



ASSESSMENT OF ADMINISTRATION PATTERN AND RELATIVE RISK OF SELF-MEDICATION WITH ANTIBIOTICS AMONG COLLEGE STUDENTS

Sheetal Singh Tomer^{*1}, Arun Kumar¹ and Aditya Parashar²

¹Doctor of Pharmacy (Pharm.D) Intern, Teerthanker Mahaveer College of Pharmacy, Moradabad, Uttar Pradesh, India.

²Assistant Professor, Department of Pharmacy Practice, Sri Aurobindo Institute of Pharmacy, Indore, Madhya Pradesh, India.

***Corresponding Author: Sheetal Singh Tomer**

Doctor of Pharmacy (Pharm.D) Intern, Teerthanker Mahaveer College of Pharmacy, Moradabad, Uttar Pradesh, India.

Article Received on 21/06/2020

Article Revised on 11/07/2020

Article Accepted on 31/07/2020

ABSTRACT

Self-medication is human behaviour in which an individual uses medicine for self-administration to treat the common diseases. Antibiotics (*Penicillin, Cephalosporin, Tetracyclines and Aminoglycosides*) are commonly used as self-medicated drugs that treat infections by killing or inhibiting the growth of bacteria. A prospective study was performed with 105 college students to find out the administration pattern and related risks associated in self-medication with antibiotics, including demographic characteristics of the population, general questions, pattern-based questions and relative risk assessment done by using statistical method. The relative risk is the ratio of the probability of an outcome in an exposed group to the probability of an outcome in an unexposed group. The result shows the relative risk more than 1, indicating that self-medication falls under harmful aspects of human behaviour. The major study population are female- 69 (65.71%) students, belong to rural areas which is higher 74 (70.74% of the test population) than urban population showing that the rural population is not much aware of the negative impacts of self-medication. 80 (76.19%) students have accepted that they easily get an antibiotic medicine, out of which 21 (20%) students have experienced an adverse effect from the ongoing treatment. 38 (36.19%) students used antibiotics for wound healing purpose. 51 (48.57%) students have purchased the antibiotics by using previously written prescriptions, 27 (25.71%) followed the instructions from community pharmacist also. It is necessary to understand that self-medication is not safe at all. One should avoid such attitude in order to maintain one's health status.

KEYWORDS: Antibiotic medicines, Self-medication, Risk assessment, Administration pattern, Health hazards, Treatment adherence, Drug resistance.

INTRODUCTION

Self-medication is reflex of human behaviour in which an individual uses a medicine/drug/chemical substance meant to treat or to prevent a disease condition without any physician consulting. This drug is able to improve the individual's pathological state or biological activity. Self-medication can also be described as the selection of drug products voluntarily to treat self-diagnosed signs and symptoms beyond advising a medical practitioner and supervisor in order to obtain a desired and well-improved health or physical state.^[1-2] Antibiotics are strong drugs meant to be used against bacterial infections. They act by inhibiting the growth of bacterial cell wall or by killing the bacteria. It is important to use them wisely only when necessary to treat a disease condition or wound healing.^[3-4] Without counselling to a physician, antibiotic consumption may lead to antibiotic drug resistance in the body. Antibiotics are not prescribed in viral infections. Now a day, antibiotics are the most commonly used medicines, easy to

obtained/purchased and used beyond the prescription of a physician or healthcare professionals hence termed over-the-counter (OTC) drugs.^[5-6] Consequences of self-medication along with the antibiotics dominating to health hazards, extremely in the progressing world, various as they are associated to poverty, inaccessibility, lack of health care provider, poor aspects of healthcare facilities and patient's misinterpretations about physician and medical practitioner. Self-medication with antibiotics is linked with the health hazards of improper drug use, which disposes patients to drug interaction, covering up complication or rise in symptoms of the disease and the progression of microbial resistance. To this end, the need of this research was to determine the administration pattern and related risk of self-medication along with antibiotics among college students.^[7] Self-medication offers decreased cost and faster relief of symptoms but to be very true this habit falls in drug abuse. Moreover, some drugs can show unwanted or adverse effects worsening the patient condition. This can

be a result of the wrong drug selection, error in dose strength selection or an interaction reaction between the drugs or the food taken by the patient itself.^[8]

