

ORIGINAL RESEARCH ARTICLE

KNOWLEDGE, ATTITUDE AND PRACTICE ON ANTIBIOTIC USE AND ITS RESISTANCE AMONG MEDICAL STUDENTS IN A TERTIARY CARE HOSPITAL

Srijana Panthi<sup>1,\*</sup>, Priya Pathak<sup>1</sup>, Jyoti Sitaula<sup>2</sup>

<sup>1</sup>Department of Community Medicine, College of Medical Sciences (COMS), Bharatpur, Chitwan, Nepal

<sup>2</sup>Department of Orthopedics Surgery, Chitwan Medical College (CMC), Bharatpur, Chitwan, Nepal

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*\*Correspondence to: Srijana Panthi, Department of Community Medicine, College of Medical Sciences Teaching Hospital, Bharatpur, Chitwan, Nepal.  
Email: [srijanapanthi7@hotmail.com](mailto:srijanapanthi7@hotmail.com)*

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ABSTRACT

**Background:** Antimicrobial resistance is evolving as a major global public health problem. This study was aimed to assess the knowledge, attitude and practice on antibiotic use and its resistance among medical students in a tertiary care hospital.

**Methods:** Questionnaire was administered to the students of an undergraduate medical college hospital to assess their knowledge, attitude and practice about rational use of antibiotics. Data was analyzed using SPSS version 20.

**Results:** Two hundred fifty three undergraduate students completely filled the electronic questionnaire. About 76.3% of the students believed that improper use of antibiotics/self-prescription can cause and promote antibiotic resistance. One third (33.2%) of students thought that use of antibiotics will speed up recovery from flu and cold and skipping one or two doses does not contribute to the development of antibiotic resistance. Majority (93.3%) of the students had never attended a Continuing medical education about rational use of antibiotics in the past. The knowledge, attitude and practice domain scores were not significantly different between the students among various academic years.

**Conclusions:** Our study showed that the majority of the students had good knowledge and attitude about antibiotics and its resistance. Their practice was satisfactory towards rational use of antibiotics. Medical students need to be sensitized regarding antimicrobial resistance through various Continuing medical education and workshops highlighting its burden and impact. Proper guidelines and strict policy on sales of antibiotics without prescription should be implemented and monitored regularly.

INTRODUCTION

Antimicrobial resistance (AMR) is stated to be one of the greatest challenges to global public health. Excessive and irrational use of antibiotics leads to development of antimicrobial resistance over time.<sup>1,2</sup> As a result, the medicines become ineffective and infections persist in the body, increasing the risk of spread to others.<sup>3</sup>

The irrational and injudicious use of high doses of antibiotics for therapy and suboptimal doses as growth promoters are leading causes of AMR in Nepal.<sup>4</sup> Nepal has only recently started its journey on the path to an integrated response to the challenge of antimicrobial resistance. In addition, most of the routinely used antibiotics are available over the counter, increasing the non-prescribed antibiotic usage.<sup>5</sup> Consequently, these reasons along with irrational use of antibiotics and unawareness among the consumers, Nepal is bound to have high AMR in absence of intervention.<sup>6</sup>

Misuse and the overuse of the antibiotics is mostly addressed with the prescription system via health care professionals. However, the lack of data on the status of the understanding the antimicrobial resistance and the inadequate experience for

it does not allow the implementers to guide the health care professional in a common grounds to address the antimicrobial resistance.<sup>7</sup> It is the high time that we include young medical students in continuous medical education on antibiotic resistance to take up advocacy and stewardship role in antimicrobial resistance in future. The objective of this study was to assess the knowledge, attitude and practice (KAP) on Antibiotic use and its resistance among Medical Students in a Tertiary Care Hospital.

