Original Research Article

Assessment of knowledge on pharmacotherapeutics among undergraduate medical students in a South Indian medical college

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ABSTRACT

Background: Pharmacotherapeutics knowledge is important for rational drug therapy. Assessment of knowledge on emergency and non-emergency medical conditions in medical students will be helpful to develop a methodological approach in building knowledge on patient care and in improving quality of medical education.

Methods: It was a questionnaire based cross-sectional study conducted among undergraduate medical students in MIMS college after taking Institutional ethical committee permission. The students of final MBBS part-I and final MBBS part-II and house surgeons were given semi-structured questionnaires. It constitutes questions on awareness of pharmacotherapeutics of non-emergency (20) and emergency (8) medical conditions.

Results: Received a total of 284 responses, of them 43.32%, 39.43% and 17.25% are from final MBBS part-I, final MBBS part-II and house surgeons respectively. 48.1% students agreed that undergraduate training sufficient to confidently give a safe prescription to the patient. The overall knowledge of the students in pharmacotherapeutics relating to certain non-emergency conditions is found to be 64.89% and relating to emergency conditions, it is 62.98%.

Conclusions: Knowledge on emergency and non-emergency PT is moderate. Appropriate training programs are needed to improve this situation. Regular evaluative measures also help to overcome the present situation.

Keywords: Rational drug use, Pharmacotherapeutics, Non-emergency, Emergency medical conditions

INTRODUCTION

Knowledge of pharmacotherapeutics plays an important role in treating ailments effectively. Pharmacotherapeutics (PT) is the application of pharmacological information together with the knowledge of the disease for its prevention, mitigation or cure.\(^1\) Selection of the most appropriate drug, dosage and duration of treatment taking into account the specific features of a patient are a part of PT.\(^2\)

The conference of experts on the rational use of medicines, convened by the World Health Organization (WHO) in Nairobi 1985, stated that rational use of medicines requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost.\(^3\) Therefore, PT knowledge is a prerequisite for rational prescribing and prepares the medical undergraduates to be efficient doctors.

Very few studies have been conducted to find the PT knowledge of medical students. These studies reported deficiency in PT knowledge.\(^4,5\) The present study aims at assessing knowledge of undergraduate medical students on pharmacotherapeutics.
METHODS

This was a cross-sectional study conducted among undergraduate medical students of final MBBS part-I and final MBBS part-II and house surgeons. Institutional ethical committee (IEC) clearance had been taken prior to starting of the study. Strict anonymity was maintained about the test results. Study was conducted in MIMS, Nellimarla, A.P, in the month of March-April 2019.

Questionnaires were distributed to the students after taking informed consent. The questionnaire constitutes general information of the students, questions on awareness on pharmacotherapeutics, 20 questions relating to non-emergency medical conditions and 8 questions relating to emergency medical conditions of pharmacotherapeutics. The obtained data was statistically analyzed using microsoft excel.

RESULTS

The questionnaire was distributed to a total of 300 students belonging to final MBBS part-I, final MBBS part-II and house surgeons, and a total of 284 students had filled the given forms. Out of 284 students, the responses from males and females are 27.6% and 72.4% respectively.

Table 1: Demographic information.

| Characteristics       | Responses in percentage |
|-----------------------|-------------------------|
| Sex                   |                         |
| Male                  | 27.6                    |
| Female                | 72.4                    |
| Year of study         |                         |
| Final MBBS part I     | 43.32                   |
| Final MBBS part II    | 39.43                   |
| House surgeons        | 17.25                   |

Table 2: Awareness on pharmacotherapeutics.

| Characteristics                                                                 | Responses in percentage |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Definition of pharmacotherapeutics                                                                                          | 59.7                    |
| Trained regarding pharmacotherapeutics during pharmacology in 2nd year under graduation                                      |                         |
| Yes                                                                                 | 80.6                    |
| No                                                                                  | 19.4                    |
| Undergraduate training sufficient to give a safe prescription                                                              |                         |
| Agree                                                                              | 48.1                    |
| Disagree                                                                           | 51.9                    |
| Most important factor considered while prescribing a drug                                                                    |                         |
| Safety and cost                                                                     | 10.6                    |
| Safety and efficacy                                                                | 72.7                    |
| Efficacy and cost                                                                   | 16.7                    |

