

# Knowledge and Antibiotics Self-medication Behaviours among Students of Non Medical Background: A Questionnaire-based Cross-sectional Study

KR VIDYA<sup>1</sup>, MK SAGAR<sup>2</sup>, S SOWMYA<sup>3</sup>, K LOHIT<sup>4</sup>

## ABSTRACT

**Introduction:** Antibiotics are the life saving therapeutic agents used worldwide from neonates to geriatric patients for the treatment and prevention of bacterial infections. Antibiotics Self-medication (ASM) is a major public health problem due to irrational and inappropriate use of antibiotics as a routine practice among public.

**Aim:** To assess the knowledge and ASM behaviours among Bachelor of Science (BSc) degree students and also to estimate the prevalence of ASM among students of non medical background.

**Materials and Methods:** This cross-sectional study was conducted from April to November 2017 in Tumakuru, Karnataka, India, using a validated questionnaire. A total of 152 degree students were enrolled in the present study. The questionnaire consisted of 28 questions based on knowledge and behaviour towards self antibiotic medication practice was used to collect

data from face to face interaction. Data were entered into MS excel and were analysed using Statistical Package for the Social Sciences (SPSS) 19.0.

**Results:** Out of 152 students, 93 (61.2%) were treated with antibiotics and among them 64 (42.1%) were self-medicated with antibiotics. Students self-medicated with antibiotics, due to convenience 32 (50%), lack of trust in doctor 9 (14.1%). Selection of antibiotic were maximally from the previous doctor's prescription 30 (46%), followed by opinion of family members 16 (25%). Around 50% and 22% of the students obtained antibiotics from community pharmacist and from the left over from previous prescription, respectively.

**Conclusion:** The ASM was practiced among students and was encouraged by the community pharmacists and family members. Even without the proper knowledge, due to convenience the ASM has increased among the students.

**Keywords:** Antibiotic resistance, Antimicrobials, Prescription, Public health

## INTRODUCTION

Antibiotics are the life saving therapeutic agents used worldwide from neonates to geriatric patients, during pregnancy or lactation, with or without any co-morbid condition for the treatment and prevention of bacterial infections [1]. Antibiotic Resistance (ABR) alone is responsible for the death of an estimated 7,00,000 people all over the world per annum and this number may increase to 10 million by 2050 [1]. Increase in ABR worldwide, specifically in developing countries, necessitates the need to pay attention [2]. In India, ABR is prevalent in the community from paediatric to geriatric age group patients across all classes of antibiotics [3]. This rise in ABR is putting every life at risk even to common infections. One most important reason for ABR is ASM. ASM is defined as the selection and use of antibiotics by individual to treat self-recognised illness or symptoms without any advice from the registered doctor [4].

Inappropriate use of antibiotics causes catastrophic public health problems even with common infections and minor injuries in the coming days due to alarming increase in the rate of antibiotic resistance [2]. Self medication practices include mainly acquiring medicines without prescription, reusing old prescription and by the opinion of the community pharmacist or by the family members, close relatives or by friends which is left over from the previous prescription [5]. Self-medication has a major drawback which is that the user does not follow adequate dose of antibiotics and stop taking antibiotics once relieved from the symptoms. Increasing in the rate of antibiotic resistance is mainly due to inadequate dosing, incomplete courses, improper drugs and counterfeit drugs [5]. India as a developing country is drowned in the problem of ASM

significantly. The overall prevalence of ASM was ranged from 7.3% to 85.59% and among medical students it was 44.5% [5,6].

Many studies regarding self-medication among medical, nursing and allied students have been conducted which constitutes 3.3% of students enrollment at undergraduate level [5-9], but information regarding self-medication practice with antibiotics among other degree students of various discipline is scarce. The knowledge and practice component affects the self-medication pattern and hence this study was conducted to assess the knowledge and behaviour of ASM among BSc degree students of non medical background and also to estimate the prevalence of ASM among students of non medical background.

