percentage of participants had previously used antibiotics for different purposes (Table 1). But the most alarming findings of the present study are that almost half of the participants (42.1%) had no idea about the completion of the antibiotic courses. It is very much possible that participants of this group may also do not have knowledge about antibacterial resistance. And yes, we found about 46.4% of the participants do not know about the occurrence of antibiotic resistance (Table 1). Again, about 51.0% students do not have any knowledge what will happen if bacteria become resistant to most of the antibiotics. All of these informations give us a common scenario why antibiotic resistance is increasing day by day in developing and/or low income countries. But almost everyone (97.9%) agrees that antibiotics should not be taken without doctor's advice (Table 1).

Table: 1: Table showing the frequency and percentage of participants giving the answer of specific questions of the questionnaire.

Questions	Frequency	Yes (%)	Frequency	No (%)
Do you know about antibiotics?	137	94.5%	8	5.5%
Have you used antibiotics before?	137	94.5%	8	5.5%
Do you have any idea about antibiotics courses?	84	57.9%	61	42.1%

Do you know the outcome of incompleting of the course?	95	66.4%	48	33.6%
Do you know about antibiotic resistance?	75	53.6%	65	46.4%
Do you know the outcome of antibiotic resistance?	70	49%	73	51%
Do you think that you should take antibiotics without doctor's prescription?	3	2.1%	142	97.9%

Our study found that almost 59.1% students acquired information of antibiotics from doctors, besides 6.8% from newspaper and 12.1% from media. Most of the students (83.7%) had taken antibiotics as doctor's prescription where from registered pharmacy was 9.2%, from someone's advice 5%, self-medication 2.1% (**Figure 1**).

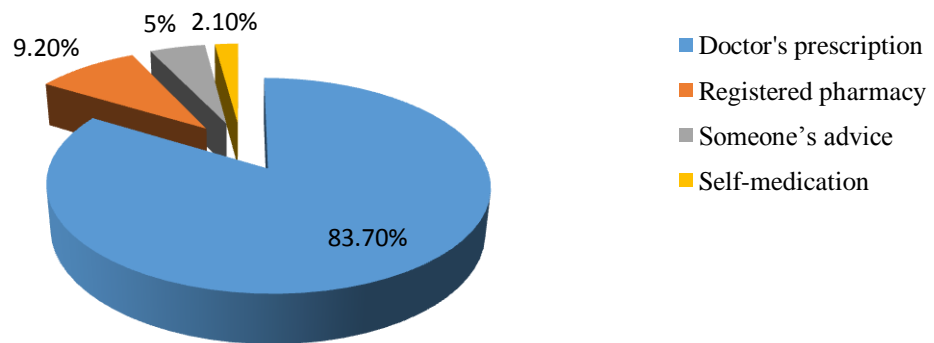


Figure 1: Pie diagram showing the percentage of participants as their source of recommendation to use antibiotics to treat different diseases.

We found azithromycin (46.4%) is the most frequently used antibiotics among the dormitory students whereas the least used antibiotic is the kanamycin (1.6%)(**Table 2**). We also found fever (63.4%) is the disease where most of the participants use antibiotics (**Table 3**). Fever is considered as one of the common sign and symptoms of many diseases but here very often fever is treated with antibiotics without knowing the exact cause of the fever which also explains the occurrence of antibiotic resistance.

Table 2:Table showing the frequency and percentage of participants using the types of antibiotics.

Types of Antibiotics	Frequency	Percentage
Azithromycin	58	46.4%
Amoxicillin	50	40.0%
Flucloxacillin	34	27.4%
Ciprofloxacin	33	26.4%
Metronidazole	20	16.0%
Cefixime	16	12.8%
Tetracycline	7	5.60%
Doxycycline	6	4.80%
Ceftibuten	5	4.00%
Kanamycin	2	1.60%

Finally, we asked students the very simple question to evaluate their general knowledge about antibiotics. We asked students that antibiotics works against which type of microorganisms. Though 64.1% of the participants gave the correct answer, a large number of the participants (29.7%) gave the answer that antibiotics work against viruses as well as against fungus (6.2%)(**Figure 2**).

