

Self-Medication of Antibiotics among Medical and Nursing Students in a Medical College of Kathmandu

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ABSTRACT

Introduction

The practice of self-medication of antibiotic among future healthcare professionals can lead to the emergence of antibiotic-resistant bacteria. This study aimed to investigate the prevalence, and underlying factors associated with self-medication of antibiotics among medical and nursing students.

Methods

A cross-sectional questionnaire based survey was conducted at Nepalese Army Institute of Health Sciences among second year students of MBBS and nursing streams after obtaining approval from Institutional Review Committee and informed consent from participants. The questionnaire comprised statements for knowledge, awareness and perception and practice. Descriptive parameters were used to summarize the data.

Results

The overall percentage of self-medication practice with different antibiotics was 31.41% within the past one year among 156 total participants. The two most common reasons for self-medication were convenience in getting antibiotics (MBBS 62.1%, BScN 25% and BNS 12.5%) and previous experiences of similar illness (MBBS 58.6%, BScN 66.7% and BNS 87.5%). Azithromycin was the most used antibiotic for self-medication by BNS (62.5%) and MBBS (58.6%) students whereas metronidazole was more commonly used by BScN students (41.7%). MBBS and BNS students primarily self medicated antibiotics for common cold and sorethroat, while BScN students commonly used them for fever and diarrhea.

Conclusion

This study revealed the practice of self-medication with antibiotics among medical and nursing students albeit less as compared to the other studies. However, such self-medication practice can adversely affect the future of antibiotic related issues especially emergence of antimicrobial resistance.

Keywords

Antibiotics; antimicrobial resistance; medical students; nursing students; prevalence; self-medication

INTRODUCTION

Self-medication with antibiotics (SMA) is the acquisition and self-administration of antibiotics for treating a perceived infection, and/or for chronic or recurrent illness without a prescription or advice from a qualified healthcare professional.¹ Studies suggest that self-medication practice of antibiotics is increasing worldwide and more than two-thirds of antibiotics consumption in low and middle income countries (LMIC) are in the form of self-medication.^{2, 3} Such injudicious use of antibiotics can lead to the emergence of antibiotic resistant bacteria that impose a constant threat to the existing health care system.^{3, 4}

Medical and nursing students have better access to healthcare related information and facilities making them vulnerable to practice self-medication.⁴ A study done among Chinese university students revealed 65.9% prevalence of SMA.⁵ Similarly, the SMA among medical and dental students was found around 50% in Nepal.^{2, 3} A previous study in the same setting was done earlier that focused on self-medication in general and reported a prevalence of 76% but it was not focused on antibiotics⁶ thus justifying the need of this study. Medical and nursing students being future healthcare professionals; their knowledge, attitude, and behaviors about antibiotic use might have potential impact on rational antibiotic use and could help reduce the burden of antimicrobial resistance (AMR).^{4, 7, 8}

Understanding the underlying factors of SMA behavior can help identify education and awareness gaps and thereby design the effective training module for prudent use of antibiotics.⁸ Hence, this study aimed to investigate the prevalence, and underlying factors associated with self-medication of antibiotics among medical and nursing students, with a focus on assessing their knowledge and practices related to this behavior.

METHODS

A descriptive cross-sectional study was conducted in Nepalese Army Institute of Health Sciences (NAIHS), Kathmandu, Nepal, over four months from March 2025 to June 2025 after getting approval from the Institutional Review Committee (IRC) on with registration no 1236. The target study group were students of second year in Bachelor of Medicine and Bachelor of Surgery (MBBS) programs, Bachelor of Science in Nursing (BScN) and Bachelor in Nursing Sciences (BNS) programs because these students are taught about antibiotics and their uses in first year itself and are liable to indulge in self-medication.

Census sampling was done targeting a total number of 180 students (100 from MBBS and 40 each from BScN and BNS programs). A self-administered

questionnaire-based survey was designed to assess knowledge, awareness and practices regarding self-medication with antibiotics. The questionnaire was self-designed and tailored to suit the target population of this study. The construction and content of the questionnaire was validated with two consultant pharmacologists followed by face validation through pilot study with a small group of students viz. MBBS 10, BScN 4 and BNS 4 (10% of the study sample) from different years of study than our sample to ensure its clarity, reliability and time to fill the questionnaire. Before the questionnaire was distributed, each student was informed about the purpose of the study, and their informed consent was obtained. Students were informed beforehand that their participation was voluntary and ensured that the anonymity would be maintained.

