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Knowledge, Attitude and Practice of Antimicrobial Resistance among Dental Students in a Medical College of Nepal

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ABSTRACT

Introduction: Antibiotic resistance has become one of the major global health problems and it is still increasing throughout the world. This problem of antibiotic resistance can be reduced by educating the undergraduate medical and dental students. Therefore, there is an urgent need to evaluate the knowledge of antimicrobial resistance among the undergraduate dental students. Therefore, this study has been undertaken to assess the knowledge of antimicrobial resistance among dental students.

Methods: A cross sectional study was conducted on dental students from first week of July to second week of July 2020. As the country was in lockdown, online questionnaire was used to collect data. The responses obtained were cleaned and coded in Microsoft Excel. The demographic parameters were tabulated and total score compared among different subgroups of respondents. The frequency of different measures mentioned by respondents was also noted.

Results: Among the 82 participants, 67(81.7%) were female and 15(18.3%) were males. The mean age of participant was 21.5 and the standard deviation was 1.8. The total score, mean, standard deviations (SD), Median (Q1, Q3) was calculated. The mean score was 12.8, SD 1.5 and median score was 13 with first quartile Q1 12 and third Quartile Q3 was 14. The maximum possible score was 15.

Conclusion: In this study all the dental undergraduate students had good knowledge, attitude and practice about antimicrobial resistance. This study shows that adequate knowledge about antimicrobial resistance has been imparted to the dental undergraduate students.

Keywords: Antibiotic resistance; attitude; dental; knowledge; practice

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INTRODUCTION

Antibiotics are one of the important drugs in modern medicine. Antibiotics are most commonly used to cure infectious diseases. Penicillin was the first antibiotic that was discovered by Sir Alexander Fleming in 1928.[1,2] This has been used to save lives of millions of people during after the world war two. Antibiotic treatment is one of the main approaches of modern medicine which is used to cure infections. As antibiotics are very commonly used, it has led to the emergence of resistance to these agents.[3] Antimicrobial resistance organism are increasing worldwide and there is a decline in the discovery of new antibiotics. Antibiotics resistance crisis has led to a serious issue in public health. There is a constant failure in the development of new antimicrobial agents. Also, there is improper use of antibiotics, which contributes to the emergence of resistance. [4] The threat of antibiotic resistance is rapidly progressing. The extensive use of antimicrobials by the healthcare professionals has also helped in the development of antimicrobial resistance. [5]

One of the major causes of antibiotic resistance is the use and overuse of these medications. Also easy availability of antibiotics as over the counter medication has further complicated the situation.[6] Antibiotics resistance will complicate the treatment of even common infectious diseases like pneumonia, tuberculosis, septicaemia etc.[7] Antibiotics resistance increase the duration of illness, prolong hospital stay and increase economic burden to the patient.[8]Also, irrational use of antibiotics is one of the major factor that contributes to antimicrobial resistance.[9] Other factors are self medication with antibiotics and lack of proper health policies. [10, 11] Another important factor is the lack of knowledge about antimicrobial resistance of the health care provider. [12] Rational prescribing is thought to be the best way to control resistance. Therefore, it is very important to educate health care professionals about antimicrobial resistance.

The major step towards training health care professional is at the undergraduate level. Undergraduate medical students are one of the major prescribers of antibiotics in the future days. The students can play an important role in reducing the irrational use of antibiotics. In this context an increasing number of research reports have focused their attention on investigating the knowledge, attitude and practice of antimicrobial resistance in medical students.

Several studies in the literature have evaluated antibiotic knowledge and prescribing patterns among dental practitioners. However, these studies have mostly been concerned with practicing dentists, rather than exploring the knowledge, attitudes and practice of dental students. This study aims to evaluate dental students' knowledge, attitudes and practice regarding antibiotic resistance.

