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## Evaluation of knowledge, attitude and self-medication practice of antibiotics among medical students

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### Abstract

**Background:** Antibiotics are important and essential armamentarium against bacterial infections. Resistance to antibiotics is an emerging global public health problem, attributed to many factors, including injudicious use. Medical students in India have been taught about the microbes as well as pharmacological aspects of antibiotics in their second professional year by microbiology and pharmacology departments respectively. But the knowledge acquired would be incomplete if the application aspects are found wanting, like self-medication practice.

### Objectives

1. To evaluate the Knowledge, Attitude and Practice (KAP) towards antibiotic usage among undergraduate medical students
2. To understand the effect of curriculum on their knowledge regarding antibiotic use.
3. To identify gaps in knowledge, attitude and practice among medical students from antibiotic use perspective.
4. To assess the self-medication of antibiotics among the students.

**Methods:** A cross sectional Questionnaire based survey was done over a period of two months (July – August, 2019) in Government Villupuram Medical College on medical students who had completed their second professional year. Out of 204 prefinal and final year M.B.B.S students; 150 were selected based on homogeneous, purposive sampling. Validated Questionnaire for KAP (Knowledge, Attitude and Self-medication Practice) with respect to antibiotic use was administered and responses were collected.

**Results:** Almost all had adequate knowledge about rational use of antibiotics as per 10-item Questionnaire (48.6% scored 10 out of 10; 42.6% scored 9/10; 6.6% scored 8/10 and 1.3% scored 7/10). Results for attitude aspect showed that most agreed that antibiotic resistance was a major public health problem and antibiotics were freely available. For 64% of study population newer antibiotics were more efficacious whereas 48% stated costly drugs were more efficacious. 45.3% of students self-medicated themselves with antibiotics without consulting a doctor in the previous year.

**Conclusion:** The results revealed that theoretical knowledge and attitude about antibiotic usage translated inadequately into practice, necessitating interventions from clinical departments so that when medical students enter internship as well as after completion of the course, they start using antibiotics judiciously.

**Keywords:** antibiotic drugs, self-medication, medical students

### Introduction

Antibiotics are drugs used to kill or inhibit the growth of bacteria but are sometimes toxic to human cells. They are among the most commonly prescribed medications, yet they are injudiciously used very often. In spite of strict guidelines for scientific and rational use of antibiotics, clinical and public use differ resulting in risk like antibiotic resistance<sup>[1]</sup>. Resistance to antibiotics is a subset of antimicrobial resistance (AMR), and it applies to bacteria that become resistant to antibiotics. Antibiotic resistance poses threats like difficulty in treating the disease completely, requiring higher doses with the attendant toxicity and alternative medications which may be expensive<sup>[2]</sup>. Indiscriminate use of antibiotics including self-medication are important reasons for resistance and in some cases lead to multidrug resistant (MDR) bacteria<sup>[3]</sup>. Awareness about the significance and seriousness of antibiotic resistance is the first step towards slowing its progress and recommendations have been made globally to meet the challenge<sup>[4]</sup>.

Commonly suggested approach is to create awareness among the general population as well as to educate health care professionals about antibiotic resistance and its dangerous

consequences explaining the steps to prevent its development and spread [5, 6]. Prescribers play an important role in the battle against antibiotic resistance, not only through their safe and rational prescribing, but also by creating awareness among the patients and imparting health education to the public regarding safe medication practices regarding antibiotics [7, 8].

In recent years, researchers started focusing on Knowledge, Attitude and Practice (KAP) towards antibiotic use and misuse. Literature from studies on general population showed differences in the level of knowledge about antibiotic resistance between western countries and developing countries like India, later where it was insufficient [9, 10, 11, 12].

Medical undergraduates who are future prescribers are expected to have good knowledge and attitude regarding antibiotic use and growing threat of resistance [13]. It is emphasized that adequate training should be given to the healthcare professionals regarding proper usage of antibiotics in order to promote their rational use [14]. Being medical students, self-medication practices could be more common among them when compared to non-medical students and general population [15]. It is prudent to know how medical students apply the knowledge acquired from the curriculum in their real-life scenario with respect to antibiotic usage. This KAP study was aimed to unravel such issues among the undergraduate medical students who completed their second professional year, means they must had learnt about microbes and antibiotics from microbiology and pharmacology classes respectively.

**Materials and Methods**

**Study Design**

This study was a cross-sectional, questionnaire-based survey.

**Place of study**

Govt. Villupuram Medical college in Tamil Nadu.