METHODS

This was a cross-sectional study conducted among students from first, second, third and fourth years (253 out 350 students) of MBBS and BDS students of College of Medical Sciences from 10<sup>th</sup> June to 9<sup>th</sup> July 2020. This study was questionnaire-based study, developed based on the literature review<sup>8-11</sup> of comparable studies done in the past. The questionnaire was pre-tested on ten percent of the sample size, and then modified according to the results and feedback. The questionnaire consisted of 16 questions in the knowledge and attitude domain (1-8: knowledge domain questions; 9-16: attitude domain scores), and 7 questions in the practice domain. Because questions 3, 7-8, 12-16 were negative items

i.e. negatively phrased compared to other questions, reverse scoring was done for these questions before the final analysis.

The questionnaire was distributed to the participants after obtaining their informed consent with permission from principal of the institution. Only completely filled questionnaires were used for final analysis. Identity of the participants was kept confidential throughout the study periods. A structured questionnaire containing questions based on a five-point Likert scale was used. A few questions were true and false type also. Sample size was calculated using the formula:  $z^2xpq/e^2/1+z^2xpq/e^2N$

N= Total students (350)

e=0.05 margin of error

z=1.96 (C.I) Confidence interval

p=0.5

$1.96^2 \times 0.5 \times 0.5 / (0.05)^2 / 1 + (1.96)^2 \times (0.05 \times 0.5) / (0.05)^2 \times 350$

=93.44

Approval from the Institutional Ethical Committee (COMS-IRC 2019-031) was obtained. Participation were entirely voluntary and neither they were forced or coerced at any level with flexibility to withdraw from the study at any point of time. Only completely filled questionnaires were used for final analysis. Data collection was done using Google Forms and entered into SPSS-20/Microsoft Excel sheets. Data was described using mean and standard deviation for quantitative variables, and numbers and percentages for categorical variables. One-way Analysis of Variance (ANOVA) test was used to compare indi-

vidual domain scores between different academic years. A p-value of < 0.05 was considered as statistically significant.

## RESULTS

Out of 350 students, 253 (72.28%) students completely filled the questionnaire. The response rate of our study was 72%. The mean age of the study participants was  $21.4 \pm 1.8$  years. There were 121 (47.8%) males and 132 (52.2%) females. Demographic data are shown in Table 1.

**Table 1: Demographic characteristics of participants**

Academic year	Frequency (%)
1 <sup>st</sup> year	56 (22.1)
2 <sup>nd</sup> year	64 (25.3)
3 <sup>rd</sup> year	75 (29.6)
4 <sup>th</sup> year	58 (22.9)
Total	253 (100.0)

As shown in Table 2 and 3, 76.3% of the students believed that improper use of antibiotics/self-prescription can cause and promote antibiotic resistance. Surprisingly one third of students thought that use of antibiotics will speed up recovery from flu & cold and skipping one or two doses does not contribute to the development of antibiotic resistance. Most of the students also agreed that antimicrobial resistance is a major public health concern.

**Table 2: Knowledge of participants towards antimicrobial resistance**

S.N	Statements	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Mean $\pm$ SD
1.	Improper use of antibiotics can cause antibiotic resistance	0 (0.0)	1 (0.4)	5 (2.0)	54 (21.3)	193 (76.3)	4.7 $\pm$ 0.5
2.	Antibiotic resistance is prompted by self-prescription	5 (2.0)	7 (2.8)	26 (10.3)	139 (54.9)	76 (30.0)	4.1 $\pm$ 0.8
3.	Viral infection with fever should be treated with antibiotics	60 (23.7)	77 (30.4)	48 (19.0)	43 (17.0)	25 (9.9)	3.4 $\pm$ 1.3
4.	Poor infection-control practices by healthcare professionals cause spread of antimicrobial resistance	4 (1.6)	32 (12.6)	56 (22.1)	100 (39.5)	61 (24.1)	3.7 $\pm$ 1.0
5.	Animal husbandry (antibiotic usage in animals) is a source of antibiotic resistance	22 (8.7)	57 (22.5)	66 (26.1)	65 (25.7)	43 (17.0)	3.2 $\pm$ 1.2
6.	The use of higher antibiotics as initial therapy for mild infection may increase the risk of antibiotic resistance	3 (1.2)	9 (3.6)	16 (6.3)	104 (41.1)	121 (47.8)	4.3 $\pm$ 0.8
7.	Skipping one or two doses does not contribute to the development of antibiotic resistance	56 (22.1)	102 (40.3)	18 (7.1)	52 (20.6)	25 (9.9)	3.4 $\pm$ 1.3
8.	Use of antibiotics will speed up recovery from flu and cold	53 (20.9)	66 (26.1)	50 (19.8)	67 (26.5)	17 (6.7)	3.3 $\pm$ 1.2

