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Assessment of Knowledge, Attitude and Practices about Antibiotic Resistance and Usage: A Questionnaire Based Study Among Medical Students

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Abstract---Background: The current trend of treatment, using antibiotics has definitely helped improve patient outcome and prevent infectious disease however the irrational and unregulated use these drugs has created a havoc of antibiotic resistance. The Worldwide spread of the antibiotic resistant organisms has gradually created the threat of antimicrobial insufficiency and is leading us back to an pre-antibiotics era. Patients infected with these antibiotic resistant organisms are likely to face long durations of hospital stay, increased cost of treatment and require treatment with second and third line drugs, which may be more toxic and less effective. Medical students are going to be primary care physicians to serve the community. These future prescribers are frontline fighters against antimicrobial resistance, by rationally prescribing the antibiotics and promoting patient awareness. There are sufficient evidences to support that newly licensed doctors/prescribers are not adequately trained to prescribe medications safely. Lack of adequate training during medical degree course may be one of the reasons for that. Objective: To assess the knowledge, attitudes, and the practices of medical students with respect to antibiotic resistance and usage

Keywords---antibiotics resistance, attitude, knowledge, medical students, practice.

Introduction

Antibiotics play magnificent role in the treatment of infectious disease and are among the most commonly used drugs in healthcare sector (Goossens, 2009). Patient healthcare has improved a lot due to their use in both preventive and treatable therapy (Piddock, 2012). However, due to the unfolding of resistant microorganisms, their fruitfulness is seriously endangered (Spellberg et al., 2013). Antibiotics are the most commonly used drugs often associated with inappropriate use leading to resistance (Sadasivam et al., 2016). Increased hospital stay, increased mortality, use of additional drugs and other resources and increasing cost of treatment are some of the consequences of infections with resistant organisms (Dellit et al., 2007).

Education and enlightenment about antibiotic resistance should be given tremendous attention during undergraduate training of MBBS (Simpson et al., 2007). Hence the present study was conducted to elicit the knowledge, attitude and practices of the study population about antibiotic resistance and usage, so that the gaps in their knowledge could be addressed with the help of proper educational interventions and these budding doctors in future prescribe antibiotics judiciously and also help to prevent their indiscriminate and inappropriate use.

Aims and objective

To assess the KAP regarding antibiotic use and antibiotic resistance in final year MBBS students.

Material and Methods

This was a cross-sectional, questionnaire based study which was undertaken in the department of Pharmacology in SKIMS MCH amongst final year MBBS undergraduate students. A written informed consent was taken before administering the questionnaire. A structured, validated questionnaire was used to collect the information from the participants after approval from the Institutional Ethics Committee (IEC). The questionnaire used in this study was developed for its content and relevance after extensive research of the literature for similar studies. The students were briefed about the purpose of the study.

Statistical analysis

The responses were evaluated and presented as numbers and percentage

Knowledge questions (Agree/Disagree)

K1: Can antibiotics cure bacterial infections.

K2: Can antibiotics cure viral infections.

- K3:** Have you heard about antibiotic resistance.
K4: If taken too often, antibiotics are less likely to work in future.
K5: Do you think use of antibiotics will speed up recovery from cold and cough.
K6: Do you think indiscriminate and inappropriate use of antibiotics will decrease the efficacy of treatment.
K7: Is the efficacy better if, newer and costlier antibiotics are used.
K8: Is antibiotics resistance an additional burden of cost to the patient.
K9: Use of more than one type of antibiotic is a better choice to control infections.
K10: Skipping 1 or 2 doses of antibiotics doesn't contribute to antibiotic resistance.
K11: Large doses of antibiotics are better for quick action

Attitude questions (Agree/Disagree)

- A1:** Whenever someone has cold, do you recommend taking antibiotics to prevent getting a more serious illness.
A2: When someone gets fever, antibiotics help in quicker recovery.
A3: Whenever someone takes an antibiotic it contributes to development of antibiotic resistance.
A4: Antibiotics are safe drugs and they can be commonly used.
A5: Antibiotics can prevent any ailment from becoming worse.
A6: Antibiotic resistance affects you and your family's health.

