

Undergraduate medical students' perceptions regarding personal drug selection exercise

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ABSTRACT

Background: Right drug for the right patient in the right dose for the right duration is the aim of rational prescribing. The foundation for rational prescribing can be laid if prescribing doctors are sensitized to this concept during undergraduate studies. The knowledge of personal drug (P-drug) selection process is an important step towards rational prescribing.

Objectives: This study was done to analyse the students' opinions and the difficulties they faced in the process of P-drug selection.

Materials and methods: In first phase of this study, fifth semester students of MBBS course were taught the process of selecting a P-drug in pharmacology practical classes. In second phase, students were given questionnaire to put forth their views on selection process of P-drug. The quantitative data was expressed as median and interquartile range (IQR).

Results: Majority of the students were in favor of introducing the process of selection of P-drug in undergraduate pharmacology curriculum [4 (4-5), scale 1-5]. The students were of the opinion that such exercise will give in-depth knowledge of various groups of drugs used and highlight the intragroup differences. Students' also opined that P-drug exercise also enable them to remember various aspects of the drugs for long period. Students also felt that the P-drug selection process will help them to understand how drug selection been done for the treatment of various disease conditions.

Conclusion: P- drug selection exercise helps students to understand the differences between various drugs used for the treatment of one disease condition. This may serve as a strong foundation for developing rational prescribing skills.

Key words: P-drug, pharmacology, undergraduate curriculum, prescription writing

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INTRODUCTION

Physicians prescribe drugs routinely to treat common diseases taking into account drug efficacy, safety, cost and convenience. It requires skill to select the appropriate drug for any condition.^[1] Irrational prescribing is a common problem which can be prevented.^[2, 3] The fundamental need for the prescribing practitioner is the quality of therapeutic reasoning and prescribing skills. Currently, these skills are inadequate as the traditional prescription writing exercises followed by many medical schools in India are no more than a recall test and they hardly ensure the art of scientific prescribing^[4] i.e. prescribing based on certain criteria.

In 1994, a manual on the principles of rational prescribing 'Guide to Good Prescribing'

was developed by the World Health Organization (WHO) Action Program on Essential Drugs.^[5] In 2001, 'Teachers Guide to Good Prescribing' was developed as a companion volume to help medical teachers to use the 'Guide to Good Prescribing' to teach undergraduate medical students. According to this, the students are taught to set up their personal drugs or P-drug for common conditions. By taking information from different guidelines and references, students

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develop their set of P-drugs.^[6] This method orients students towards therapeutics and exposes them to a sequential decision-making process for prescribing.^[7]

In Kasturba Medical College, Manipal, India, lectures are mainly delivered by Power-Point presentations. Blackboard is also used at well-organized lecture halls.^[8] The practical classes are conducted in the departmental laboratory and seminar rooms. They are conducted in small groups of 10 - 12 students for 2 hours and consist of demonstration of animal experiments, prescription writing for common diseases and emergency conditions and problem based learning. In prescription writing, more stress is laid on the therapeutic aspect of various drugs indicated for the specified condition and includes doses, frequency of administration, adverse effects, interactions, contraindications etc. However P-drug method described by Joshi and Jayawickramarajah^[7] and guide for good prescribing published by WHO^[5] is not being taught. There are recommendations for inclusion of P-drug concept in the undergraduate pharmacology practical curriculum in India.^[9] As per our knowledge, very few medical schools of India have P-drug selection exercises. Therefore before introducing this exercise in undergraduate curriculum we wanted to explore students' opinions regarding the exercise and difficulties faced in the process of P-drug selection.

MATERIALS AND METHODS

Study subjects

The study was carried out in August 2010 after the approval from University Ethics committee, Manipal University, Manipal, India. The study population consisted of fifth semester medical students of Kasturba Medical College, Manipal, India. In fifth semester students are taught microbiology, pathology, forensic medicine in addition to pharmacology as per Medical Council of India guidelines. Hence, our sample can be a representative of any medical school in India. Sample size for estimating mean was calculated based on pilot study of anticipated standard deviation of 3 and 95% confidence level and margin of error ± 1 .

The minimum sample size was observed to be 36. It was a prospective, quasi-experimental study.