The questionnaire comprised of four parts: Part A (background information); Part B (statements for knowledge), Part C (statements for awareness and perception) and Part D (statements for practice) (Box 1). Statements of awareness were provided with 5-point Likert scale (strongly agree to strongly disagree). Each scale was assigned with numerical values ranging from 5 to 1 (e.g. 5 for strongly agree to 1 for strongly disagree for positive statements and vice versa for negative statements) and then mean score was calculated across all responses. The most common types of antibiotics used, the medical problems for which self-medication was practiced, and the underlying variables driving these behaviors, such as accessibility, cost, and prior experience were identified.

Data was checked for completeness and consistency by the two researchers (MS and AK) and was entered and analyzed using IBM SPSS

Box 1. Key domains of the questionnaire

Domains
A. Knowledge
1. Definition of the term "Antibiotics"
2. Discontinuation of antibiotic use
B. Awareness regarding antibiotic use
C. Antibiotic use practice
1. Reasons for self-medication with antibiotics
2. Indications for which the antibiotics was/were used
3. Antibiotics that were used for self-medication
4. Basis for selection of antibiotics
5. Change of antibiotic during the course of self-treatment and the reason for the change

Statistics version 23. Descriptive parameters were used to summarize the data. Categorical variables were presented as frequencies and percentages in tabulated form. Continuous variables were reported as means and standard deviations.

RESULTS

Out of 180 students, 156 students (85 MBBS, 39 BScN and 32 BNS) consented for the study. Overall percentage of self-medication practice with different antibiotics was 31.41% (49) within the past one year. The prevalence of self-medication practice was found 34.1% (29), 30.7% (12) and 25% (8) among MBBS, BScN and BNS students

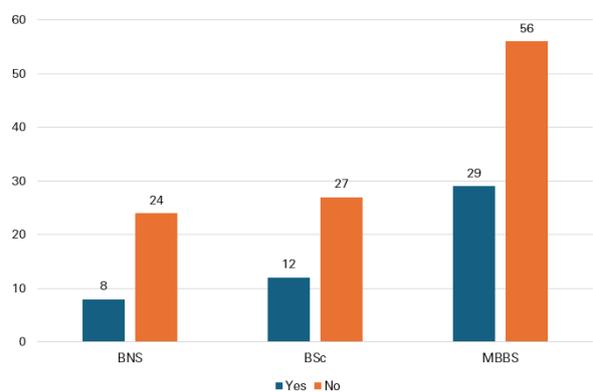


Figure 1. Students with self-medication in last one year

respectively (Figure 1).

Knowledge of self-medication and antibiotics

Out of 156 respondents, 96.2% of respondents (95.3% of MBBS students, 94.9% of BScN students and 100% of BNS students) correctly replied that antibiotics are the agents used to treat infections caused by bacteria and other microorganisms. Similarly, 90.5% (77) students from MBBS, 92.2% (36) from BScN and 96.9% (31) from BNS responded that one should stop taking antibiotics after completing the antibiotic course (Table 1)

Regarding awareness, 83.9% and 76.3% of students of all streams strongly agreed to the statement that one should consult a physician before taking antibiotics and unnecessary use of antibiotics can lead to emergence of antibiotic resistance respectively (mean score ranging from 4.79-4.94 and 4.67-4.71 respectively).

Regarding the use of leftover antibiotics for similar symptoms without consulting a doctor, 88.2% MBBS students, 89.7% BScN students and 90.6% of BNS students disagreed with it. Similarly, 71.8% of MBBS students, 53.8% of BScN students and 71.9% of BNS students disagreed to consider self-medication with antibiotics as a convenient and harmless solution to illness. The percentage of students who disagreed on the statement that antibiotics can effectively treat all infections were 82.4%, 53.8% and 62.5% from MBBS, BScN and BNS program respectively (Table 2).

