

## Knowledge, Attitude, and Practice of Medical Students about Antibiotic Usage and Antimicrobial Resistance

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### Abstract

**Background:** To reduce the magnitude of antimicrobial resistance, there is a need to strengthen the knowledge for future prescribers regarding use and prescription of antibiotics. Before that, it is required to have a conclusive evidence about knowledge, attitude, and practices of that group.

**Objective:** to evaluate the knowledge, attitude and practices (KAP) towards the use of antibiotics as well as their resistance among Lebanese university students

**Materials and Methods:** A survey was conducted by distributing an online questionnaire to 260 medical students & they were required to fill up the questionnaire which contained questions regarding knowledge, attitude and practice of antimicrobial usage and antimicrobial resistance. This research study was conducted from 10<sup>th</sup> to 21<sup>st</sup> march, 2022. Data gathered from the survey were analysed with SPSS statistical software.

**Results:** Majority of the students (91.2%) were aware of the fact that antimicrobial resistance is a serious global public health issue. Only 13.3% felt the need of antimicrobials to treat common cold, while Around two third students (77.3%) were disbelieved about injudicious use of Antimicrobials shortens the duration of illness. Majority 74.6% of the students completed the full course of antibiotics Only half (47.3%) of the students always consulted a doctor before starting an antimicrobial agent.

**Conclusion:** The knowledge of the students regarding antimicrobials was satisfactory, though the attitude was moderate towards it. Appropriate educational interventions and strategies can be introduced to tackle this weak aspect of our students.

**Keywords:** Antibiotic resistance, knowledge, medical students, practices

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## Introduction

Antimicrobial resistance (AMR) is one of the serious health problem worldwide, giving considerable attention from health care professionals from all over the world. The developing world continues to bear the brunt of the challenge. India leads the world in the irrational and indiscriminate use of antimicrobials [1]. Antibiotics are the most commonly prescribed and widely used medications, contributing to the worrisome rise in AMR [2]. Patients' "more medication, better doctor" views are mostly responsible for doctors' illogical prescription practises. Free, unregulated over-the-counter (OTC) antibiotic availability for humans and animals, a lack of understanding, self-medication, illogical demand for antibiotic prescriptions, and a lack of awareness regarding antibiotic resistance are all contributing reasons to the current deterioration.

To reduced emerging problem of AMR, national antibiotic policies have been devised, a national surveillance database for antibiotic usage has been established, and the national centre for disease control (NCDC) has been recognised as the country's focal point for AMR [3]. But these well-structured interventional strategies are still in initial stage, it has started to get positive changes at national and community level. However, something more specific and directed needs to be done at individual level that influences health related behaviour.

In the fight against AMR, knowing the degree of knowledge, attitudes, and behaviours of young doctors, as well as how universities and postgraduate schools view AMR as a significant educational issue, is critical. For these reasons, we conducted the knowledge, attitudes and practices (KAP) survey involving young MBBS students in order to gain a snapshot of the current situation regarding education on AMR.

## Materials and Methods

A descriptive cross-sectional study was undertaken in pharmacology department with collaboration of community medicine department of medical college of Gujarat. The data was collected from 10<sup>th</sup> March to 21<sup>st</sup> March, 2022. The Institutional Ethical Committee provided ethical approval. The study comprised MBBS students in their third first and third final years. Prior to data collection, students gave their consent. A total 260 students participated in our study. After studying previously published related studies, a semi-structured questionnaire was created with various adjustments [4-6]. The questionnaire was divided into four sections. It featured a demographic profile of students in the first section. The second section consisted of questions designed to measure students' knowledge of antibiotics and resistance. It contained questions in the third section to determine students' attitudes toward the prudent use of antibiotics. The researchers used a 5-point Likert scale to assess knowledge and attitudes concerning antibiotics and resistance, with responses ranging from 1 to 5. 1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, and 5=strongly disagree. Forth part consisted of questions related to practices to self-medication of antibiotics & it too assessed using Likert scale whose responses ranged from 'always' to 'never'. In order to simplify the analysis, 5-point response options of the Likert scale, was reduced to three, such as always/sometimes/never, agree/disagree/not sure. Microsoft Excel version 2010 was used to analyse the gathered data. The frequency and percentage of students' KAP toward antibiotic usage and resistance were calculated.

## Results

In present study, among the 260 medical students, 182 (70%) were males and 78 (30%) were female. Students ranged in age from 19 to 21 years old (M=20, SD=0.6) (table-1).