## MATERIALS AND METHODS

This cross-sectional study was conducted at Siddaganga Science College (B.Sc degree college) in Tumakuru, Karnataka, India, for a period of 8 months from April to November 2017 after obtaining the Institutional Ethics Committee (IEC) approval (ref no. SSMC/IEC-April/2/2017).

**Inclusion criteria:** All the students aged between 17-22 years, studying in B.Sc degree course and who gave written informed consent were included in the study.

**Exclusion criteria:** Students who refused to give consent were excluded from the study.

**Sample size calculation:** Considering study done by Daniel JSR et al., [8] prevalence of ASM among non medical students was 55%, with 15% relative precision at 95% confidence level, 150 was the calculated samples size.

### Data Collection

The data was collected from all the consented students using a validated questionnaire. The questionnaire was devised by the researchers after reviewing the literature [5,10] and was validated by the subjects experts. The questionnaire consisted of four questions regarding knowledge and 24 questions regarding self-medication behaviours. The questionnaire was given to all the students and explained about the study, verbal consent was taken by the students and the responses were collected by the investigator by face to face interaction based on their antibiotic use in the previous 12 months.

### STATISTICAL ANALYSIS

Data were entered into MS excel and were analysed using SPSS 19. descriptive data were presented as number and percentage.

### RESULTS

A total of 152 students including 148 male students and four female students with the mean age of 20.5±1.1 years were interviewed personally and collected the data.

Out of 152, 93 (61.2%) of students had ever taken antibiotics in the last one year and among them 64 (42.1%) self-medicated with antibiotics, 83 (54.6%) students know about antibiotics and 118 (77.6%), 16 (10.5%) and 14 (9.2%) believed that they are used for bacterial, viral and others including fungal infections, respectively. Among students those who self-medicated with antibiotics, 31 (48.4%) believe that they had taken multiple trade names antibiotics at the same time. Students self-medicated with antibiotics, due to convenience 32 (50%), lack of trust in doctor 9 (14.1%) [Table/Fig-1].

Part A: Self-medication behaviours (Attitude and Practice)		N (%)
<b>1. Have you ever taken antibiotics?</b>		
A. Yes	1	93 (61.2)
B. No	2	59 (38.8)
<b>2. Have you ever treated yourself (self-medicated) with antibiotics?</b>		
A. Yes	1	64 (42.1)
B. No	2	88 (57.9)
<b>3. How many times did you treat yourself with antibiotics in the past one year?</b>		
	1	19 (12.5)
	2	18 (11.8)
	3	10 (06.6)
	4	09 (05.9)
	5	07 (04.6)
	6	01 (01.5)
<b>4. What was (were) your reason(s) of self-medication with antibiotics? (Check more than one if applicable)</b>		
		N=64 (100%)
A. Cost saving	1	2 (3.1)
B. Convenience	2	32 (50.0)
C. Lack of trust in prescribing doctor	3	09 (14.1)
D. Others (specify)	4	21 (32.8)
<b>5. What did you consider when selecting antibiotics? (Check more than one if applicable)</b>		
A. Type of antibiotics	1	12 (18.7)
B. Brand of antibiotics	2	15 (23.4)
C. Price of antibiotics	3	02 (03.1)
D. Indications for use	4	20 (31.3)
E. Adverse reactions	5	09 (14.1)
F. Others (specify)	6	06 (09.4)
<b>6. Did you ever check the instructions come with the package insert of antibiotics for self-treatment?</b>		
A. Yes, always	1	42 (65.6)
B. Yes, sometimes	2	20 (31.3)
C. Never	3	2 (03.1)
If Never, please go to Question 8		