Table 1. Responses regarding assessment of knowledge

Domains	Statement	Options	MBBS		BScN		BNS	
			N	%	N	%	N	%
Definition of the term "Antibiotics"	*The term "Antibiotics" is used generally to define:	a) drugs used to treat infections caused by bacteria and other microorganisms	81	95.3	37	94.9	32	100
		b) drugs used in treating bacterial and viral infections	4	4.7	2	5.1	0	0
Discontinuation of antibiotic use	When is it appropriate to stop antibiotic use?	a) After completing the antibiotic course	77	90.5	36	92.2	31	96.9
		b) After symptoms disappear	4	4.7	1	2.6	0	0
		c) Few days after recovery	2	2.4	1	2.6	1	3.1
		d) After a few days regardless of the outcome	2	2.4	1	2.6	0	0

*Students responded to only two options

Table 2. Responses of students regarding awareness of self-medication of antibiotics

Statement	MBBS		BScN		BNS	
	Mean±SD	95% C.I (lower to higher)	Mean±SD	95% C.I (lower to higher)	Mean±SD	95% C.I (lower to higher)
One should consult physicians before taking antibiotics.	4.79±0.98	4.57 to 4.99	4.85±1.51	4.37 to 5.32	4.94±1.73	4.34 to 5.53
Unnecessary use of antibiotics can lead to antibiotic resistance.	4.71±0.96	4.50 to 4.91	4.67±1.43	4.22 to 5.12	4.69±1.58	4.13 to 5.23
One can use leftover antibiotics for similar symptoms without consulting a doctor.	4.33±0.84	4.15 to 4.50	4.46±1.34	4.04 to 4.88	4.44±1.45	3.93 to 4.94
Self-medication with antibiotics is a convenient and harmless solution to illness.	3.95±0.72	3.79 to 4.10	3.46±1.00	3.15 to 3.78	3.69±1.09	3.30 to 4.06
Antibiotics can effectively treat all infections	3.99±0.72	3.83 to 4.14	3.46±1.00	3.15 to 3.78	3.41±0.99	3.06 to 3.75

Mean score± Standard deviation (SD), 95% C.I.=95% Confidence Interval

Practice of self-medication with antibiotics

The two most common reasons for self-medication were convenience in getting antibiotics (MBBS 62.1%, BScN 25% and BNS 12.5%) and previous experiences of similar illness (MBBS 58.6%, BScN 66.7% and BNS 87.5%). Other reasons mentioned were avoiding crowds at out-patient departments (MBBS-2) and cost-saving (BScN-1).

The antibiotics used for self-medication by medical and nursing students are illustrated in Table 3.

Only 5 out of 29 students (17.2%) from MBBS changed the antibiotic during the course of self-medication whereas only 1 out of 8 students (12.5%) from BNS did so and none of the students from BScN changed their medication. The most common reason for change of medication was that the former antibiotic did not work (MBBS 60% and BNS 100%).

DISCUSSION

This study was done to assess the prevalence and practices of self-medication among medical and nursing students. The overall prevalence was 31.4%, which is less as compared to the study conducted in Nepal by Shrestha D et al (52.8%) and Mandal NK et al (51.1%) and international study conducted by Haque M et al (39.3%) and Simegn W et al (55.3%).^{2, 3, 9, 10} The variation in prevalence may be due to variation in selection of study population, the availability of antibiotics as well as the size of the study population, and coverage of antibiotics in

their curriculum.

Regarding knowledge, students from all the streams have correctly answered (>90%) both the questions that antibiotics mean the agents used to treat infections caused by bacteria and other microorganisms and that it's appropriate to stop antibiotic use after completing the course. This could be attributed to the knowledge they have acquired during their course of study, and this also imparts how education can have a positive impact on our understanding and practice.

Common cold and sore throat were the most common conditions for which the students from all three streams had self-medicated themselves. This data commensurate with other previous studies done in Nepal, Sri Lanka, China and India.^{2, 3, 11, 12} This could probably be due to the common patterns of seasonal illness in south Asian regions making them the most common conditions for which self-medication is practiced. Azithromycin was the most common antibiotic in MBBS and BNS streams followed by amoxicillin and metronidazole whereas metronidazole was the most common drug used for self-medication in BScN followed by azithromycin and amoxicillin which could be because of relative ease of administration (once daily for three days with respect to azithromycin) and less adverse effects with these drugs. These findings are similar to the findings of other studies.^{2, 13} Our study also showed that very few students changed the antibiotic during the course of self-medication. This could be attributed to the fact that the students are

Table 3. Responses regarding antibiotics used, common indications and basis for selection