**Study period**

Two months – July & August, 2019

**Sample size**

Total of 150 students, 75 each from third and final professional M.B.B.S students were included out of 204

based on homogenous, purposive sampling.

**Inclusion criteria**

1. Third and final year M.B.B.S students
2. Willing to participate in the study

**Exclusion criteria**

1. First and second professional year M.B.B.S students
2. Interns & Postgraduates

**Materials**

This study was conducted after getting approval from Institutional Ethics Committee. Structured questionnaire on Knowledge, Attitude and self-medication Practice on antibiotics was designed and pilot study was done with 10 students from second professional year. After validation of the questionnaire and getting informed written consent, proforma was administered to the third and final year medical students in person. Responses were collected immediately to avoid bias.

The proforma had two parts – socio demographic data and KAP questionnaire. KAP questionnaire in turn had three parts. First, knowledge about the fundamental tenets of antibiotic use was tested by 10 questions, each carrying one mark. Scoring was done from 0 to 10 based on the correct responses. More than 75% of marks, i.e., 8 and above were considered as adequate given the fact that these students had completed their microbiology and pharmacology examinations. Attitude was assessed by five questions in second part, each with yes or no or cannot say options. Appropriate answers correspond to the scientific attitude of students. Practice of self-medication with antibiotics were gathered by 10 questions reflecting real life scenario. Desirable and undesirable behaviours were sorted based on the prevailing norms. SPSS version 22 was used for statistical analysis.

**Results**

Out of 150 students, 70 were males (46.7%), 80 were females (53.3%) and age ranged from 19 to 22 (mean age for males – 20.85 and females -20.93). 22 students had at least one of their parents as a health care professional (14.6%). Socioeconomic class (SEC) of students based on Modified Kuppuswamy index (2001) was presented in Table 1.

**Table 1:** Socio Economic Class distribution

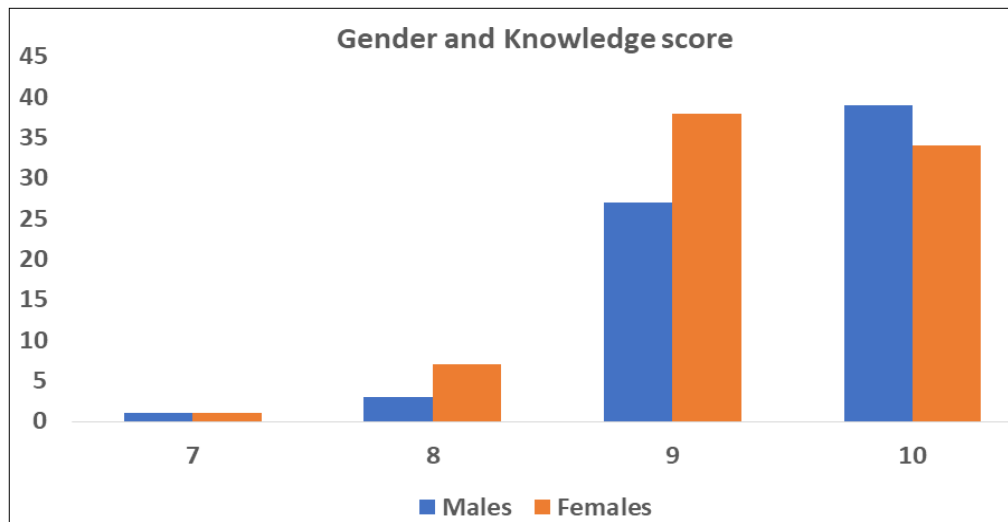
| SEC | Total n=150 (%) | Males n=70(%) | Females n=80(%) |
|-----|-----------------|---------------|-----------------|
| 1.  | 27 (18)         | 12 (17.2)     | 15 (18.7)       |
| 2.  | 47 (31.3)       | 23 (32.8)     | 24 (30)         |
| 3.  | 33 (22)         | 17 (24.3)     | 16 (20)         |
| 4.  | 24 (16)         | 11 (15.7)     | 13 (16.3)       |
| 5.  | 19 (12.7)       | 07 (10)       | 12 (15)         |

Responses for Knowledge part of KAP presented in Table 2 and gender-based mark distribution in Figure 1. Marks ranged from 7 to 10. Two participants scored 7 (1.3%), 10 (6.6%) scored 8, 65 (42.6%) scored 9 and 73(48.6%)

students scored 10 out of 10. Gender difference in marks were slightly significant between males (9.48±0.65) vs females (9.25±0.77) with *p* value -0.04. (Chi-square test)