Table 4 represents practice of participants on antimicrobial resistance. Majority (93.3%) of the students had never attended a CME about rational use of antibiotics in the past. Almost half of the participants had advised others or taken antibiotics without consulting any physician. More than 90% of the students have completed the full course of antibiotics prescribed by the physician. More than two thirds of the participants have

never taken antibiotics prophylactically and did not prefer using antibiotics for cough and sore throat.

The knowledge, attitude and practice domain scores were not significantly different between the students among various academic years (Table 5). The second-year students scored lowest on knowledge domain as compared to other groups.

**Table 3: Attitude of participants towards antimicrobial resistance**

S.N	Statements	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Mean ± SD
1.	Antibiotics resistance means that if antibiotics are taken too often, they are less likely to work in future	4 (1.6)	22 (8.7)	21 (8.3)	98 (38.7)	108 (42.7)	4.1 ± 0.9
2.	Do you think self-medication promote antibiotics resistance?	3 (1.2)	24 (9.5)	17 (6.7)	113 (44.7)	96 (37.9)	4.1 ± 0.9
3.	Do you think antibiotic resistance is a public health problem and potential threat to human-kind?	2 (0.8)	1 (0.4)	25 (9.9)	94 (37.2)	131 (51.8)	4.4 ± 0.7
4.	Do you agree antibiotics should be prescribed for all type of infections?	80 (31.6)	105 (41.5)	40 (15.8)	11 (4.3)	17 (6.7)	3.9 ± 1.1
5.	Do you think more expensive the antibiotics, more effective it will be?	103 (40.7)	128 (50.6)	11 (4.3)	10 (4.0)	1 (0.4)	4.3 ± 0.7
6.	Antibiotic are safe drugs, hence they can be used commonly	76 (30.0)	107 (42.3)	45 (17.8)	19 (7.5)	6 (2.4)	3.9 ± 1.0
7.	Adverse effects of antibiotics are reduced by using more than one antibiotic at a time	48 (19.0)	109 (43.1)	44 (17.4)	47 (18.6)	5 (2.0)	3.6 ± 1.0
8.	When you have a cough and sore throat, antibiotics are the first drug of choice for early treatment and to prevent emergence of resistant strains	33 (13.1)	111 (43.9)	30 (11.9)	62 (24.5)	17 (6.7)	3.3 ± 1.2

**Table 4: Practice of participants on antimicrobial resistance**

S.N	Statements	Yes	No
1.	Have you ever attended a CME about rational use of antibiotics?	17 (6.7)	236 (93.3)
2.	Have you ever advised antibiotics use to someone?	123 (48.6)	130 (51.4)
3.	Have you ever taken any antibiotics without consulting physician?	120 (47.4)	133 (52.6)
4.	Do you complete the full course of antibiotics prescribed by the physician?	234 (92.5)	19 (7.5)
5.	Do you save the remaining, leftover antibiotics for the next time when you get sick?	125 (49.4)	128 (50.6)
6.	Do you take antibiotics to prevent any disease (prophylactically)?	65 (25.7)	188 (74.3)
7.	Do you prefer to take antibiotics when you have a cough and sore throat?	69 (27.3)	184 (72.8)