METHODS

This study was carried out after taking permission from Institutional Ethics Committee of KIST Medical college and Teaching Hospital. Ethical approval was obtained with a reference number 76-77-01-29. A comparative cross sectional observational questionnaire based study was conducted on dental students to gather information about the Knowledge, attitude and practice of antimicrobial resistance. Data collection was done from 1st July to 15th July 2020. Study was conducted among the undergraduate dental students from first year to fourth year. A total of 180 dental students were approached for the study. All students willing to participate were included in the study.

Any student unwilling to respond to the survey was excluded.

Questionnaire was designed based on the previous studies.[13-15]The first part of the questionnaire contained the written consent part. It was followed by the second part (Q no. 1 to 4) were about the demographic information of the students: Age, gender, address. The third part(Q no. 5 to 19) of the questionnaire were about the knowledge (Q no. 5 to 9), attitude (Q no. 10 to 14) and practice (Q no. 15 to 19). The knowledge of the participant was assessed by a set of true and false questions. The attitude of the participants was assessed by using a 5-point Likert scale. The responses were in the range of "strongly disagree to strongly agree". The practice of the participants towards antibiotics use was also assessed by Likert scale whose responses range from "always to never".

The possible answers "strongly agree" and "agree" were considered as a "positive" answer, while the possible answers "disagree" and "strongly disagree" were considered as a "negative" answer and remaining were uncertain. The possible answers "always" and "usually" were considered as a "positive" answer,

while the possible answers "never" and "rarely" were considered as a "no" answer. All the correct answers were scored as "1 "and all the incorrect answers were scored as "0".

A structured online questionnaire was used as a data collection tool. An online questionnaire was constructed using Google form. The questionnaire was distributed with the help of class representatives of each year via their email and social networking accounts. All the participants were informed about the purpose of the research.

Data analysis

The responses obtained from questionnaires were entered in Microsoft Excel. The demographic parameters as well as other parameters including knowledge, attitude and practice were analyzed descriptively and tabulated as number and percentage. The total score, the mean total score, standard deviation, median total score, first quartile Q1 and third quartile Q3 were calculated.

RESULTS

Out of 180 students, 82 students participated. The survey respond rate was 45 %. The demographic characteristics including age, gender, year of study and area of residence has been presented in Table 1. Out of 82 participants, 67(81.7%) were females and 15(18.3 %) were males. Among the 82 participants 8(9.8%) were from first year, 20(24.4 %) were from second year, 21(25.6 %) were from third year, and 33(40.2 %) were from 4th year. The majority of the participants 52(63.4%) were from urban area.

Table 1.Demographic characteristics of respondents (n=82)

Characteristics	Number (Percentage)
Gender	
Male	67(81.7)
Female	15(18.3)
Year of study	
First year	8(9.8)
Second year	20(24.4)
Third Year	21(25.6)
Fourth Year	33(40.2)
Area of residence	
Rural	5(6.1)
Semiurban	25(30.5)
Urban	52(63.4)

The minimum age of participant was 18 and maximum age of participants was 27. The mean age of participant was 21.5 and the standard deviation was 1.8 (Table 2)

Table 2. Age of Participants (n = 82)

Age	Minimum	Maximum	Mean	Standard deviation
	18	27	21.5	1.8

In our study, all eighty two study participants were aware that antimicrobial resistance is a serious and important global health issue. Out of eighty two participants, seventy three participants (89%) knew that if antibiotics are taken too often they are less likely to work in the future. Seventy two participants (91.5%) said that antibiotics cannot be taken as over the counter medication. Eighty participants (97.6%) were aware that irrational use of antibiotics can lead to antimicrobial resistance. Seventy (85.4%) believed that antibiotics can cause secondary infections after killing good bacteria present in the body. (Table 3)

Table 3. Knowledge of participants regarding antibiotic resistance (n=82)

