



Knowledge, Attitude and Practices Regarding the Antibiotic Use and Resistance among the BDS and MDS Students of Babu Banarsi Das College of Dental Sciences, BBDU, Lucknow.

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ABSTRACT

Introduction : Antibiotics were called “magic bullets” for quite some time. The use and misuse of antibiotics induce selection pressure, resulting in the development of resistance traits in bacterial populations. Increase in rate and spread of Antimicrobial resistance (AMR) is mainly caused due to excessive use, incorrect prescription, inappropriate consumption, self medication and self diagnosis which is closely associated with cultural, social and economical factors in developing countries.

Materials & Methods: A Cross-Sectional, questionnaire study was conducted between December 2021 to February 2022 on BDS and MDS students of Babu Banarasi Das College of Dental Sciences, BBDU, Lucknow. Sample is Total enumerates. A 23 variable, pre-structured, self-administered, close ended questionnaire was given to every students.

Result: A total of 390 students participated in the study in which 300 were BDS students and 90 were MDS students. 95.2% of MDS and 88.6% of BDS students were aware that antibiotics are used to treat bacterial infections. 98.9% MDS and 89.3% BDS students correctly answered the main clinical symptoms of COVID-19. Only 15.1% of the MDS students agreed that “a doctor is a good one even if he does not prescribe antibiotics when the patient thinks that it is needed” whereas, 29.1% of the opposite group of students share the same opinion.

Conclusion: MDS students had better knowledge in almost all the questions related to knowledge; and, had more informed attitude towards dealing with the problem of antibiotic resistance. The knowledge and attitude of BDS students were, as expected, less satisfactory.

Keywords: Knowledge, Attitude, Practice, Antibiotics, Antibiotic Resistance

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I. INTRODUCTION

One of the defining moments in the human race in its fight to combat morbidity and attain longevity was the development of antibiotics. It revolutionized the treatment in the post-world war era. But today wheel of time has turned over and in present scenario biggest threat to save lives is resistance to these very antimicrobials. ¹Antibiotics were called “magic bullets” for quite some time; however, these magic bullets were not always magical enough to survive some serious downsides. The use and misuse of antibiotics induce selection pressure, resulting in the development of resistance traits in bacterial populations. ² Antibiotics are one of the most commonly used as well as misused drugs now a days. ³

Antibiotic resistance is one of the world’s most fatal health crises. Without prompt action, the yearly death toll could reach 10 million by 2050, which is definitely more than deaths resulting from cancer, measles, cholera, and traffic accidents combined. ⁴ Increase in rate and spread of Antimicrobial resistance (AMR) is mainly caused due to excessive use, incorrect prescription, inappropriate consumption, self medication and self diagnosis which is closely associated with cultural, social and economical factors in developing countries. ^{5,6,7,8} Overusing antibiotics or using them irrationally can easily result not only in the emergence of resistant bacterial strains but also in adverse reactions, and can also result in an economic burden on national health systems. Antimicrobial

resistance often occur through the inhibition of specific antimicrobial pathways such as cell wall synthesis, nucleic acid synthesis, ribosome function, protein synthesis, folate metabolism, and cell membrane function.⁸

Antibiotic use has been increasing steadily in recent years.. Between 2005 and 2009, the units of antibiotics sold increased by about 40 per cent. Increased sales of cephalosporins were particularly striking, with sales (in units sold) increasing by 60 percent over that five-year period, but some increase was seen in most antibiotic classes. In comparison, a pilot survey conducted at private retail pharmacies in 2004 and a survey in the same areas in 2008 found increased use of cephalosporins, but decreased use of macrolides.⁹ Antibiotic resistance has been a low-priority area in most developing and many developed countries. Compared with the immediate challenges of HIV/ AIDS, tuberculosis, malaria, pneumonia, and many other infectious diseases, the loss of antibiotics at some future time does not capture the same attention. Resistance against certain antibiotics is already at high levels in certain places in India (and around the world), but the problem has remained largely unknown because relatively few studies were published and nationwide surveillance was not being carried out. But the issue came to the fore in India when New Delhi metallo- β -lactamase-1 (NDM-1), first reported in 2009, made front-page news in 2010.^{9,10} The need of this study aims to evaluate the knowledge, attitude and practices (KAP) towards the antibiotic use and resistance among the BDS and MDS students of BABU BANARSI DAS COLLEGE OF DENTAL SCIENCES, BBDU, Lucknow.