**Table 1: Characteristics of the study population (n=260)**

Characteristics	Characteristics	Frequencies (%)
Sex	Male	182 (70)
	Female	78 (30)
Year of study	Third first	128 (49.2)
	Third final	132 (50.8)
Age (years)	≤ 19	104 (40)
	20	108 (41.5)
	≥ 21	48 (18.5)

**Table 2: Knowledge of participants on antibiotic use and resistance (n=260)**

No.	Questions	Agree n (%)	Neither agree nor disagree n (%)	Disagree n (%)
1	Antibiotics are useful for bacterial infection	248 (95.4)	10 (3.8)	2 (0.8)
2	Antibiotics are useful for viral infection	75 (28.8)	5 (1.9)	180 (69.2)
3	Use of antibiotics will speed up recovery from flu and cold	138 (53.1)	2 (0.8)	120 (46.2)
4	Antibiotics resistance means that if antibiotics are taken too often, they are less likely to work in future	198 (76.2)	22 (8.5)	40 (15.4)
5	Antibiotics resistance is important and serious global public health issue	237 (91.2)	10 (3.8)	13 (5.0)
6	Indiscriminate and injudicious antibiotics use can lead to			
a)	Ineffective treatment	218 (83.8)	16 (6.2)	26 (10.0)
b)	Increased adverse effects	219 (84.2)	13 (5.0)	28 (10.8)
c)	Increased cost burden to the patient	227 (87.3)	10 (3.8)	23 (8.8)
7	Antibiotics can cause secondary infections after killing good bacteria present in the body	195 (75.0)	26 (10.0)	39 (15.0)

Antimicrobial resistance is a critical worldwide health issue, according to 237 students (91.2%) & 13(5%) did not consider it as a serious issue and almost same number of students were uncertain about it. Antimicrobial medications do not cure viral infections, according to 180 of the students (69.2%) & total 75(28.8%) considered it otherwise and remaining 5(1.9%) remained indecisive. 120(46.2. %) students considered that antimicrobial agents will not speed up recovery from flu & cold, while 138(53.1%) students considered antimicrobial agents were

required, whereas 2(0.8%) students were unclear about it. 198(76.2%) students agreed that Antibiotics resistance means that if antibiotics are taken frequently, they are less likely to work in future, whereas 40(15.4%) students didn't agree with this statement and 22(8.5%) remained doubtful about it. Antibiotics might induce secondary infections after killing healthy bacteria in the body, according to 195 students (75%) & 39(15%) didn't agree with it & 26(10%) remained unclear (table-2).

**Table 3: Attitude towards antibiotics use (n=260)**

No.	Questions	Agree n (%)	Neither agree nor disagree n (%)	Disagree n (%)
1	Antimicrobials are safe drugs, hence they can be commonly used medication	59 (22.7)	29 (11.2)	172 (66.2)
2	Skipping one or two doses does not contribute to the development of Antimicrobial resistance	58 (22.3)	63 (24.2)	139 (53.5)
3	Adverse effects of Antimicrobials are reduced by using more than one Antimicrobial at a time	56 (21.5)	61 (23.5)	143 (55.0)
4	Injudicious use of Antimicrobials shortens the duration of illness	49 (18.8)	10 (3.8)	201 (77.3)
5	When you have a cough and sore throat, Antimicrobials are the first drug of choice for early treatment and to prevent emergence of resistant strains	84 (32.3)	38 (14.6)	138 (53.1)
6	It is important to obtain culture and sensitivity report for Antimicrobial prescription	185 (71.2)	32 (12.3)	43 (16.5)

In present study, only 59(22.7%) students believed that antimicrobial agents are safe and can be used commonly, while 172 (66.2%) of respondents disagreed, and 29 (11.2%) were undecided. Only 58 students (22.3%) agreed that skipping one or two doses has no effect to the development of antimicrobial resistance whereas 139(53.5%) disagreed and 63(24.2%) were indecisive. 56(21.5%) participants agreed that adverse effects of antimicrobial agents are reduced by using more than one antimicrobial agent at a time, whereas 143(55%) disapproved and 61(23.5%) were unclear. Only 49 individuals (18.8%) believed that

overuse of antimicrobial drugs shortens the duration of sickness, whereas 201(77.3%) disagreed and 10(3.8%) remained unsure. 185(71.2%) participants agreed that it is important to obtain culture and sensitivity report of antimicrobials agents, whereas 43(16.5%) disagreed and 32(12.3%) remained undecided about it. Total 84(32.3%) participants believed that antimicrobial agents are the first drug of choice Cough and sore throat should be treated as soon as possible to avoid the emergence of resistant strains, whereas 138(53.1%) disagreed and 38(14.6%) remained unclear (table-3).