MATERIALS AND METHODS

A community based, cross-sectional study was conducted for duration of 3 months (October to December 2019). The hypothesis was set to identify the student's attitude towards self-medication system and their knowledge status about antibiotic medications with respect to the safe and rational use of antibiotics to avoid the drug abuse and drug resistance in the human body. Student's drug administration pattern and relative risk assessment was done followed by a statistical method. 105 college students were enrolled randomly for the assessment of the administration pattern and relative risk of antibiotic medications. The data was collected by the use of predesigned MCQs set including questions related to antibiotic use pattern and relative risk during self-medication. After collecting the data, all the sets were evaluated to assess the transparency of the self-medication with antibiotics. The evaluation was done at the end of the study and the result was divided into three groups indicating the drug information, administration pattern and relative risk over antibiotic use.

RESULTS

Total 105 students were enrolled in the study, 36(34.28%) were male and 69(65.71%) were female.

Most of the study population 74(70.74%) come from a rural area and 31(29.25%) come from an urban area (shown in Table 1). Study general questions pointed out that the maximum numbers of 89(84.76%) students are found to be familiar with antibiotic medicines and their use. Approximately 80(76.19%) students have accepted history of self-medication with antibiotic medicines and 21(20%) of them had a history of at least one adverse effect due to antibiotics (shown in Table 2). In our study, pattern-based questions find out a number of 24(22.85%) students taking self-medication just because it is easy to purchase and 14(13.33%) of them have a different reason that self-medication is cost-effective. There are some common reasons for antibiotics self-medication mentioned as runny nose, nasal congestion, cough, sore throat and wound healing have equal weightage. Selection of antibiotics was based on four main parameters listed as (i) From previous treatment prescription- 51(48.57%), (ii) Suggestion from community pharmacist-27(25.71%), (iii) Self-experience- 20(19.04%) and (iv) Suggestion from family- 07(6.66%) (data shown in Table 3). Risk measurement was done on the basis of some multiple-choice questions (MCQs) asked during study assessment, results show that there is an increased risk(1.875) on adverse drug effect with self-medication (data is represented in Table 4).

Table 1: Demographic characteristics.

S. No.	Variables	Values (n=105)		Percentages (%)
1.	Gender	Male	36	34.28
		Female	69	65.71
2.	Residence	Rural	74	70.74
		Urban	31	29.25

Table 2: General questions.

S. No.	Questions	Answers (n=105)		Percentage (%)
1.	Are you familiar with antibiotics?	Yes	89	84.76
		No	16	15.23
2.	Have you ever self-medicated with antibiotics?	Yes	80	76.19
		No	25	23.80
3.	History of any adverse effect with Antibiotics?	Yes	21	20.00
		No	84	80.00

Table 3: Pattern-based questions.

Pattern based questions(n=105)	
Reason for self-medication with antibiotic medicines?	
Variables	Values (%)
Easy to get	24 (22.85)
Cost effectiveness	14 (13.33)
Lack of trust in physician	14 (13.33)
None of the above	53 (50.47)
For which reason antibiotic medicines were used?	
Variables	Values (%)
Runny nose	17 (16.19)
Nasal congestion	12 (11.42)

Cough	19 (18.09)
Sore throat	19 (18.09)
Wound healing	38 (36.19)
Antibiotics were selected on the basis of?	
Variables	Values (%)
Suggestion from family	07 (06.66)
Suggestion from a community pharmacist	27 (25.71)
Previous treatment prescriptions	51 (48.57)
Self-experience	20 (19.04)

Table 4: Risk assessment (n=105).