Q. No.	Questions	True N (%)	False N (%)
	Antimicrobial resistant is an important and serious global health issue.	82 (100)	
	Antimicrobial resistance means that if they are taken too often they are less likely to work in the future.	73 (89)	11
	Antibiotics can be taken as over the counter medication.	7 (8.5)	75 (91.5)
	Irrational use of antimicrobial agents leads to the emergence of growing problem of resistance.	80 (97.6)	2 (2.4)
	Antibiotics can cause secondary infections after killing good bacteria present in the body.	70 (85.4)	12 (14.6)

The attitude of the dental students towards antibiotic use was good. Sixty (73.1%) of participants disagreed that skipping the doses of antibiotics can lead to antibiotic resistance. And seventy five (91.4%) disagree to the statement that taking less antibiotic than prescribed is more beneficial.

Table 4. Attitudes of the participants towards antibiotic resistance (n= 82)

Q. No. (n=82)	Question	Agree N (%)	Neutral N (%)	Disagree N (%)
	Antibiotics are safe drugs, hence they can be commonly used.	10 (12.2)	28(34.1)	44(53.6)
	Skipping one or two doses of antibiotics does not contribute to antimicrobial resistance	22(26.8)	-	60(73.1)
	Overuse in antibiotics results in antibiotic resistance.	68(82.9)	7(8.5)	7(8.5)
	Adverse effects of antimicrobials are reduced by using more than one antimicrobial at a time.	19(23.1)	15(18.2)	48(58.5)
	Taking less antibiotic than prescribed is more beneficial.	3(0.03)	4(0.04)	75(91.4)

The practice of the participants towards antibiotic use was also quite good. Fifty four (65.8%) participants always consulted doctor before taking antibiotics. Fifty five (67.1%) participants always completed the full course of antibiotics. And seventy two (87.8%) participants always checked the expiry date of the antibiotics before using it.

Table 5. Practice of the participants regarding antibiotic resistance (n=82)

Q. No. (n=82)	Questions	Always N(%)	Usually N(%)	Rarely N(%)	Never N(%)
15.	Do you consult a doctor before taking antibiotic?	54 (65.8)	23 (28)	4 (4.9)	1 (1.2)
16.	Do you buy drug directly from pharmacy?	4(4.9)	17 (20.7)	51 (62.2)	10 (12.2)
17.	Do you complete the full course of antibiotic treatment given by the doctor?	55(67.1)	24(29.3)	3(3.7)	-
18.	Do you prefer to take antibiotic when you have cough and sore throat?	-	4 (4.9)	48(58.5)	30 (36.6)
19.	Do you check the expiry date of antibiotic before using it?	72 (87.8)	8 (9.8)	2 (2.4)	-

The number of participants answering every statements correctly were also calculated in percentage. (Table 6)

Table 6. Number of students providing correct answers

Q. No.	Statements (Correct answer)	Number and % of respondents answering correctly (n=82)
	Antimicrobial resistance is an important and serious global health issue. [Correct answer: true]	82 (100)
	Antimicrobial resistance means that if they are taken too often, antimicrobials are less likely to work in the future. [Correct Answer: true]	73 (89)
	Antibiotics can be taken as over the counter medication (can be taken without prescription). [Correct answer: false]	75(91.5)

Irrational use of antimicrobial agents leads to the emergence of growing problem of resistance.[Correct answer: true]	80 (97.6)
Antibiotics can cause secondary infections after killing good bacteria present in the body. [Correct answer: true]	70 (85.4)
Antibiotics are safe drugs, hence they can be commonly used medication. [Correct answers: Strongly Disagree, Disagree]	44(53.6)
Skipping one or two doses of antibiotic does not contribute to antimicrobial resistance. [Correct Answer: Strongly Disagree, Disagree]	60 (73.1)
Overuse of antibiotics result in antimicrobial resistance. [Correct Answer: Strongly Agree, agree, agree]	68 (82.9)
Adverse effects of antimicrobials are reduced by using more than one antimicrobial at a time. [Correct Answer: Strongly Disagree, disagree]	48 (58.5)
Taking less antibiotic than prescribed is more beneficial. [Correct Answer: Strongly disagree, disagree]	75 (91.4)
Do you consult a doctor before taking antibiotic? [Correct Answer: Always, usually]	77 (93.9)
Do you buy drug directly from pharmacy? [Correct Answer: Never, rarely]	61 (74.3)
Do you complete the full course of treatment given by the doctor? [Correct Answer: Always, Usually]	79 (96.3)
Do you prefer to take antibiotic when you have cough and sore throat? [Correct Answer: Never, rarely]	78 (95.1)
Do you check the expiry date of antibiotic before using it? [Correct Answer: Always, Usually]	80 (97.5)