II. MATERIALS AND METHODS

STUDY DESIGN: A Cross-Sectional, questionnaire study was conducted to evaluate the knowledge, attitude and practices (KAP) towards the antibiotic use and resistance among the BDS and MDS students of BABU BANARSI DAS COLLEGE OF DENTAL SCIENCES, BBDU, Lucknow.

STUDY POPULATION: The study population consisted of BDS and MDS students of BABU BANARSIDAS COLLEGE OF DENTAL SCIENCES, BBDU, Lucknow, and the study extended over a period of 2 months.

STUDY SCHEDULE: The study was conducted from December 2021 to February 2022.

ETHICAL ISSUES: A verbal consent was obtained from the participating population and the ethical clearance was taken from the Institutional Ethical committee of Babu Banarasi Das College Of Dental Sciences.

PILOT STUDY: A pilot study was done to check the feasibility and reliability of the study.

SAMPLE: The sample size was total enumerates of BABU BANARSI DAS COLLEGE OF DENTAL SCIENCES, BBDU, Lucknow.

QUESTIONNAIRE: A 23 variable, pre-structured, self-administered, close ended questionnaire was given to each BDS and MDS students of BABU BANARSI DAS COLLEGE OF DENTAL SCIENCES, BBDU, Lucknow. The variables assessed were, question number 1 to 12 were used to evaluate the knowledge of BDS & MDS students regarding antibiotics use and resistance, while question number 14, 15, 17, 18, 19 and 13, 16, 20, 21, 22 and 23 were used to evaluate the attitude and practice respectively of the BDS and MDS student.

DATA COLLECTION: The questionnaire was distributed personally by the investigator himself and collected back personally on the same day.

DATA ANALYSIS: The data collected was transferred to Microsoft Excel and was analyzed using the SPSS version 20.0. Descriptive statistical analysis was carried out in the present study. Chi square test was used to study the association between variables.

III. RESULTS

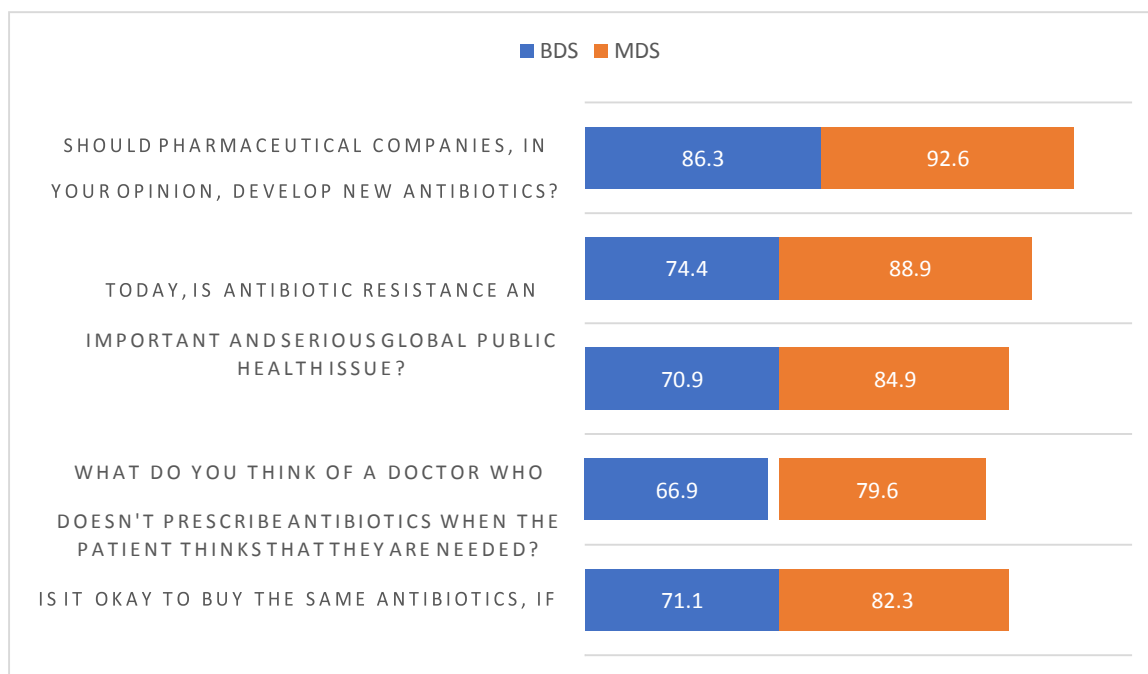
From the data retrieved by the survey, a randomly distributed population was obtained as respondents. A total of 390 students participated in the study. Respondents were categorized into two groups - 300 were BDS students and 90 were MDS students.