Practice questions (Yes/No)

- P1:** Do you take proper consultation from the doctor before starting an antibiotic.
P2: The doctor prescribes you a course of antibiotic. Do you always complete the course of medication.
P3: Do you give leftover antibiotics to anyone if they get sick.
P4: Have you ever self medicated with antibiotics.
P5: Have you ever taken antibiotics prophylactically to prevent infections.

Results

Out of 104 students only 90 responded. The medical students had fair knowledge about antibiotics and resistance. 92.2% (n=83) were aware of the fact and agreed that antibiotics can cure bacterial infections. 90% (n=81) disagreed that antibiotics can help in curing viral infections. Highest correct response i.e. 100% was noted for the statement "Have you heard about antibiotic resistance". A majority of respondents 70% (n=63) agreed that if antibiotics are taken too often they are less likely to work in future. More than three quarters 81.1% (n=73) of respondents agreed with the fact that antibiotics will speed up recovery from cold and flu while remaining 18.9% (n=17) disagreed. 94.4% (n=85) respondents believed that indiscriminate and inappropriate use of antibiotics will decrease the efficacy of treatment. A majority 70% (n=63) of the students thought newer and costlier antibiotics are more effective and 91.1% (n=82) agreed that AMR presented an additional burden of cost to the patient. 51.1% (n=46) believed use of more than one type of antibiotic is a better choice to control infections. Around a quarter of

participants 26.6% (n=24) felt skipping 1 or 2 doses of antibiotics doesn't contribute to antibiotic resistance and was irrelevant in development of AMR. Less than 10% respondents recorded that large doses of antibiotics are better for quick action.

Table 1
Assessment of knowledge regarding antibiotic resistance and usage

Question	Agree	Disagree
Can antibiotics cure bacterial infections.	92.2% n=83	7.7% N=7
Can antibiotics cure viral infections.	10% n=9	90% n=81
Have you heard about antibiotic resistance.	100% n=100	0% n=0
If taken too often, antibiotics are less likely to work in future.	70% n=63	30% n=27
Do you think use of antibiotics will speed up recovery from cold and cough.	81.1% n=73	18.9% n=17
Do you think indiscriminate and inappropriate use of antibiotics will decrease the efficacy of treatment.	94.4% n=85	6.6% n=5
Is the efficacy better if, newer and costlier antibiotics are used.	70% n=63	30% n=27
Is antibiotics resistance an additional burden of cost to the patient.	91.1% n=82	8.9% n=8
Use of more than one type of antibiotic is a better choice to control infections.	51.1% n=46	48.9% n=44
Skipping 1 or 2 doses of antibiotics doesn't contribute to antibiotic resistance.	26.6% n=24	73.4% n=66
Large doses of antibiotics are better for quick action.	8.8% n=8	91.2% n=92

The attitudes pertaining to antibiotic use and resistance were examined and the results are depicted in Figure1, wherein 32 participants reported that antibiotics should be taken on developing a cold and 67 students believed that irrespective of the etiology of fever, antibiotics hasten the process to get relief from fever. 21 participants believed that taking antibiotics contributes to development of antibiotic resistance. Most of the students (n=81) thought that antibiotics are safe, and 80 respondents believed Antibiotics can prevent any ailment from becoming worse. 52 students responded that antibiotics affect their personal and their family's health.

Majority of students 63.3% (n=57) believed in consulting doctor before starting antibiotics and most of them 66.6% (n=60) always complete the course of Medication, (n=52) agreed to giving leftover medication to other people and less than a quarter 22.2% (n=20) agreed to have self medicated. Only 10% (n=9) respondents agreed to taking antibiotics prophylactically to prevent infections.