Table 3:Table showing the frequency and percentage of diseases for which participants used different antibiotics.

Diseases	Frequency	Percentage
Fever	90	63.4%
Cold & cough	36	25.4%
Diarrhea	22	15.5%
Irritable bowel syndrome	14	9.9%
Throat pain	12	8.5%
Headache	10	7.0%
Urinary Tract Infection	6	4.2%
Eye Infection	6	4.2%
Other Infections	44	31.0%

Discussion

There are some factors like geographical regions, social circumstances and existing health care systems influence antibiotic use and misuse in all over the world⁵. Since antibiotic resistance is increasing day by day in the world, especially in the developing/low income countries, our aim was to know the knowledge of antibiotics and antibiotic resistance among a group of people together with collecting the data which type of antibiotics are being used by the group to treat which type of diseases. We choose University students to carry out our survey study because University is the organization of a country where students receive higher studies and it is expected that they will know better than other community of the country.

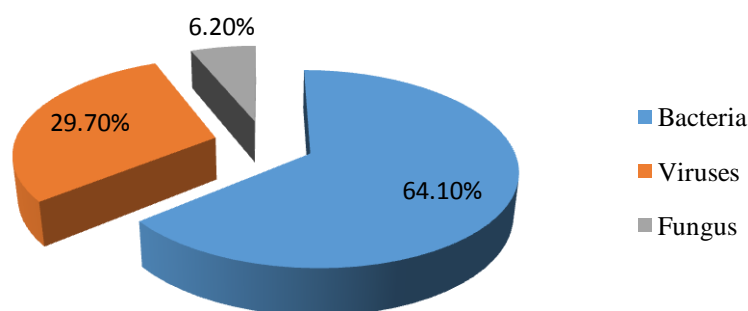


Figure 2: Pie diagram showing the percentage of participants as they inform which types of microorganisms are killed or inhibited by antibiotics.

We found 94.5% of the participants are familiar with antibiotics and have used antibiotics at least once in life. But a large percentage of participants have a poor knowledge about antibiotics and antibiotic resistance. Such as 61 out of 145 (42.1%) participants have no idea about completion of antibiotic courses, 48 (33.6%) participants do not know the outcome of the incompleteness of antibiotic courses, 65 (46.4%) participants do not know about antibiotic resistance and even half of the participants (51%) do not know if bacteria become resistant to antibiotics what will happen if bacterial infections spread all over the

World. Taken together, this scenario speaks the occurrence of antibiotic resistance in developing/low income countries like Bangladesh.

We found azithromycin was the most frequently used antibiotics among the dormitory students where they use antibiotics to treat mainly fever (63.4%), cold & cough (25.4%), infections, etc. In a survey study of 900 participants in the three major cities of Bangladesh, it was found that people of those cities used antibiotics especially for cold & fever, infections, diarrhea etc⁶. Results of our study also found cough & fever is the major illness for taking antibiotics. This is very much expected results because our physical practitioners often prescribe antibiotics without proper identifying the cause of the illness mostly for the fever bearing in mind a secondary infection by bacteria. On the other hand, a group of people also seek others suggestion to treat cold & fever and most of the people give advice to take antibiotics because he/she might take that antibiotic and get cured from cold & fever. Again, some people go directly to the pharmacy store and buy antibiotics just consulting with the pharmacist without proper doctor's prescription. Even some people do not consult with pharmacist. They just buy and use antibiotics by themselves^{6,7}. Biswas et al. found about 347 (26.69%) out of 1300 participants experienced self-medication with antibiotics and the research group claims this self-medication of antibiotics is a serious problem of health sector in Bangladesh⁸ which might also be a big problem for the World. It is very common for developing or low income countries that people can buy any medicine without doctor's prescriptions. Therefore, both the reasons (prescribing antibiotics by physicians without proper identifying the cause of the disease and people can buy antibiotics without doctor's concern) might play a role in increasing antibiotic resistance. Though, now-a-days, according to the Government rules some pharmacy stores do not sell antibiotics without proper evidence of doctor's prescription but this practice is only limited to certain areas of some cities. In survey study of antibiotic abuse in Ghana, researchers showed that 71.5% people bought antibiotics without doctor's prescription and 69.9% did not seek even pharmacist's advice. They found that people bought mostly amoxicillin 71.5%, ampicillin 13.1%, Flucloxacillin, Metronidazole, Cloxacilin was 10.8%. They used those antibiotics for the treatment of mostly cold 50.8%, cough/chest pain 33.1%, stomach ache 16.9% and skin infection 9.2%⁵. In our study most of the students (64.1%) knew that antibiotic works against bacteria but others answer wasn't satisfactory. But the positive sign was that self-medication of antibiotic was markedly less (2.1%). Most of them admired that they shouldn't take antibiotic without doctor's concern (97.9%).