<b>7. How much did you understand the instructions?</b>		
A. Fully understood	1	19 (29.7)
B. Partly understood (percentage)	2	40 (62.5)
C. Did not understand at all	3	3 (4.7)
D. Never read	4	2 (03.1)
<b>8. How did you know the dosage of antibiotics? (Check more than one if applicable)</b>		
A. By checking the package insert	1	09 (14.1)
B. By consulting a doctor	2	36 (56.3)
C. By consulting a pharmacist	3	12 (18.6)
D. By consulting family members/friends	4	01 (01.6)
E. From the newspapers, magazines, books, or TV programs	5	0
F. From the internet	6	01 (01.6)
G. From my previous experience	7	02 (03.1)
H. By guessing the dosage by myself	8	1 (01.6)
I. Not responded/Don't know	9	2 (03.1)
<b>9. Did you ever change the dosage of antibiotics deliberately during the course of self-treatment?</b>		
A. Yes, always	1	3 (04.7)
B. Yes, sometimes	2	21 (32.8)
C. Never	3	37 (57.8)
D. Not responded/Don't know	4	3 (04.7)
If Never/not responded, please go to Question 14		
<b>10. Why did you change the dosage of antibiotics during the course of self-treatment? (Check more than one if applicable)</b>		
A. Improving conditions	1	09 (14.1)
B. Worsening conditions	2	09 (14.1)
C. To reduce adverse reactions	3	18 (28.1)
D. Drug insufficient for complete treatment	4	10 (15.6)
E. Others (specify)	5	03 (04.7)
F. Not responded/Don't Know	6	15 (23.4)
<b>11. Did you ever switch antibiotics during the course of self-treatment?</b>		
A. Yes, always	1	13 (20.3)
B. Yes, sometimes	2	32 (50)
C. Never	3	13 (20.3)
Don't know/Not responded	4	06 (9.4)
If Never/not responded, please go to Question 16		
<b>12. Why did you switch antibiotics during the course of self-treatment? (Check more than one if applicable) (N=45)</b>		
A. The former antibiotics did not work	1	10 (22.2)
B. The former antibiotics ran out	2	4 (8.9)
C. The latter one was cheaper	3	4 (8.9)
D. To reduce adverse reactions	4	24 (53.3)
E. Others	5	03 (6.7)
<b>13. How many different antibiotics did you take maximally during a single illness?</b>		
		N=64 (2 not responded)
	1	22 (34.4)
	2	23 (35.9)
	3	09 (14)
	4	04 (6.3)
	5	04 (6.3)
<b>14. Are you concerned that you might have taken counterfeit antibiotics?</b>		
A. Yes, very much	1	17 (26.6)
B. Yes, somewhat	2	25 (39.1)
C. No	3	22 (34.3)
<b>15. Have you ever found out that you had taken the same antibiotics with different names at the same time?</b>		
A. Yes	1	31 (48.4)
B. No	2	29 (45.3)