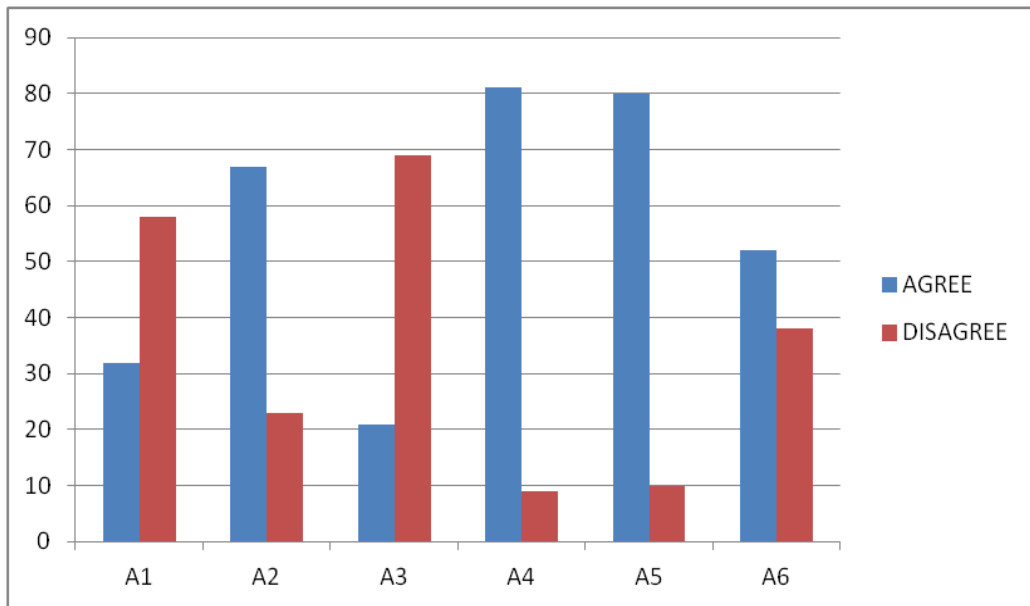


Figure 1. The attitudes of participants pertaining to antibiotic use and resistance

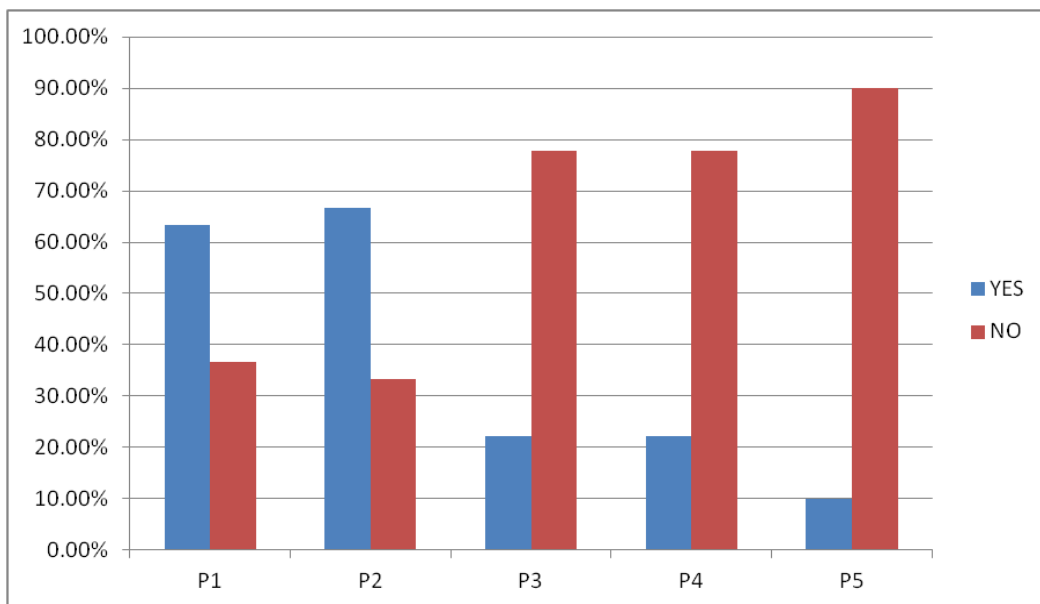


Figure 2. The practice of participants pertaining to antibiotic use and resistance

Discussion

Results stipulate that final professional medical students had a fair knowledge about antibiotic usage and resistance. These results are in concurrence with some studies documenting high awareness of antimicrobial use and resistance among medical students ([Suaifan et al., 2012](#); [Afzal Khan et al., 2013](#); [Scaioli et al., 2015](#); [Sharma et al., 2016](#)).