The total score of each participant was calculated. All the correct answers were scored as “1 “and all the incorrect answers were scored as “0”. The total mean score, SD, Median (Q1, Q3) was calculated. The mean score was 12.8, SD 1.5 and median score was 13 with first quartile Q1 12 and third Quartile Q3 was 14. (Table 7)

Table 7. Total score of the participants (n=82) with their mean and SD

Score	Mean	SD	Median (Q1,Q3)
Knowledge	4.6	0.6	5(4,5)
Attitude	3.6	0.9	4(3,4)
Practice	4.6	0.7	5(4,5)
Total Score	12.8	1.5	13(12, 14)

The mean total score of first year dental students was 12.8, with standard deviation of 1.4. The median score was 12 with first quartile Q1 12 and third quartile Q3 14. The mean total score of second year dental students was 12.4 with standard deviation of 1.4. The median score was 12 with first quartile Q1 12 and third quartile Q3 13.8. The mean total score of third year dental students was 13.4 with SD 1.2. The median score was 13 with first quartile Q1 12.5 and third quartile Q3 14.5. The mean total score of fourth year dental student was 12.8 with a standard deviation of 1.7. The median score was 13 with a first quartile Q1 12 and a third quartile Q3 14. (Table 7)

Table 7. Total score of the participants with their mean, SD, Median (Q1 and Q3)

Year of study	Mean total score	SD	Median (Q1,Q3)
First Year	12.8	1.4	12(12,14)
Second Year	12.4	1.4	12(12,13.8)
Third Year	13.4	1.2	13(12.5,14.5)
Fourth Year	12.8	1.7	13(12,14)

Among the different batches of dental students, the third year dental students had highest mean total score of 13.4 with a standard deviation of 1.2. The median score of third year dental students was 13 with a first quartile Q1 12.5 and third quartile Q3 14.5.

The third year dental students had highest mean score of 4.9 on knowledge with a standard deviation of 0.4. The median score on knowledge of third year dental students was 5 with a first quartile Q1 5 and third quartile Q3 5. Also, the highest mean score of 3.9 on attitude was also on third year dental students with a standard deviation of 0.8. The median score on attitude on third year dental students was 4 with a first quartile Q1 3 and third quartile Q3 5. The highest mean score on practice of 4.7 was also on third year dental students with a standard deviation of 0.6. The median score on practice was 5 with a first quartile Q1 4 and third quartile Q3 5. (Table 8,9,10,11)

Table 8. Knowledge, attitude and practice scores among first year dental students.

Score First year	Mean	SD	Median (Q1,Q3)
Knowledge score	4.5	0.8	5(4,5)
Attitude score	3.6	0.8	3.5(3,4)
Practice score	4.6	0.7	5(4.3,4.5)
Total Score	12.8	1.4	12(12,14)

Table 9: Knowledge, attitude and practice scores among second year dental students

Score Second year	Mean	SD	Median (Q1,Q3)
Knowledge score	4.6	0.6	5(4,5)
Attitude score	3.3	0.8	3(3,4)
Practice score	4.5	0.8	5(4,5)
Total Score	12.4	1.4	12(12,13.8)

Table 10. Knowledge, attitude and practice scores among third year dental students