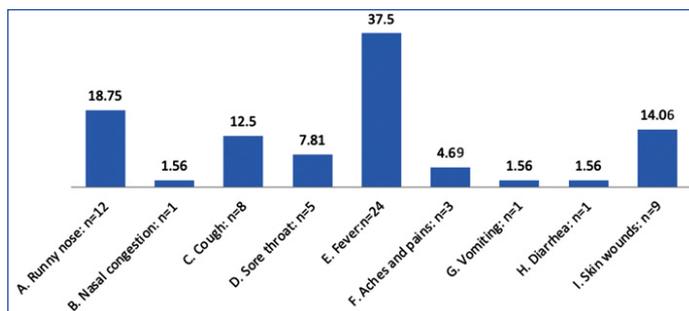
C. Don't know/Not responded	3	04 (6.3)
<b>16. When did you normally stop taking antibiotics? (Check more than one if applicable)</b>		
A. After a few days regardless of the outcome	1	03 (4.7)
B. After symptoms disappeared	2	16 (25)
C. A few days after the recovery	3	13 (20.3)
D. After antibiotics ran out	4	01 (1.6)
E. At the completion of the course	5	10 (15.5)
F. After consulting a doctor/pharmacist	6	17 (26.6)
G. Others (Not specified any reason)	7	04 (6.3)
<b>17. Have you ever had any adverse reaction when you took antibiotics for self-medication?</b>		
A. Yes	1	9 (14.1)
B. No	2	55 (85.9)
If No, please go to Question 19		
<b>18. What did you do for the adverse reactions? (check more than one if applicable) (N=9)</b>		
A. Stopped taking antibiotics	1	0
B. Switched to another antibiotic	2	2 (22.2)
C. Consulted pharmacy staff	3	2 (22.2)
D. Consulted a doctor	4	3 (33.3)
E. Consulted family members/friends	5	1 (11.1)
F. Nothing	6	1 (11.1)
G. Others	7	0
<b>19. Please write down the names of antibiotics you have ever taken for self-medication:</b>		No one responded. All response were blank
A. B. C.		-
D. E.		-
Not responded/Don't know		64
<b>20. What do you think about self-medication with antibiotics for self health care?</b>		
A. Good practice	1	23 (36)
B. Acceptable practice	2	24 (37.5)
C. Not acceptable practice	3	15 (23.4)
4. Not responded/Don't know	4	02 (03.1)
<b>21. Do you think you can treat common infectious diseases with antibiotics successfully by yourself?</b>		
A. Yes, I can	1	25 (39.1)
B. Not sure	2	31 (48.4)
C. No, I cannot	3	08 (12.5)
<b>Part B: Knowledge</b>		
<b>1. Do you know what are antibiotics?</b>		
A. Yes	1	83 (54.6)
B. No	2	66 (43.4)
C. Not responded/Don't know	3	3 (2.0)
<b>2. What are antibiotics used for? (Check more than one if applicable)</b>		
A. Virus infection	1	16 (10.5)
B. Bacterial infection	2	118 (77.6)
C. Others	3	14 (9.2)
D. Not responded/Don't know	4	4 (2.7)
<b>3. Which of the following statement(s) about antibiotics is (are) correct? (True/False/Don't know)</b>		
A. Broad-spectrum antibiotics are better than narrow-spectrum ones	1	NA
B. Higher doses result in faster recovery	2	NA
C. Lower doses result in less adverse reactions	3	NA
D. Switching antibiotics enhances drug effects	4	NA
E. Switching antibiotics reduces adverse reactions	5	NA

F. Intravenous is better than oral medication	6	NA
D. Not responded/Don't know	7	152 (100)
<b>4. What is (are) the common adverse reaction(s) of antibiotics? (Check more than one if applicable)</b>		
A. Nausea	1	41 (27.0)
B. Vomiting	2	17 (11.2)
C. Diarrhoea	3	18 (11.8)
D. Rash	4	23 (15.1)
E. Vaginal thrush	5	0
F. Drug resistance	6	17 (11.2)
G. Multiple responses		36 (23.7)
G.1. Nausea, Vomiting		22/36 (61.1)
G.2. Nausea, Rash		17/36 (47.2)
G.3. Vomiting, Rash		04/36 (11.1)
G.4. Vomiting, Diarrhoea		09/36 (25)
G.5. Rash, Drug resistance		06/36 (16.7)
G.6. Nause, Vomiting, Diarrhoea		11/36 (30.6)

[Table/Fig-1]: Questionnaire used in the study and their responses.

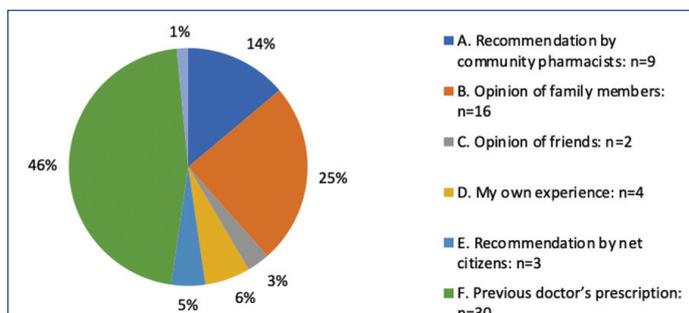
While selecting the ASM, students consider their indications, brand, adverse effects and type of antibiotics among 20 (31.3%), 15 (23.4%), 9 (14.1%) and 12 (18.7%), respectively. 42 (65.6%) students always check for package inserts if available. During the course the doses or duration were changed by themselves among 24 (37.4%) mainly to reduce adverse effects 18 (28.1%), due to worsening or improved conditions 9 (14.1%) [Table/Fig-1].