Our findings showed that 95.2% of MDS students were aware that antibiotics are used to treat bacterial infections. Whereas 88.6% of BDS students were knowledgeable about the effectiveness of antibiotic against bacterial or viral infection. Moreover, the current study revealed that the large majority of students in MDS compared to BDS (82.3% vs. 71.1%, respectively), were knowledgeable about the timing of when to stop the antibiotics use. In our study, the majority of the MDS students (77.9%), were familiar with terms related to antibiotic resistance, whereas around more than half of BDS students (62.6%) were aware of such terms. In this study, it was found that the students had good knowledge towards COVID-19, practiced appropriate preventive measures to prevent COVID-19 and demonstrated positive attitudes towards the new norm during the pandemic. 98.9% MDS and 89.3% BDS students correctly answered the main clinical symptoms of COVID-19. In the current study, about half of the students reported the use of antibiotics at least once in the year prior to study. The average attitudes score was higher in the MDS students compared to BDS group. Only 15.1% of the MDS students agreed that "a doctor is a good one even if he does not prescribe antibiotics when the patient thinks that it is needed" whereas, 29.1% of the opposite group of students share the same opinion given in Table 1 and Graph 1 and 2.

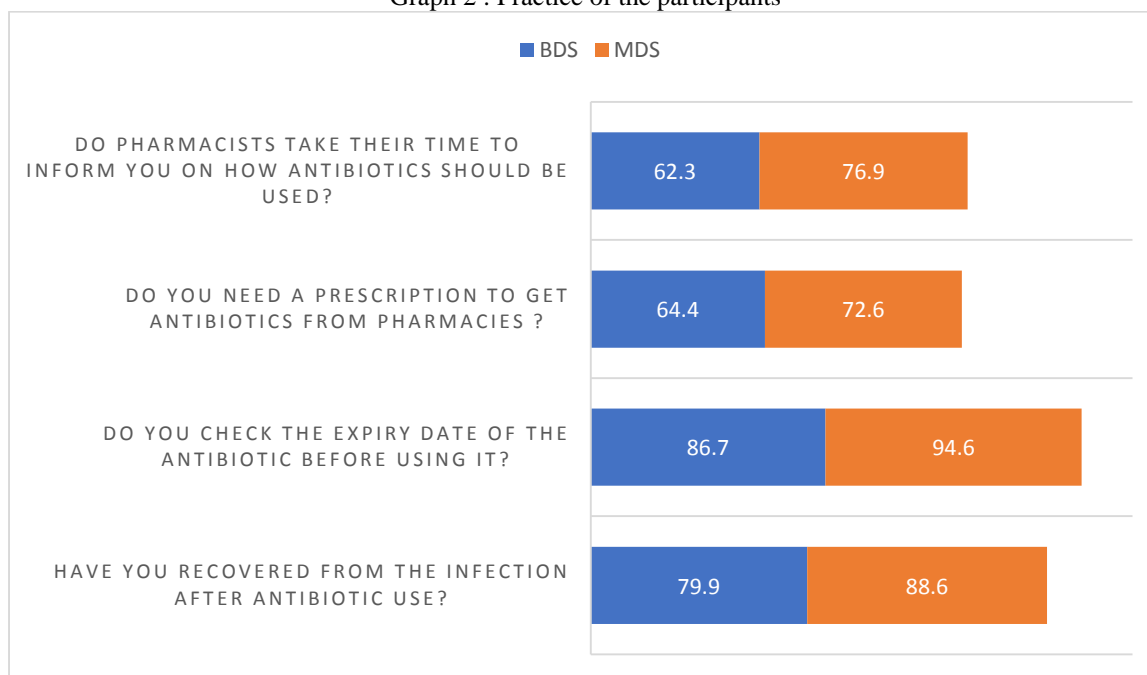
Table 1 : Knowledge of the participants

	Participants who answered correctly (n%)		
	BDS	MDS	P value
Effectiveness of antibiotics to treat bacterial/viral infections	88.6	95.2	0.001
Effectiveness of antibiotics to treat Malaria	69.8	84.6	0.001
Effectiveness of antibiotics to treat Fever	72.1	96.8	0.02
The main clinical symptoms of COVID-19 are fever, cough, sore throat and difficulty breathing	89.3	98.9	0.47
Developments of new antimicrobials/vaccinations for covid-19 is simple and does not take up much time	77.6	88.7	0.17
Like COVID-19, a new resistant bacterial strain can cause similar or worst pandemic events	66.8	82.4	0.003
Have heard of any of the following terms- Antibiotic resistance, Superbugs, Bacterial resistance against antibiotics, Drug resistance	62.6	77.9	0.042
Think that antibiotic resistance is the result of insufficient knowledge about antibiotic use	79.9	86.9	0.04
Think that antibiotic resistance can result from inappropriate use of antibiotics outside the doctor's prescription	78.6	87.2	0.03
Result of skipping one or two doses of antibiotic	66.5	77.9	0.02
Think that more antibiotic we use in society, the higher is the risk that resistance develops and spreads	72.0	89.3	0.003
Can antibiotic resistance spread from one person to another	74.6	84.1	0.43

Graph 1: Attitude of the participants



Graph 2 : Practice of the participants



IV. DISCUSSION