Score Third year	Mean	SD	Median (Q1,Q3)
Knowledge score	4.9	0.4	5(5,5)
Attitude score	3.9	0.8	4(3,5)
Practice score	4.7	0.6	5(4,5)
Total Score	13.4	1.2	13(12.5,14.5)

Table 11. Knowledge, attitude and practice scores among fourth year dental students

Score Fourth year	Mean	SD	Median (Q1,Q3)
Knowledge score	4.6	0.6	5(4,5)
Attitude score	3.6	1.0	4(3,4)
Practice score	4.5	0.7	5(4,5)
Total Score	12.8	1.7	13(12,14)

DISCUSSION

Antibiotics resistance has become a serious threat to the modern world. The use and misuse of antibiotics has contributed to antimicrobial resistance.[16] "Antimicrobial Resistance" was chosen as a theme on World Health Day by WHO on 2011. This theme was chosen by WHO to increase the awareness of Antimicrobial Resistance all over the world. Even the treatment of common infectious disease will be difficult in the future as highlighted by WHO in its global surveillance report 2014. [17] The current study was undertaken to assess the knowledge, attitude and practice of antibiotic resistance among the dental students in a medical college of Nepal.

All of the participants were aware that antimicrobial resistance is a serious and important global health issue. Similar finding was obtained in other studies conducted among medical doctors and students. In a study conducted in Peru, 98% of the participants were aware of the fact that antimicrobial resistance was a global problem.[18, 19] Similar responses were present in other studies done on medical students. [13-15, 20-22]

A majority of the participants had knowledge that antibiotics should not be taken as over the counter medication but a minority of the participants still believed that antibiotics can be taken as over the counter medication. This may be because of the easy availability of antibiotics as over the counter medication where antibiotics are easily available without prescription.[23, 24]

Furthermore, our study showed that 97.6 % were aware that irrational use of antibiotics can lead to the growing problems of antibiotic resistance. This finding was similar to a survey done in US where almost all of the medical students had the knowledge that injudicious use of antibiotics can cause antimicrobial resistance.[25]

In our study 67.1 % of the students always completed the full course of antibiotics as prescribed by doctors. However, other study showed that 94.8% of the students believed that full course of antibiotics should be taken as prescribed by the doctors. [13]

In our study, 36.6 % believed that antibiotics should never be taken for cough and sore throat. However, in other study more than 55 % of the students believed that antibiotics need to be prescribed for a simple viral illness. [26] In another study more than 60 % of the participants believed that antibiotics should be prescribed for viral illness. [27] This can increase the irrational use of antibiotics and in turn increase the problem of antibiotic resistance. [28]

Moreover, 87.8 % of the participants always checked the expiry date of antibiotics before using it. Similar findings were observed in other studies. [13, 15, 20] In our study, 65.8% of the participants always consulted a doctor before taking an antibiotic. This finding is different than another study done on dental students where 62.8 % of second year dental students and 57.6 % of third year dental students has taken antibiotics without consulting a doctor. [29]

Our study is one of the few study which has been conducted to assess the knowledge, attitude and practice of antimicrobial resistance in the dental students. But the major limitation of the study is that the response rate was low. Out of 180 students, only 82 students participated in the study. Another limitation is the convenience sampling. Also, this study was conducted among the dental students in only one medical college of Nepal.

Our study showed that all of the dental students had very good knowledge about awareness about antimicrobial resistance. The medical and the dental students are the future prescribers of the antibiotics. Hence, the medical and dental students must have sound knowledge on rational prescribing. Therefore, it is important to evaluate the knowledge of antimicrobial resistance at the undergraduate level.

CONCLUSION

The finding of this study showed that all the dental students had good knowledge, attitude and practice regarding antibiotic use. This shows that the knowledge imparted by the college on antimicrobial resistance was good. Further improvement in this area can be done by including rational use of antibiotics in the medical curriculum.

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