Self-treated illness with antibiotics were fever 24 (37.5%), running nose 12 (18.75%), skin wounds 9 (14.06%) [Table/Fig-2].



[Table/Fig-2]: Self treated illness with antibiotics.

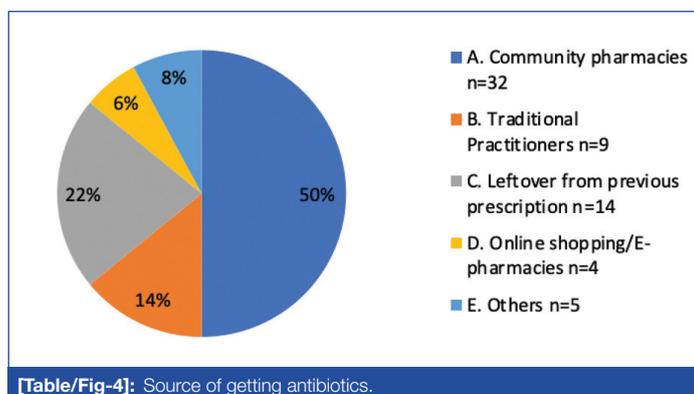
The selection of antibiotic were maximally from the previous doctor's prescription 30 (46%) followed by opinion of family members 16 (25%) and recommendation by community pharmacist 9 (14%) [Table/Fig-3].



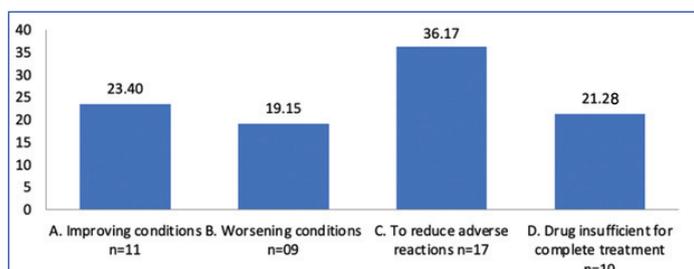
[Table/Fig-3]: Source for selection of antibiotic.

They obtain antibiotics mainly from community pharmacies 32 (50%) followed by left over from previous prescriptions 14 (22%) [Table/Fig-4].

When asked for reason for stopping antibiotics, 11 (23.40%) replied due to improvement in condition, 17 (36.17%) to reduce adverse reaction and 9 (19.15%) due to worsening condition [Table/Fig-5].



[Table/Fig-4]: Source of getting antibiotics.



[Table/Fig-5]: Reason for stopping antibiotics.

## DISCUSSION

It was observed that 42.1% B.Sc degree students reported usage of antibiotics for self-diagnosed illnesses similar to 44.5-57.6% among medical and 54.2% among nursing students [5,9,11,12]. Previous doctor's prescription was used among 46% similar to other studies with medical students (43%-46.6%) [5,6,13].

The study reveals that fever, common cold, sore throat (upper respiratory tract symptoms) were the most common illness for which self-medicated antibiotics were used. These findings are similar to the findings by Vidya KR et al., [5], Nair A et al., (62.4%) [13], Kumar V et al., (58.7%) [14] and Fadare JO and Tamuno I (34.8%) [15]. In community, fever and running nose is more commonly due to viral infection which don't require antibiotics, but 51.5% of students consumed antibiotics for these symptoms and 20.3% stopped antibiotics once the symptoms disappeared in contrast to 56.5% medical student who stop taking once symptoms disappeared [5]. This contrasting difference may be due to negligence among medical students to complete the course due to easy availability of information and antibiotics even to restart. Previous prescriptions was used to selecting the antibiotics among 47% students and 70% students purchased antibiotics without doctor's current prescription and 22% students used antibiotics from the previous prescription left over which is similar to medical students [5]. This is a concern as students are not adherent even after consulting doctors and unrestricted purchasing of antibiotics is happening without any restrictions from local pharmacies.