**Table 5: Comparison of knowledge, attitude and practice domain scores between students of different academic years**

Variable	1 <sup>st</sup> year (n = 56)	2 <sup>nd</sup> year (n = 64)	3 <sup>rd</sup> year (n = 75)	4 <sup>th</sup> year (n = 58)	p-value
Knowledge domain score	34.3 ± 4.5	31.2 ± 3.2	35.2 ± 2.9	35.4 ± 2.9	0.06
Attitude domain score	26.9 ± 3.3	27.0 ± 3.2	28.1 ± 3.2	27.5 ± 3.3	0.15
Practice domain score	3.0 ± 1.3	3.3 ± 0.9	3.1 ± 1.2	3.3 ± 1.3	0.26

## DISCUSSION

Antimicrobial resistance (AMR) is a major health issue globally. Awareness regarding AMR is key to stop its rising incidence. Knowledge on AMR is of utmost importance to rational use. Medical students at medical college are the foundation for becoming a qualified prescriber in the future. Medical students are exposed to theories on antimicrobials and its use since first year of medical school and learn P-drug concept includes the name of a drug, dosage form, dosage schedule and duration of treatment for a specified condition in the second year. However, it is not until internship and after being a medical license holder, they become qualified to prescribe medicine to patients. Therefore, this study was conducted to assess the knowledge, attitude and practice of AMR among undergraduate medical students who are

headed towards becoming future health care professionals.

Majority of the students were well aware that improper use of antibiotics/self-prescription could cause and promote antibiotics resistance similar to the study conducted by Taj Uddin Shaik at e<sup>8</sup> in 2016 where most of the participants showed good level of knowledge among medical students about antimicrobial resistance. Surprisingly, however, only half of the participants considered antimicrobials as a major public health problem, unlike the study in India where approximately 90% of the students perceiving AMR as a major public health problem.<sup>9,10</sup>

In our study, approximately one-third of the students agreed that use of antimicrobials will speed up recovery from flu and cold similar to the study done in India amongst the second year students, where 75% of them considered antibiot-

ics to be wonder drugs that hasten recovery from illness, with more than half considering them to be safe drugs.<sup>9</sup>

Almost half of students had ever advised others or taken antibiotics without prescription similar to the results of a study by Gupta et al<sup>10</sup> in 2018 which showed that 45% of medical students responded to having bought antibiotics without medical prescription. Regardless of the self-reported practices on antibiotics use, the majority of students completed a full course of antibiotics prescribed by the physician and never used antibiotics prophylactically. But interestingly, almost half of the participants responded that they save the remaining, leftover antibiotic for the next time when they get sick.

The knowledge, attitude and practice domain scores were not significantly different between the students of various academic years as opposed to the study by Zuzu et al<sup>11</sup> which had significant differences between the year of study and the level of knowledge, attitude and practices of the participants. 2<sup>nd</sup> year students were the group to have least knowledge domain scores in our study.

AMR is a result of unnecessary and excessive use of antibiotics in humans as well as animals.<sup>4</sup> Overcrowding, availability of antibiotics without prescription, self-medication and lack of awareness further adds to the problem. AMR is an epidemic and a major public health problem that needs an integrated approach involving healthcare professionals, pharmaceutical companies and lawmakers.<sup>12</sup> Regular CMEs and workshop

should be conducted for medical students and should be a part of their curriculum.<sup>13,14</sup> Clinical teaching using vignettes can make students better understand the burden and rationale of using antibiotics. Almost half of our participants had advised their friends and relatives to take antibiotics despite being unqualified. The left over antibiotic not always will be right antibiotic for the next illness, it may expire and hence become ineffective, or it will be only an incomplete course that promotes resistance<sup>14</sup>. This mandates a proper guideline and strict policy on sales of antibiotics without prescription.<sup>15</sup>

Our study has few limitations. This includes convenience sampling, use of self-administered questionnaires rather than face to face interviews which may have caused recall bias along with small sample size. Hence, the study is not generalizable to other settings.

## CONCLUSION

Medical students need to be sensitized regarding AMR through various CMEs and workshops highlighting its burden and impact. Education can play a major role in increasing awareness and developing positive attitude and safe practice. Hence, the medical curriculum should have proper guidelines on the rationale of antibiotic prescription.

**CONFLICT OF INTEREST:** None

**FINANCIAL DISCLOSURE:** None

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