Domains	Statement	Options	MBBS		BScN		BNS	
			N	%	N	%	N	%
Antibiotics that were used for self-medication	Which antibiotics did you use for self-medication? (Check more than one if applicable)	Azithromycin	17	58.6	3	25.0	5	62.5
		Amoxicillin	14	48.3	1	8.3	2	25
		Metronidazole	8	27.6	5	41.7	1	12.5
		Ciprofloxacin	4	13.8	0	0.0	0	0
		Cotrimoxazole	1	3.4	0	0.0	0	0
		Cloxacillin	0	0.0	1	8.3	0	0
		Albendazole	0	0.0	1	8.3	0	0
Indications for which the antibiotics was/ were used	For which of the following complaint(s) did you use antibiotics? (Check more than one if applicable)	Common cold	17	58.6	1	8.3	5	62.5
		Sore throat	16	55.2	1	8.3	5	62.5
		Fever	11	37.9	6	50.0	0	0
		Cough	7	24.1	1	8.3	3	37.5
		Diarrhea	7	24.1	4	33.3	0	0
		Wound/skin injury	3	10.3	0	0.0	0	0
		Toothache	2	6.9	0	0.0	0	0
Basis for selection of antibiotics	Your selection of antibiotics was based on (Check more than one if applicable)	Previous doctor's prescription	13	44.8	4	33.3	1	12.5
		My own experience	9	31.0	2	16.7	8	100
		Recommendation of community pharmacist	7	24.1	4	33.3	0	0
		Opinion of family members	4	13.8	2	16.7	0	0
		Opinion of friends	1	3.4	1	8.3	0	0

well aware of the duration of antibiotics use and have an understanding that antibiotics should not be changed without any compelling indication during the course of treatment. This particular domain was not included in other similar studies carried out in Nepal.^{2,3,8}

Our study observed high awareness across all three student groups with mean scores above 4.3 for statements about physician consultation, resistance development and avoiding use of leftover antibiotics. This aligns with findings from similar studies in South Asia, Middle East and Africa.¹⁴⁻¹⁶

MBBS students demonstrated elevated mean scores (3.95-3.99) in comparison to nursing students (3.41 - 3.69) (Table 2) on the statements regarding antibiotics self-medication being convenient and safe; and antibiotics' utility on treating all infections which suggested that there are potential gaps in translating pharmacological knowledge into practical antibiotic stewardship attitudes and is in accordance to other similar studies done in Nepal.^{2,3}

Though the total prevalence of self-medication with

antibiotics was least in our study, still we observed one-third of students indulging in this practice. Injudicious use of antibiotics for treating self-limiting trivial infections or viral infections like common cold where it is ineffective may lead to the emergence of multi-drug resistant bacteria.¹⁷⁻²⁰ The infection with antibiotic resistant medications is very difficult to treat with available first- and second-line drugs and may force health professionals to use more toxic and expensive antibiotics.²⁰⁻²¹ In addition to the adverse outcome on healthcare, antimicrobial resistance presents substantial economic challenge for government and societies. The financial burden of managing resistant infections is significantly elevated as a result of extended hospitalizations, escalated healthcare consultations and the necessity of costly medications.²² Therefore, medical students should be repeatedly made aware of the rational use of antibiotics.

This cross-sectional study prevents causal interpretation and did not explore the statistical association of factors like knowledge with practice

of self-medication, however; it calls for a nationwide study including all medical institutions in Nepal to generate a large pool of data on self-medication with antibiotics among medical and nursing students. There might be the chance of recall bias and social desirability bias.

CONCLUSION

This study revealed the practice of self-medication with antibiotics among medical and nursing students albeit less as compared to the other studies. However, such self-medication practice can adversely affect the future of antibiotic related issues especially emergence of antimicrobial resistance. Addressing this issue with inclusion of practical approach on rational use of antibiotics in medical and nursing curricula is thus required.

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CONFLICT OF INTEREST

The author(s) declare that they do not have any conflicts of interest with respect to the research, authorship, and/or publication of this article.

All authors are faculties of the study site. The authors declare no other conflict of interest with respect to the study, authorship, and publication of this article.

AUTHOR CONTRIBUTIONS

The first and second authors conceived the study, all authors reviewed literature, developed methodology, designed and revised the questionnaire. The first and second authors collected data, entered and verified the data. The second author analyzed the data. The first author drafted the manuscript and was revised by all other three authors. All authors read and approved the final manuscript and are accountable for this publication.

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