About 14.1% students have reported that they are experienced by adverse effects compared to 0.89% medical students. This variation in adverse effects may be due to variation in antibiotics consumed and its dose and duration [5].

There is indiscriminate sales of antibiotics and lack of strict regulatory control of antibiotic sales. The schedule H1 includes only few antibiotics mainly comprising of newer generation cephalosporins, carbapenems, aminoglycoside, newer fluoroquinolones and first- and second-line antitubercular drugs excluding important antibiotics like fluoroquinolones including ciprofloxacin and ofloxacin, beta-lactams including co-amoxiclav, cephalexin, cefadroxil and macrolides which includes azithromycin [16].

After looking at the studies published regarding ASM, this differentiation between new and old antibiotics for restricted use is allowing every individual to buy the antibiotics without any restriction. Indiscriminate

sale of antibiotics is increasing the chances of ASM and hence increasing the antibiotic resistance [16-18]. ASM is correlated with inappropriate antibiotic use and ultimately leading to development of antibiotic resistance. Community pharmacy professionals are playing a significant role in primary care because of their easy access to community. However these professionals are undertrained and accordingly there is lack of awareness in the community and mistrust. Hence it is very important to create awareness and educate among community and immediate intervention is required at the community level to prevent this misuse [17,18].

Without proper knowledge there is uncontrolled misuse of antibiotics among students. As the accessibility to doctors, selling and monitoring antibiotic sales varies across different regions, with the emergence of antibiotic resistance and rampant misuse of antibiotic there is a urgent need for educating public and students at the community level and immediate intervention has to be done at the national level with strict implementation of guidelines to the sales of antibiotics at pharmacy level to stop selling antibiotic without any prescription [3]. Immediate precautionary measures has to be taken to prevent this hazard.

## Limitation(s)

Recall bias and absence of a comparative group are some of the limitations of present study.

## CONCLUSION(S)

In present study, 42.1% B.Sc degree students reported usage of antibiotics for self-diagnosed illnesses. ASM is very rampant among the science degree students without the proper knowledge of its dosage, indications and adverse effects. The ease of its availability and support from the pharmacies and family members are the most important reasons for the raise of ASM. Public education programs, inclusion of chapters at secondary education level regarding the adverse effects of antibiotics misuse and strict regulations in selling of antibiotics may help in curbing this issue. A multicentric study including students from different disciplines along with the educative programs to change their attitude in using antibiotics as self medication will add a great value to the society.