Our findings showed that 95.2% of MDS and 88.6% of BDS students were aware that antibiotics are used to treat bacterial infections. Moreover, the current study revealed that the large majority of students in MDS compared to BDS (82.3% vs. 71.1%, respectively), were knowledgeable about the timing of when to stop the antibiotics use. In an article published in 2017 by **Jamhour et al.** including 400 adults' respondents from two cities in Lebanon, they found that 61% thought that antibiotics should be taken as a common cold treatment.¹¹ **Mouhieddine and colleagues** have reported in 2015 that 46.1% of them expressed moderate knowledge levels, where 3.5% did not know that antibiotics are not anti-viral.¹² Similarly, **Jifar and Ayele in 2018**, reported that 83% of respondents in Harar city, Eastern of Ethiopia, replied that antibiotics speed up the recovery colds.¹³ Moreover, **Khajuria et al. 2019** showed that 90% of medical students agreed that antibiotics are useful for bacterial infections¹⁴. **Gary and colleagues**, have reported in 2012, that 44% percent of non-medical students and 28.1% of medical students agreed that antibiotics could cure cold and viral infections¹⁵. This is consistent with the findings of a global survey conducted by the world health organization (WHO) in 2015¹⁶. WHO established a key strategy by engaging the prescribers and educating the public to reduce misuse of antibiotic use^{17,18}.

In our study, the majority of the MDS students (77.9%), were familiar with terms related to antibiotic resistance, whereas around more than half of BDS students (62.6%) were aware of such terms which is similar to study done by **Jamhour and colleagues** in 2017¹¹ and another report published in 2015, it showed that 48.5% of respondents from Lebanon, declared continuing to take their full course of antibiotics even if their symptoms improved, underlying an alarmingly 51.5% who could stop their treatment after symptoms improvement.¹³

In this study, it was found that the students had good knowledge towards COVID- 19, practiced appropriate preventive measures to prevent COVID-19 and demonstrated positive attitudes towards the new norm during the pandemic. 98.9% MDS and 89.3% BDS students correctly answered the main clinical symptoms of COVID-19. Most of the KAP studies conducted previously reported adequate knowledge of the respondents towards COVID-19^{3,19,14}. This was consistent with a previous local study, where the overall correct responses were more than 80%.²⁰

In the current study, about half of the students reported the use of antibiotics at least once in the year prior to study. Our data is more consistent with a study (53.5%) conducted in Harar city, Eastern Ethiopia¹³. At the same time, our scores were higher than what was reported by Tesfaye (2017) who reported that 35.9% of participants consume antibiotics once during the year preceding the study²¹. On the other hand, our finding was considerably lower than what was found in Namibia, which was 80%²².