51.9% of the students exhibit lack of confidence, while the remaining 48.1% of the students are confident that their undergraduate training is sufficient to give a safe prescription to the patients. 72.7% of students opined that safety and efficacy is the most important factor considered while prescribing a drug.
The overall knowledge of the students in pharmacotherapeutics relating to certain non-emergency conditions is found to be 64.89%. Most of the students, 92.2% and 91% could correctly answer the most widely used anaesthetics drug and the drug of choice in treating early uncomplicated type II diabetes mellitus respectively.

The overall knowledge of the students in pharmacotherapeutics relating to emergency conditions is 62.98%. Majority of the students 93.5% correctly identified the drug of choice used to relieve acute angina.

Table 4: Emergency conditions.

| Questions                                                                 | Percentage of correct response |
|---------------------------------------------------------------------------|--------------------------------|
| Life-saving drug in anaphylactic shock?                                   | 88.3                           |
| First line drug for status epileptics?                                    | 63.2                           |
| I.V. fluid of choice to correct severe dehydration?                      | 61                             |
| First line drug useful in the management of status asthmatics?           | 79                             |
| Insulin preparation used to treat diabetic ketoacidosis?                 | 31                             |
| Drug of choice in relieving acute angina?                                 | 93.5                           |
| Drugs useful in hypertensive emergency are all, except?                  | 35.2                           |
| Dose of atropine to reverse muscarinic effects in organophosphorus poisoning? | 52.6                           |

DISCUSSION

48.1% of the students are confident that their undergraduate training is sufficient to give a safe prescription to the patients. In a study from India by Sharma et al, 7.5-81.6% medical students considered themselves competent to prescribe anti-microbials for various infections.5

Most important factor while prescribing a drug is considered to be safety and efficacy by 72.7% of the students, and safety and cost and efficacy and cost by 10.6% and 16.7% of the students respectively. This is similar to the results obtained by Khan et al study 2016 and they think that there is a scope of improvement in their knowledge and perception towards PT.7

Metformin is an old but still the best treatment for type 2 diabetes mellitus.8 91% of the students correctly answered the drug of choice to treat uncomplicated early type 2 diabetes mellitus as metformin.

Beta blockers are no longer first choice drugs as per the joint national committee 8 recommendation about treatment of hypertension, which is known to only 33.3% of the students.9

In the United States, the recommended primary therapy for Pylori infection is proton pump inhibitor (PPI) based triple therapy, and the drug of choice for peptic ulcer is correctly answered by 76.6% of the students.10

The drugs commonly used in allergic conditions are known to 15.8% of the students. The primary drug treatments for acute anaphylactic reactions are epinephrine and H1 antihistamines. Corticosteroids are potentially effective in preventing biphasic (i.e., recurrent) reactions.11

Non-selective cycloxygenase inhibitors are one of the most commonly prescribed drugs for various painful inflammatory conditions and are also the leading cause of adverse drug reactions.12 Gastric mucosal damage and peptic ulcer is the most common adverse effect of NSAIDs is known to 83.6% of the students. Paracetamol is the most common anti-pyretic drug used in pediatric population, its dose calculation is expected to be known to students, 56% of the students could correctly answer the same. 63% could correctly identify that tramadol, an opioid analgesic is not effective in the treatment of migraine.13

Tetracyclines, NSAIDs, ACEi’s are some of the drugs contraindicated in pregnancy. Folic acid, a nutritional supplement can safely be used during pregnancy and is no contraindication is known to 85.5% of the students.14

Pseudomembranous colitis is a known adverse effect of antibiotics like cephalosporins, tetracyclines, and clindamycin, but can be treated effectively by metronidazole was correctly answered by 68.4% of the students.

Fluroquinolone (ciprofloxacin and ofloxacin) have for some years been the drugs of choice for enteric fever, but resistance to these drugs has become very common in South Asia. Therefore, currently ceftriaxone could be the drug of choice in the treatment of enteric fever.15 It is known to only 56.4% of the students.