## REFERENCES

- [1] Bhatia R. Antimicrobial resistance: Threat, consequences and options. *Natl Med J India.* 2018;31:133-35.
- [2] World Health Organisation. Facts Sheet on Antibiotic Resistance. Available from: <https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance>. [Accessed on May 30, 2019].
- [3] Vidya KR, Manjunath M, Lohit K, Prashanth HV. Antimicrobial susceptibility pattern of bacterial isolates from urine samples from female patients suffering from urinary tract infection at tertiary care center in South India. *Natl J Community Med.* 2021;12(6):127-32.
- [4] Kumari R, Kumar D, Bahl R, Gupta R. Study of knowledge and practices of self-medication among medical students at Jammu. *J Med Sci.* 2012;15:141-44.
- [5] Vidya KR, Sagar MK, Lohit K. Prevalence and pattern of antibiotics self-medication among medical students. *Natl J Physiol Pharm Pharmacol.* 2021;11(08):886-89.
- [6] Kasulkar AA, Gupta M. Self medication practices among medical students of a private institute. *Indian J Pharm Sci.* 2015;77(2):178-82. Doi: 10.4103/0250-474x.1566569.
- [7] Nepal G, Bhatta S. Self-medication with antibiotics in WHO Southeast Asian region: A systematic review. *Cureus.* 2018;10:e2428.
- [8] Daniel JSR, Prasanand S, Joice S, Rani PJ. Prevalence and practice of self medication among undergraduate medical students and non-medical students in south India. *Int J Basic Clin Pharmacol.* 2019;8:388-93.
- [9] Pal B, Murti K, Gupta AK, Choudhury U, Rastogi M, Pandey H, et al. Self medication with antibiotics among medical and pharmacy students in North India. *Curr Res Med.* 2016;7(2):07-12.
- [10] Pan H, Cui B, Zhang D, Farrar J, Law F, Ba-Thein W, et al. Prior knowledge, older age, and higher allowance are risk factors for self-medication with antibiotics among university students in southern China. *PLoS One.* 2012;7(7):e41314.
- [11] Biswas S, Ghosh A, Mondal K, Dalui SK, Haldar M, Biswas S, et al. Self-medication with antibiotics among undergraduate nursing students of a government medical college in Eastern India. *Int J of Pharmacological Res.* 2015;5:239-43.
- [12] Olayemi OJ, Olayinka BO, Musa AI. Evaluation of antibiotic self-medication pattern amongst undergraduate students of Ahmadu Bello University (Main Campus), Zaria. *Res J Appl Sci Eng Technol.* 2010;2:35-38.

- [13] Nair A, Doibale MK, Kulkarni SK, Dimple VK, Rajput PS, Shingare AD, et al. Pattern of self-medication with antibiotics among undergraduate medical students of a government medical college. *Int J Prevent Public Health Sci.* 2015;1:09-13.
- [14] Kumar V, Mangal A, Yadav G, Raut D, Singh S. Prevalence and pattern of self-medication practices in an urban area of Delhi, India. *Med J DY Patil Univ.* 2015;8:16-20.
- [15] Fadare JO, Tamuno I. Antibiotic self-medication among university medical undergraduates in Northern Nigeria. *J Public Health Epidemiol.* 2011;3:217-20.
- [16] New Delhi: Department of Health and Family Welfare, Government of India; 2013. Gazette notification G.S.R. 588(E). The Gazette of India dated. 2013;4-8.
- [17] Guinovart MC, Figueras A, Llor C. Selling antimicrobials without prescription far beyond an administrative problem. *Enferm Infecc Microbiol Clin.* 2018;36(5):290-92.
- [18] Chadavalada V, Babu SM, Balamurugan K. Non prescription sale of schedule H1 antibiotics in a city of South India. *Indian J Pharmacol.* 2020;52(6):482-87.

**PARTICULARS OF CONTRIBUTORS:**

1. Associate Professor, Department of Community Medicine, Shri Atal Bihari Vajapayee Medical College and Research Institute, Bangalore, Karnataka, India.
2. Intern, Department of Pharmacology, Sri Siddhartha Medical College, Tumkur, Karnataka, India.
3. Associate Professor, Department of Anatomy, Shri Atal Bihari Vajapayee Medical College and Research Institute, Bangalore, Karnataka, India.
4. Professor, Department of Pharmacology, Sri Siddhartha Institute of Medical Sciences and Research Centre, T Begur, Nelamangala, Bangalore Rural, Karnataka, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. K Lohit,  
Professor, Department of Pharmacology, Sri Siddhartha Institute of Medical Sciences  
and Research Centre, Bangalore Rural, Karnataka, India.  
E-mail: lohik4u@gmail.com

**PLAGIARISM CHECKING METHODS:** [\[Jain H et al.\]](#)

- Plagiarism X-checker: Mar 14, 2022
- Manual Googling: Aug 30, 2022
- iThenticate Software: Sep 06, 2022 (10%)

**ETYMOLOGY:** Author Origin**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Mar 05, 2022**Date of Peer Review: **Apr 19, 2022**Date of Acceptance: **Sep 08, 2022**Date of Publishing: **Nov 01, 2022**