Variables	History of adverse effect		Total
	Yes	No	
Exposed to self-medication	18	62	80
Unexposed to self-medication	3	22	25
	21	84	105

Relative Risk Assessment

The relative risk or risk ratio is the ratio of the probability of an outcome in an exposed group to the probability of an outcome in an unexposed group. When a treatment has a relative risk value greater than 1, the risk of a bad outcome is increased by the treatment. Our result shows a relative risk of more than 1 that is 1.875, indicating that self-medication falls under harmful aspects of human behaviour.

$$RR = \frac{CI \text{ exposed}}{CI \text{ unexposed}}$$

$$RR = \frac{\frac{a}{a+b}}{\frac{c}{c+d}}$$

$$RR = \frac{\frac{18}{80}}{\frac{3}{25}} = \frac{0.225}{0.12} = 1.875$$

DISCUSSION

Self-medication can be defined as the drug administration without getting counselling from a physician for either diagnosis or treatment. The most widely self-medicated medicines are over-the-counter (OTC) drugs, antibiotic medicines and dietary supplements used to treat common health issues at home. Self-medication is when you take antibiotics without first consulting a physician or by using leftover antibiotics from previous treatments or getting antibiotics at the pharmacy without a prescription. We conducted this study with 105 college students and awareness was 76.19%. Similar kind of study was conducted by Agrawal A et al. with 152 medical students, data reveals that 69% test population was aware of antibiotic use and 56.6% of them were aware of antibiotic resistance.^[9] Our study reveals that 24 (22.85) people accept that antibiotic medicines are easy to obtain while 14 (13.33) say that these drugs are cost-effective. Most commonly used antibiotics are Amoxicillin, Ciprofloxacin and Metronidazole. In our study, most of the population 89(84.76%) has accepted

that they were familiar with antibiotic medicines and 80 (76.19%) of them have taken antibiotics for the treatment at home. The study conducted by Waaseth M et al. shows that 57% population was aware of antibiotics, 71% had knowledge of antibiotic resistance, more than 90% population knew that bacteria can become resistant to antibiotic use and 30% population stated that antibiotic medicines are effective against virus, cold or influenza.^[10] Another study done by Ha Van T et al. shows that 67.4% test population was aware of antibiotic use and its resistance. Females were found to have comparatively less awareness.^[11] A study done by Mahajan M et al. shows that 100% test population was aware of drug resistance and 96.51% agreed that antibiotic resistance is becoming a serious global public health issue.^[12] Potential risks of self-medication practices include incorrect self-diagnosis, delays in seeking medical advice when needed, adverse effects, drug interactions, improper mode of administration, incorrect dosage and incorrect therapy selection. As a result of self-medication, 21 (20%) of them have faced adverse effects. The most important reasons for self-medication are perceived self-medication harmless, having a history of disease with the same sign and symptoms and availability of medications at home. As we see the findings of our study, we get to know that people have specific reasons to choose an antibiotic medicine. The data shows that 17 (16.19%) students used antibiotics for runny nose, 12 (11.42%) for nasal congestion, 19 (18.09%) for sore throat, and 38 (36.19%) for wound healing purpose. The relative risk or risk ratio is the ratio of the probability of an outcome in an exposed group to the probability of an outcome in an unexposed group. It is computed as, where is the incidence in the exposed group, and is the incidence in the unexposed group. Value of RR less than zero or negative value is considered as a positive outcome of the study. A value between 0-1 is considered as safe range and more than 1 is considered as a harmful outcome of the study. Our study shows a relative risk value 1.875, indicates clearly that self-medication can be harmful. Such a practice should be stopped immediately. The

most frequent diseases for self-medication are fatigue, weakness, anxiety and fever. Some preventive measures to check self-medication are:

- Stop buying medicines without health screening and physicians advice.
- Read about the advantages and disadvantages of self-medication and create awareness.
- Pharmacists must be educated on the consequences of selling non prescribed medicines consumer protection laws and human rights.

CONCLUSION

This research work was done to check the antibiotic medicine-related knowledge and awareness between college students. Another important parameter included in this study was the drug administration pattern and frequency of self-medication. The data shows that the major population is aware of antibiotics and has a history of self-medication also. This study clears that the rural population is more exposed to self-medication and as a result, they have experienced some adverse effects too. Some of them have accepted that long-term antibiotic exposure may lead to antibiotic resistance which will definitely cause an increase in upcoming antibiotic dose. Antibiotic medicine selection was done on the basis of three main factors: (i) easy to obtain, (ii) for the treatment of the wound, and (iii) getting suggested from a community pharmacist.