The extent of comprehension about the fact that antibiotics are useful for bacterial infections was quite high among medical students. Similar level of understanding has been noted by many other studies (Scaiola et al., 2015; Huang et al., 2013). In the present study most of the students refuted the statement that antibiotics are useful for viral infections like common cold and flu akin to the findings by Ahmad *et al.*, among B. Sc. Pharmacy students (Ahmad et al., 2015). This is in contrast with the study by Azevedo MM which reported a higher percentage (>60%) of participants believing that antibiotics should be prescribed for viral illnesses. This can be attributed to the fact that medical students study about antibiotics in their curriculum (Azevedo et al., 2009). In the current study, all the students had heard about antibiotic resistance alike to that documented by Gupta et al. (2019), Lesser awareness in this regard has also been reported by many other studies (Huang et al., 2013; Ajibola et al., 2018).

Our study showed that if antibiotics are taken too often, they are less likely to work in future similar to various studies (Scaiola et al., 2015; Ahmad et al., 2015; Sakeena et al., 2018). In our study more than 3 quarter of students disagreed with the fact that antibiotics will hasten the process of recovery from flu and cold which is much higher than reported by some studies (Padmanabha et al., 2016; Shehadeh et al., 2012). Majority of our study participants agreed that newer and costlier drugs are more effective which is in contrast with the study of Tarao SM et al (Tarao et al., 2015). Most of the study participants agreed that AMR presented an additional burden of cost to patient. This is in concurrence with the study of Maragakis LL (Maragakis et al., 2008). Skipping doses and discontinuation of AMAs was seen in high proportion in a study done in Ethiopia whereas in the current study only about a quarter participants believed that skipping doses doesn't contribute to AMA resistance (Tesfaye, 2017).

Similar to our study, a study done amongst final year pharmacy students in Malaysia depicted that the participants' attitude did not correlate with their knowledge despite having a good understanding of antibiotic resistance (Rajiah et al., 2015). This emphasizes the need of updating the students regarding antibiotic usage and resistance and upgrading curriculum so that the responsibility toward the judicious use of antibiotics is ingrained in them (James et al., 2006). A study from China has also highlighted the antibiotic knowledge and attitude education should be fortified (Simpson et al., 2007).

Misconceptions about antibiotics were revealed in the present study as large percentage of the participants believed that antibiotics better worked on all fever cases and common cold. Nearly, one fourth of students asserted on taking antibiotic for cold or sore throat. This practice was quite lower in the present study than documented by many other studies (Afzal Khan et al., 2013; Scaiola et al., 2015; Sharma et al., 2016; Huang et al., 2013; Padmanabha et al., 2016; Badiger et al., 2012).

The laid back attitude of the participants was evident when three quarters considered antibiotics to be drugs that hasten recovery from illness and more than half considered them to be safe drugs. This is comparable to a study in South India where 60% presumed that antibiotics provide quick relief and contrast to a study done in central India were more than 81% disagreed to the

imprudent use of antimicrobials abbreviates the disease duration. Antibiotics should be used only for bacterial infections and it should be always be kept in mind that every drug carries a risk of adverse drug reaction (Afzal Khan et al., 2013; Yashin et al., 2018).

The self reported practices of antibiotic use in our study participants were found to be satisfactory. A majority 63.3% consulted a doctor before starting on an antibiotic and most of them completed the full course of the medication. Previous studies have shown high rates of self medication (Zafar et al., 2008). Majority of the participants took medical consultation before taking antibiotics unlike that of a study done in a medical school in nigeria (Alex, 2019). Many studies have reported that most of the students give the leftover antibiotics to their friends or roommate etc without consultation when they are sick which is akin to our study (Sharma et al., 2016; Ajibola et al., 2018; Padmanabha et al., 2016). The present study showed that less than a quarter participants self medicated where as the self-medication practice was more prevalent among study participants of Ayepola et al. (2018). This disparity may indicate roles of other factors than knowledge and belief of the users when it comes to practice.

Conclusion

This study gave us an insight about the knowledge, attitude, perception and practices regarding antibiotic resistance, and usage among the future doctor. The Knowledge level of medical students regarding antibiotics and its resistance was quite satisfactory. As far as attitude and practices are concerned, there is a significant need for improvements. Since the medical students are going to be primary care physicians in near future, it is important to have proper guidelines in medical curriculum related to use and rational prescription of antibiotics. The study revealed many important misconceptions about antibiotics. Some belief of participant's needs rectification. A better understanding of issues pertaining to antimicrobial use and resistance can enhance the effectiveness of modalities targeted at improving antimicrobial use and control of antibiotic resistance.

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