Conclusions

Seminars on the importance of antibiotics use and antibiotic resistance should be arranged in the Universities of Bangladesh to aware the students about the misuse or abuse of antibiotics. Giving them the knowledge about how antibiotics misuse or abuse can make bacteria resistant against different antibiotics. Hopefully students will be more conscious about antibiotics and their uses by this process and can teach their family members about all these things. Subsequently, the students need to be aware on the fact that, the effectiveness of an antibiotic can be preserved only when they are used with a valid prescription and also when the full course is completed⁹.

Conflict of interest

The authors declare no conflict of interest.

Funding

None.

References

1. Mazińska B, Strużycka I, Hryniewicz W. Surveys of public knowledge and attitudes with regard to antibiotics in Poland: Did the European Antibiotic Awareness Day campaigns change attitudes? *PLoS One* 2017; 12:e0172146.
2. van Rijn M, Haverkate M, Achterberg P, Timen A. The public uptake of information about antibiotic resistance in the Netherlands. *Public UnderstSci* 2019; 28:486-503.
3. Ahmed I, Rabbi MB, Sultana S. Antibiotic resistance in Bangladesh: A systematic review. *Int J Infect Dis* 2019; 80: 54-61.
4. Ahmed I, Rabbi MB, Rahman M, Tanjin R, Jahan S, Khan MAA, Sultana S. Knowledge of antibiotics and antibiotic usage behavior among the people of Dhaka, Bangladesh. *Asian J. Med. Biol. Res* 2020; 6: 519-524.
5. Tagoe DNA, Attah CO. A Study of Antibiotic Use and Abuse in Ghana: a case study of the Cape Coast Metropolis. *The Internet Journal of Health* 2010; 11: DOI: 10.5580.
6. Biswas M, Roy DN, Rahman MM, Rahman MM, Islam M, Parvez GM, Haque MU, Shahriar AE, Ahmed MS, Niloy SI. Doctor's prescribing trends of antibiotics for out patients in Bangladesh: A cross-sectional health survey conducted in three districts. *IJPSR* 2015; 6:669-75.
7. Chowdhury N, Islam MR, Hasan MM, Rouf MM. Prevalence of self-medication of antibiotics among people in Bangladesh. *International Journal of Pharmacy Teaching & Practices* 2013; 4: 504-510.
8. Biswas M, Roy MN, Manik MIN, Hossain MS, Tapu SM, Moniruzzaman M, Sultana S. Self-medicated antibiotics in Bangladesh: a cross-sectional health survey conducted in the Rajshahi City. *BMC Public Health* 2014; 14:847.
9. Effah CY, Amoah AN, Liu H, Agboyibor C, Miao L, Wang J, Wu Y. A population-base survey on knowledge, attitude and awareness of the general public on antibiotic use and resistance. *Antimicrob Resist Infect Control* 2020; 9: 105.