The 2015 WHO guidelines for the treatment of malaria state that, if the species cannot be confirmed, the patient should be managed as if the infection is caused by P. falciparum and in areas of chloroquine sensitivity, chloroquine should be used.16 The drug of choice in a case of non-resistant and non-complicated malaria is known to 72.7% of students.

Tuberculosis (TB) is a serious health care problem in India. A national program is being run for tackling it in the form of revised national TB control program (RNTCP).17 Therefore, it is expected by the students to
know the treatment regimens to treat the condition. RNTCP regimen to treat a newly diagnosed case of smear positive pulmonary tuberculosis is known to 87.8% of the students.

Iron deficiency anemia is extremely common, particularly in the developing world. Iron deficiency during pregnancy is one of the leading causes of anemia in infants and young children. Therefore the students were expected to know the dosage of iron therapy in pregnancy and it is known only to 61.3% of the students.

Labyrinthine suppressants such as anticholinergics and anti-histaminic with anticholinergic property have been found to be useful in the prevention of motion sickness. Metoclopramide is an anti-emetic which prominently works by blocking D2 receptor in vomiting center and is not a labyrinthine suppressant, therefore not effective in prevention of motion sickness. However, it was correctly identified by only 39.5% of the students, showing lack of knowledge about this condition.

Amoxicillin is active against penicillin G sensitive gram-positive and some gram-negative organisms. Cloxacillin is a penicillinase resistant penicillin having lesser activity against penicillin G sensitive organisms. Their combination does not enhance spectrum and potency, therefore is irrational. Only 44.2% of the students could correctly identify the same, showing a deficient knowledge regarding this group of drugs and their fixed dose combinations.

Drug of choice in relieving acute angina is correctly identified by 93.5% of the students. Sublingual nitroglycerin has been the mainstay of treatment for angina pectoris. Sublingual nitroglycerin can be used for acute relief of angina and prophylactically before activities that may precipitate angina.

Life-saving drug in anaphylactic shock is correctly identified by 88.3% of the students. Anaphylaxis is a life-threatening reaction where prompt and appropriate management can save lives. Epinephrine (adrenaline) is the treatment of choice.

First line drug in the management of status asthmaticus is known to 79% of the students. Treatment for acute, severe asthma includes the administration of oxygen, β2-agonists (by continuous or repetitive nebulization), and systemic corticosteroids.

Organophosphorus pesticide self-poisoning is an important clinical problem in rural regions of the developing world and is a common medical emergency condition which is treated with atropine. The dose of the drug is known only to 52.6% of the students.

The overall knowledge of the students in pharmacotherapeutics relating to certain non-emergency conditions is found to be 64.89% and relating emergency conditions, it is 62.98%. A European study reported knowledge of clinical pharmacology and pharmacotherapy in the range of 65.3-79.2% among medical students using different set of parameters i.e., pharmacokinetics, pharmacodynamics, prescribing in special group, drug interactions etc. A Chinese multicentric study reported lack of knowledge about rational antibiotic use among 27.4-92.9% medical students.

The students of the present study were found to have moderate degree of knowledge. There is a need to improve knowledge relating to management of emergency hypertension and to be updated with the latest guidelines of JNC classification, management of allergic conditions and also regarding antibiotics prescription and also management of certain emergency conditions.

This is a single center study involving limited numbers of participants. A large multicentric study may provide greater insight into the level of PT knowledge acquired by medical undergraduates in India. Questions are related with limited drugs and clinical settings; however, it gives an idea about the status of knowledge of PT among undergraduate medical students.

CONCLUSION

The general awareness on pharmacotherapeutics was found to be good among the students. The knowledge on certain non-emergency and emergency medical conditions is found to be of moderate degree and is high when compared to a similar study conducted in India. However, there is a scope for further improvement in their knowledge. Regular emphasis on pharmacotherapy is to be continued in each year of their study. Appropriate training programs are needed to improve this situation. Regular evaluative measures also help to overcome the present situation.

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