Development of questionnaire

The questionnaire consisted of 12 statements regarding students' opinion on the P-drug selection exercise. The questionnaire was pretested in first year postgraduate students of pharmacology who had finished their MBBS degree and rotatory internship. They were not exposed to concept of P-drug during undergraduate studies. Intra class correlation coefficient (ICC) was used to assess the reliability of the questionnaire and the ICC value obtained was 0.8412. The students were asked to score each individual statement and denote their degree of agreement with each using a Likert-type scale. The key was as: 1- strongly disagree with the statement, 2- disagree, 3- neutral, 4- agree and 5- strongly agree with the statement. The students were instructed to use whole numbers only. The questionnaire was based on one of the earlier study done^[10] and inputs from faculty. The content validity of the questionnaire was checked by other faculty members of the pharmacology department.

Study design

Before starting the study, consent was taken. Students were informed that their participation in study is voluntary. This interventional study had two phases. Four groups of students were randomly selected, each group containing 10-12 students. In first phase, to begin with each group was given an overview of P-drug concept and later the group selected a P-drug following various steps.^[7] During the exercise students used Current Index of Medical Specialities (CIMS) and other reference books from departmental library like Essentials of Medical Pharmacology by KD Tripathi, Goodman and Gilman's The pharmacological basis of therapeutics by Laurence Brunton, Basic and Clinical Pharmacology by Bertram G Katzung etc. For a case of amebiasis, the four criteria; efficacy, safety, cost and suitability were assigned a score of 0.4, 0.3, 0.2 and 0.1 respectively. This phase lasted for 2 hours following which students presented their findings to the facilitator. In second phase, students' opinions regarding

the exercise and difficulties faced in the process of P-drug selection was collected using a newly designed questionnaire. The demographic and other relevant information about the student respondents were also noted.

Statistical analysis

Statistical analysis of data was done using SPSS 11.5 version. The quantitative data was expressed as median and interquartile range (IQR). Students' responses to open ended questions were tabulated and grouped into categories.

RESULTS

The response rate was 42/48 i.e. 87.5%. Out of 42 students, 59.5% were males and 40.5% were females. Majority of the participants were of Indian origin constituting around 78.6%, followed by Malaysians (14.3%) and the rest were from Sri Lanka and USA. The age of the students was in the range of 20-24 years. Majority had English as the medium of instruction at school. Among the participants 42.9% were admitted through Government selection whereas the rest were self-financed.

In the first phase, students were taught

to select a P-drug for amoebiasis. The students had already read about this condition in microbiology. In pharmacology in a lecture class the students were taught about the various groups of drugs being used in this condition with emphasis on the prototype drug metronidazole. Nitroimidazole was selected as a preferred drug group for the treatment of intestinal amoebiasis (Table 1) considering the four parameters; efficacy, safety, suitability and cost. The total scores of the four criteria should add up to one. For each drug group a score is given between 1 and 10 for each of the four criteria with a higher score indicating a better value. The score of nitroimidazole group was highest amongst the six groups of drugs which can be given in amoebiasis.

Similarly, from nitroimidazoles, tinidazole was selected as the P-drug for amoebiasis (Table 2). Efficacy of all nitroimidazoles was considered same as shown in the table. However, the safety, cost and convenience that made the student groups to consider tinidazole as superior to other drugs.

In the second phase, students filled the questionnaire. Table 3 shows the median scores and interquartile range of individual items.

Table 1. Selection of drug group for amoebiasis.

Drug/ drug group	Efficacy (0.4) ^α	Safety (0.3)	Cost (0.2)	Convenience (0.1)	Total (out of 10)
Nitroimidazoles	9 ^β (3.6) ^γ	7 (2.1)	6 (1.2)	6 (0.6)	7.5
Alkaloids	9 (3.6)	4 (1.2)	5 (1.0)	3 (0.3)	6.1
Chloroquine	4 (1.6)	5 (1.5)	6 (1.2)	5 (0.5)	4.8
Amides	3 (1.2)	7 (2.1)	5 (1.0)	6 (0.6)	4.8
8-hydroxyquinolines	3 (1.2)	5 (1.5)	8 (1.6)	5 (0.5)	4.8
Antibiotics	3 (1.2)	6 (1.8)	5 (1.0)	3 (0.3)	4.3

α multiplied by β equals γ

DISCUSSION

Rational use of drugs can be achieved if patients receive medications appropriate to their specific clinical needs, proper dose and duration, with the lowest cost to them and their community.^[11]

This can be fulfilled by the use of WHO Guide to Good Prescribing which gives medical students who are future prescribers a normative model for therapeutic reasoning and prescribing and provides a six-step guide^[5] to the process of rational prescribing: (1) define the patient's problem,

Table 2. Selection of a P-drug among nitroimidazoles for amoebiasis.