**Table 4: Self-reported practices on antibiotics (n=260)**

No.	Questions	Always n (%)	Sometimes n (%)	Never n (%)
1	The doctor prescribes a course of Antimicrobial for you. After taking 2 to 3 doses, you start feeling better			
a)	Do you stop taking further treatment	47 (18.1)	78 (30.0)	135 (51.9)
b)	Do you save the remaining Antimicrobials for the next time you get sick?	56 (21.5)	97 (37.3)	107 (41.2)
c)	Do you discard the remaining leftover medication?	21 (8.1)	78 (30.0)	161 (61.9)
d)	Do you give the leftover Antimicrobial to your friend /family member if they get sick?	31 (11.9)	128 (49.2)	101 (38.8)

e)	Do you complete the full course of treatment?	194 (74.6)	59 (22.7)	7 (2.7)
2	Do you consult a doctor before starting an Antimicrobial?	123 (47.3)	118 (45.4)	19 (7.3)
3	Do you check the expiry date of the Antimicrobial before using it?	236 (90.8)	18 (6.9)	6 (2.3)
4	Do you prefer to take an Antimicrobial when you have cough and sore throat?	35 (13.5)	79 (30.4)	146 (56.2)

In table 4, it was found that whether the students stopped taking the prescribed antimicrobial agents when they felt good after taking 2 to 3 doses. 47(18.1%) always stopped, whereas 78(30%) sometimes stopped & 135(51.9%) never interrupted the medication midway. When asked whether they saved these antimicrobial agents for future use, 56(21.5%) always saved, whereas 97 (37.3%) sometimes saved and 107(41.2%) never kept leftover medication. When we asked whether they discarded the leftover medicines, only 21(8.1%) always discarded, whereas 78(30%) sometimes discarded and 161(61.9%) never discarded the leftover medicines. Almost 31(11.9%) students always handed over the leftover medicines to their sick friend/family member, whereas 128 (49.2%) students sometimes gave their friend/ family member leftover medicines. Most of students 194 (74.6%) always completed the full course of treatment, whereas 59(22.7%) sometimes completed and only few students 7(2.7%) never completed the full course of treatment. 123(47.3%) of participants always consulted a doctor before starting with an antimicrobial agent, whereas 118 (45.4%) sometimes consulted and 19(7.3%) never consulted a doctor before starting with an antimicrobial agent. When they had a cough and sore throat, a small group of 35 (13.5%) students preferred to use an antibacterial

medication. & 79(30.4%) sometimes took medication for it and 146(56.2%) never took antimicrobial agents for cough and sore throat (table-4).

## Discussion

Antibiotic resistance is on the rise all across the world, and it is becoming a major worry. Antibiotics' clinical success is dependent on how they are used by patients, physicians, and retailers. Fear of losing patients, a lack of information on rational antibiotic use, excessive and unnecessary antibiotic prescribing, incorrect dosage or route of administration, antibiotic prescribing for non-bacterial infections, patient demands, and self-prescribing may all influence prescribers' decisions. Self-medication, sharing medications, not completing the entire course of treatment, and saving a portion of the course for future use are all factors that contribute to improper antibiotic use.

The vast majority of the students in this study (91.2%) were fully aware of the global issue of antibiotic resistance. Thriemer K *et al.* and practising medical practitioners reported a similar finding, with 85.4% of participants saying antibiotic resistance is a major global issue [7]. Around two third students (77.3%) were disbelieved about injudicious use of Antimicrobials shortens the duration of illness. Similar result was found in Archana Parihar *et al* and practicing medical doctors in which 78.9 % participants has similar disagreed [8]. Antibiotics are also effective for viral infections, according to 28.8% of students in this survey and around half of students (53.1%) said use of antibiotics causes speed recovery from cold and flu and similar result was find in study done by Thriemer K *et al* and Archana Parihar *et al* [7,8].

We found in our study that “antibiotics are safe drugs; hence they can be used commonly”, 66.2% disagreed. Afzal *et al.* reported a similar result in their survey, with 78.4% of students disagreeing to the identical question. approximately 32.3 percent of students claimed that antibiotics are their first choice drugs when they have a cough or sore throat, whereas 52.32% answered the same thing in a survey conducted by Mahajan M *et al* [9,10]. Majority 74.6 percent of students finished the entire course of antibiotics, which was similar to the studies in which 78.9% and 70% of medical students finished the course, respectively [8,6].

### Conclusion

This research adds to our understanding of future doctors' knowledge, attitudes, and practises about antibiotic resistance and use. AMR is an epidemic that should be fought by everyone the prescribers, the patients and the regulators. Adoption of appropriate educational interventions and strategies is the key that can unlock the initial step to curb the alarming increase in resistance.

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