**Table 2:** Knowledge questionnaire and responses

| Statements  | Correct (%) | Incorrect (%) |
|---|-------------|---------------|
| Antibiotics are administered only through systemic route. | 150 (100%)  | 0 (0%)        |
| Antibiotics only kill pathogenic organisms                | 128 (85.3%) | 22 (14.7%)    |
| Antibiotics can cause side effects                        | 149 (98.7%) | 2 (1.3%)      |
| Choice of an antibiotic - factors                         | 149 (99.3%) | 1 (0.7%)      |
| Superbug statement  | 138 (92%)   | 12(8.0%)      |
| Antibiotic resistance definition                          | 142 (94.7%) | 8(5.3%)       |
| Multi drug therapy indications                            | 147(98%)    | 3(2%)         |
| Statement on counterfeit antibiotics                      | 139(92.7%)  | 11(7.3%)      |
| Safe antibiotics during pregnancy                         | 122(61.3%)  | 28(18.7%)     |
| Antibiotics effective against anaerobes                   | 141(94%)    | 9(6%)         |



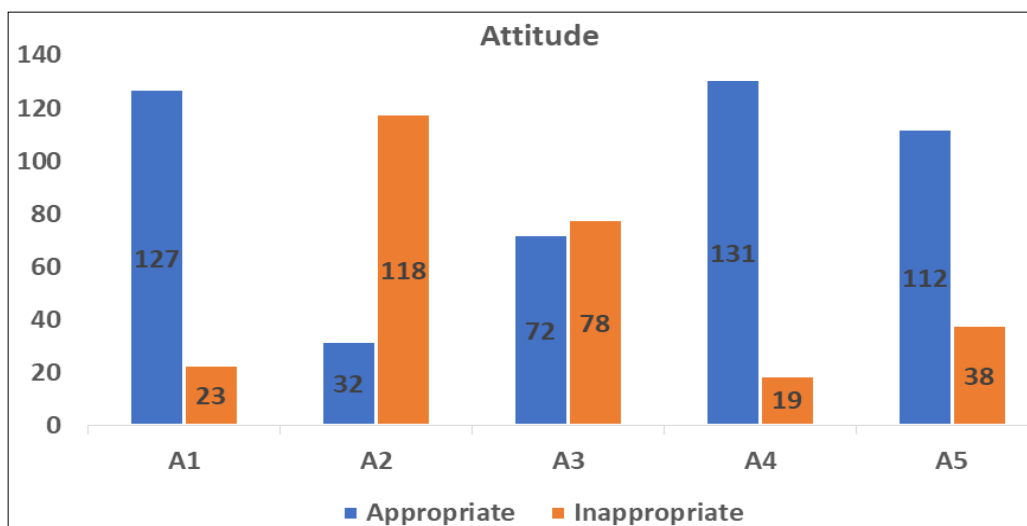
**Fig 1:** Gender-wise distribution of marks

Attitude responses were depicted in Table 3. Most agreed that antibiotics should not be used for viral infections, and acknowledged that antibiotic resistance as a major public health problem and aware of the free availability of over the

counter (OTC) of antibiotics. Higher proportion of students opined that efficacy was related to newer and costlier drugs (64% & 48% respectively). Figure 2 clumped answers as appropriate and inappropriate and presented.

**Table 3:** Attitude about antibiotic use

| Statements   | Yes (%)    | No (%)    | Can't Say (%) |
|--|------------|-----------|---------------|
| Can antibiotics be used to cure viral infections?                              | 127(84.7%) | 15(10%)   | 8(5.3%)       |
| Is the efficacy better if the antibiotics are newer?                           | 96(64%)    | 32(21.3%) | 22(14.7%)     |
| Is the efficacy better if the price is higher?                                 | 72(48%)    | 42(28%)   | 36(24%)       |
| Is it possible to buy antibiotics from pharmacy without doctors' prescription? | 131(87.3%) | 10(6.7%)  | 9(6%)         |
| Is antibiotic resistance a major public health issue in our country?           | 112(74.7%) | 32(21.3%) | 6(4%)         |