ACKNOWLEDGEMENT

First of all, I would like to thank Almighty God for providing me an ability to perform such meaningful work. I convey my highest gratitude to my Principal Sir, Dr. AK Ghosh and my Director Sir, Dr. KK Jha for their valuable guidance. I also provide my deepest thanks to my parents for their continuous support and encouragement.

REFERENCES

1. Andre M, Verby A, Berg J, Lundborg CS. A Survey of public knowledge and awareness related to antibiotic use and resistance. Department of Public Health Sciences, Karolinska Institute, Stockholm, Sweden. *Journal of Antimicrobial Chemotherapy*, 2010 March; 10: 1292-1296.
2. Kanneppady SS, OoMyo A, Lwin Mar O, Al-Abed Ahmed A, Kanneppady SK. Knowledge and Awareness of Antibiotic Resistance among Medical Students, Lincoln University, Malaysia. *Archives of Medicine and Health Sciences*, 2019 December; 7(1): 57-60.
3. Huttner B, Saam M, Moja L, Mah K, Sprenger M, Harbarth S, Magrini N. How to improve antibiotic awareness campaigns findings of WHO global survey. *BMJ Global Health*, 2019; 4: 1-9.
4. Rosin HR, Rubsamen N, Schutte G, Raschpichler G, Chaw PS, Mikolajczyk R. Knowledge on antibiotic use, self Reported Adherence to antibiotic intake and knowledge on multidrug Resistant Pathogens- Results of a population-based survey in lower Saxony, Germany. *Frontiers in Microbiology*, 2019 March; 10: 1-8.
5. Gupta MK, Vohra C, Raghav P, Assessment of knowledge, attitude and practices about antibiotic resistance among medical students. Department of community medicine and family medicine, AIIMS, Jodhpur, Rajasthan. *Journal of family medicine and primary care*, 2019 September; 8(9): 2864-2869.
6. Glasgow L, Fletcher lartey S, Gabreil O, Forde M. Health care Practitioners level of Awareness of Antimicrobial Resistance.
7. Msaon T, Trochez C, Thomas R, Babar M, Hesso I, Kayyali R. Knowledge and Awareness of the general public and perception of pharmacist about antibiotic resistance, Kingston University, London. *BMC public health*, 2018; 18: 2-10.
8. Padmanbha TS, Nandini T, Manu G, Savkar MK, Shankar RM. Knowledge, attitude, practices of antibiotic usage among the medical undergraduates of a tertiary care teaching hospital: an observational cross sectional study. Department of Pharmacology, Sri Sidhartha Medical College, Karnataka. *International Journal of Basic and Clinical Pharmacology*, 2016 September; 5(6): 2432-2437.
9. Agarwal A, Shastri R, Bansal R, Kumar A, Tripathi A. A study to assess the level of Awareness about Antibiotic use and its Resistance in MBBS students of a Private Medical College, Meerut. *IOSR Journal of Dental and Medical Sciences*, 2019 June; 18(6): 1-6.
10. Waaseth M, Adan A, Roen IL, Eriksen K, Stanojevic T, Halvorsen KH, Blix HS, Ariasen H, Nordeng ME. Knowledge of antibiotic and antibiotic resistance among Norwegian pharmacy customers, UiT The Arctic University of Norway, N-9037 Tromsø, Norway. *BMC Public health*, January; 16(99): 2-12.
11. Ha Van T, Nguyen Thi AM, Nguyen Thi HS. Public Awareness about Antibiotic Use and Resistance among residents in Highland Areas of Vietnam, Hanoi University of Pharmacy, Hanoi, Vietnam. *Hindawi Biomed Research International*, 2019 May; 2-8.
12. Mahajan M, Dudhgaonkar S, Deshmukh S. A Questionnaire based survey on the Knowledge, Attitude, Practices about Antibiotic Resistance and usage among the second year MBBS students of a Teaching tertiary care hospital in central India. Department of pharmacology, IGGMC, Nagpur. *IJPR*, 2014; 4(4): 175-179.