The average knowledge and attitude score was significantly higher in the MDS group compared to the BDS students (p-value<0.001) that agrees with the survey conducted among medical and non-medical Chinese university students as reported by **Huang et al. 2013**.²³ In another study, it was found that 80% of nursing and dentistry students in Babylon University, Iraq have high knowledge but inappropriate attitude¹⁹, results which were similarly found among Indian and Sudanese medical university students^{24,25}. As for the attitude assessment, all students agreed that AMR is a serious public health issue and that repeated use of antibiotics and insufficient

knowledge could lead to antibiotic resistance. These findings were similar, though in better numbers, to the previous studies²⁶. Our presented results revealed that MDS students had a favourable and better attitude about rational use of antibiotics compared to the group of BDS students. Only 15.1% of the MDS students agreed that “a doctor is a good one even if he does not prescribe antibiotics when the patient thinks that it is needed” whereas, 29.1% of the opposite group of students share the same opinion. It has been published by **Mouhieddine and his colleagues** that 65.1% of the 500 respondents questioned in Lebanon in 2015, referred to doctors’ prescriptions regarding antibiotics, and 22.4% declared, alarmingly, that they self-medicate¹².

According to **Jamhour and colleagues in 2017**, it is common that Lebanese get access to antibiotics without a prescription despite the high ratio of physicians to patients in Lebanon²⁷. The same pattern was observed in our study. 32.7% in Italy²⁸ used antibiotics without prescription, 28.8% in Saudi Arabia²⁹, and 9% in Hong Kong³⁰. This difference might be due to variation of regulations and their application from one country to another in addition to differences in the socio-demographical conditions. The findings presented in the current study indicate that students were not well aware of the irrational use of antibiotics, though MDS students showed a better attitude, this is different from findings published previously^{31,32}. Based on our sample, the students were well aware of the development of antibiotic resistance. However, the responses of the students in the present study cannot be generalized to other universities, since students could have different educational programs, skills and experiences^{33,34}. It is indeed a striking findings of this study having such a disparity in the attitude towards antibiotic use where majority of the students, regardless their respective majors, are aware of the issue of antibiotic resistance but in some cases, lack the appropriate attitude.

LIMITATION

The study was conducted using self-administered questionnaire for the collection of data hence study is subjected to response bias. This study was limited to participants of Lucknow city only, so it is difficult to study trends which reflect attitudes of the population on a larger scale. Therefore further studies involving larger sample over a wide geographic area should be carried out to facilitate the generalisability of the findings.

V. CONCLUSION

Antibiotic resistance is a serious public health problem. Assessment of knowledge, attitude and practices of antibiotic use in dental students can greatly impact how best to tackle the growing threat of the antibiotic resistance and its related issues. In the present study, MDS students had better knowledge (higher percentages of correct answers) in almost all the questions related to knowledge; and, had more informed attitude towards dealing with the problem of antibiotic resistance (had higher percentages of correct answers in all questions related to attitude). Thus exhibiting a good knowledge, and satisfactory behavioural attitude towards a rational use of antibiotics. The knowledge and attitude of BDS students were, as expected, less satisfactory. Strikingly, both groups of students have shown exemplary attitude when it comes to antibiotic resistance. As for practices, most of the students regardless of their majors were well aware of good practices. In this study, it was also found that the students had good knowledge towards COVID- 19, practiced appropriate preventive measures to prevent COVID-19 and demonstrated positive attitudes towards the new norm during the pandemic.

VI. RECOMMENDATION

Our findings clearly indicate that it is urgent to limit the granted access for antibiotics in India and other developed countries. Indeed, the WHO is voicing alarms about the increasing levels of the development, world-wide, of antibiotic resistant pathogenic bacteria. In order to remediate to this major issue, the WHO issued a “Global Strategy for Containment of Antimicrobial Resistance” pressing governments and decision makers to apply and take actions. Our report shows that knowledge and attitude, of the students, towards antibiotic use and antibiotic resistance could be positively impacted, though not always sufficiently, by more specialized course material related to health. This strengthens the need of the inclusion in the curriculum of students of strategies allowing to get familiarized with public health issues. Our study highlighted the possible need for knowledge-based education programs for students, including both BDS and MDS course. Specifically, our suggestions include seminars, work- shops and courses in students’ curricula the extent and effectiveness of which can be the aim of future studies. The quick implementation of awareness campaigns about knowledge and appropriate use of antibiotics seems to be a priority based on ours and others findings. In addition, health authorities should expand their investments in policy making and in a more rigorous surveillance system regarding the access to antibiotics. Awareness campaigns could be done in a number of different routes: i) through national strategies promoting vaccination and hygiene; ii) by updating curricula in universities including public health courses/ workshops in all majors; iii) through media campaigns and intervention; and, iv) through a greater proactive role for pharmacists. The absence of such strategies could result in a continuous degradation of the knowledge, attitude and practice towards antibiotic use and resistance, leading to more serious consequences on the development of antibiotic resistance.

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