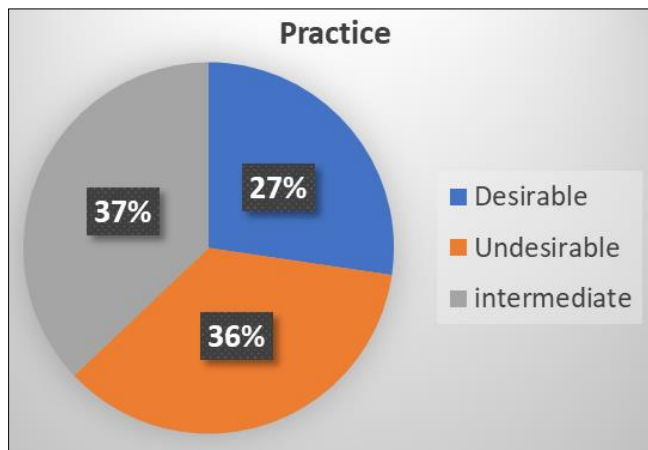
**Fig 2:** Attitude – Appropriate as per the existing literature

Practice pattern of self-medication of antibiotics for the previous year presented in Table 4 and Figure 3 illustrates how many followed desirable as well as undesirable

practices in the context of antibiotic use. Poor adherence to the best practice as stated by “sometimes” were treated as intermediate behaviour.

**Table 4:** Practice of self-medication of antibiotics

| Statements   | Never (%) | Always (%) | Sometimes (%) |
|--|-----------|------------|---------------|
| Have you taken any antibiotic without consulting a doctor last year?           | 82(54.7%) | 54(36%)    | 14(9.3%)      |
| Have you taken any antibiotic based on friend’s advice last year?              | 76(50.7%) | 66(44%)    | 8(5.3%)       |
| Have you taken any antibiotic last year just by reading from internet?         | 91(60.7%) | 32(21.3%)  | 27(18%)       |
| Have you taken any antibiotic leftover from your friends / family last year    | 47(31.3%) | 79(52.7%)  | 24(16%)       |
| Do you alter the duration of antibiotic use on your own?                       | 69(46%)   | 52(34.7%)  | 29(19.3%)     |
| Do you save the remaining antibiotics for the next time you get sick?          | 39(26%)   | 36(24%)    | 75(50%)       |
| Do you give the leftover antibiotics to your friend/roommate if they get sick? | 32(21.3%) | 17(11.3%)  | 101(67.3%)    |
| Do you change the doses on your own?   | 14(9.3%)  | 24(16%)    | 112(74.7%)    |
| Do you take it along with another antibiotic on your own?                      | 42(28%)   | 20(13.3%)  | 88(58.7%)     |
| Do you get back to your doctor after the course?                               | 41(27.3%) | 35(23.3%)  | 74(49.3%)     |



**Fig 3:** Pattern of antibiotic use – desirable vs undesirable

**Discussion**

Antibiotics are cornerstone of antimicrobial therapy for infectious diseases responsible for reducing morbidity and mortality due to deadly pathogens in the 20<sup>th</sup> century. At the same time, resistance to antibiotics were noted as early as 1970s, leading to discovery of newer drugs [16]. But the battle became harder, given the fact that more and more bacteria started exhibiting resistance even to the newer drugs. Several studies from India and abroad found that knowledge and attitude of medical students with respect to judicious use of antibiotics were fair enough and higher than that of general population or their counterparts from other fields [17, 18].

Our study was conducted in medical students who passed second professional year, thereby aiming to understand how much knowledge they acquired from the microbiology and pharmacology classes regarding antibiotic use. We excluded first and second professional year students who were generally naïve and interns who would be involved in patient care directly, both might lead to bias of either under-reporting or over-reporting respectively [19].

Our study was in concordance with other similar studies conducted elsewhere, with respect to level of knowledge [20, 21]. The attitude of the study participants with respect to antibiotic use was found to be appropriate and responsible unlike Khan AA *et al.*, who inferred a casual and lax attitude [22]. 45.3% of students in our study self-medicated themselves which was similar to Gupta MK *et al.*, [23]. Many Indian studies on medical students observed higher rate of self-medication, like 78.6% by Kumar *et al.*, and 88.18% by

Patil *et al.*, [24, 25]. Many authors were of the opinion regarding this practice of final year students which could be due to reading of diseases and clinical exposure in their posting. Hence, it might be advisable for more vigorous approach in terms of teaching them in clinical departments during their clinical postings to lower the percent of self-medication practice.

**Conclusions**

Self-medication of antibiotics was common among undergraduate medical students. In spite of having adequate knowledge about proper use of antibiotics and the risk of resistance, students taking it without consultation and prescription. This calls for continuous effort from not only preclinical period but also in the clinical period of their professional carrier.

**Limitations**

The study was based on self-reported data about self-medication in the preceding one year thus prone to recall bias. Though the students were asked to complete the questionnaire independently, influence from other students could not be entirely ruled out.

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