Drug/drug group	Efficacy (0.4) ^α	Safety (0.3)	Cost (0.2)	Convenience (0.1)	Total (out of 10)
Metronidazole	9 ^β (3.6) ^γ	6 (1.8)	8 (1.6)	4 (0.4)	7.4
Tinidazole	9 (3.6)	8 (2.4)	7 (1.4)	6 (0.6)	8.0
Secnidazole	9 (3.6)	6 (1.8)	6 (1.2)	7 (0.7)	7.3
Ornidazole	9 (3.6)	7 (2.1)	6 (1.2)	6 (0.6)	7.5
Satranidazole	9 (3.6)	8 (2.4)	5 (1.0)	6 (0.6)	7.6

α multiplied by β equals γ

Table 3. Students' perception regarding P-drug selection exercise.

Item number	Median (interquartile range)
1. P-drug concept gives in depth knowledge about drug	3 (3-4)
2. P-drug concept informs us about the class to which it belongs	3 (3-4)
3. Comparing the different drugs in same group, the intragroup variability is highlighted	4 (4-4)
4. P-drug concept helps in selecting a drug for a disease rather than for a patients	3 (2-4)
5. P-drug selection exercise clarifies the process of selecting a drug for a disease condition	4 (3-4)
6. P-drug gives a better idea of cost of different drugs in the same group	4 (4-4)
7. P-drug selection exercise promotes interaction among group members and facilitator	3 (3-4)
8. Difficult topics are better understood during this exercise	3 (3-4)
9. Selection of P-drug is a time consuming process	4 (4-5)
10. P-drug for a condition is different from drug of choice	3 (3 -4)
11. Comparing efficacy is more difficult than comparing safety while selecting a P-drug	3 (3-4)
12. Different resources used during the exercise such as, CIMS, textbook and reference books were helpful in selection of a P-drug	4 (3-4)
13. P-drug selection exercises should be included in undergraduate pharmacology practical curriculum	4 (4-5)

(2) specify the therapeutic objective, (3) choose a (drug) treatment, (4) write the prescription and start the treatment, (5) give patient information and warnings, and (6) monitor the treatment. Consequently, if undergraduate students are taught to develop a standard treatment for common disorders and a set of first-choice drugs called Personal or P-drugs they can be good future prescribers.

In our study, in first phase while scoring for efficacy, highest score was given to nitroimidazoles and alkaloids which are very efficacious for amoebiasis. Considering safety, it was found that all groups have side effects; however alkaloids were found to be highly toxic drugs and were given low score. These findings are similar to study by Parmar and Jadav.^[12]

On comparing cost, we found an average of a costly brand and cheap brand of a particular drug and finally the cost of full treatment. e.g. luminal amoebicidal drug, quiniodochlor that belongs to 8 hydroxyquinolines is cheaper and was given a higher score as compared to others. While comparing convenience, we compared availability of drug, dosage form, dosage schedule, route of administration.^[13] Among nitroimidazoles, drugs like secnidazole and tindazole used once daily orally were given a higher score as it is convenient to take a drug once a day. Then we multiplied and summated the scores and nitroimidazole group scored highest (Table 1). On comparing individual drugs in nitroimidazole group, metronidazole, tinidazole, secnidazole, orindazole, satranidazole were found to be equally efficacious. Tindazole 2 gm can be given once daily for 3 days or 500 mg twice daily for 5 days is better tolerated and cost difference is not high while comparing it with metronidazole, which is given 400 - 800 mg three times daily for 7 - 10 days. After discussion, tinidazole with highest score was selected as P-drug for amoebiasis, as shown in Table 2. Also if patient has any comorbidity or alcohol abuse the choice of drug can vary which was not there in our case.

P-drug concept helps in selecting a drug for a disease rather than for a patient because P-drugs are our priority choice for a given indication.^[5] For this question, students

opinion varied in interquartile range of disagree to agree. It requires to stress that personal drug is for disease and it is personal or preferred by the doctor. P-drug concept will impart a clear concept while choosing drug for prescription writing - students agreed to this and gave the reasons that process of P-drug selection is interactive and interesting way of learning. This concept will enable them to discriminate between different drugs while prescribing. Drug selection process gives the idea about cost of the drugs in a group which is not taught in conventional prescription writing exercise. Teaching of P-drug concept is a two way learning process i.e it is an interactive session in which students discuss with their group members as well as with teachers in comparison to didactic lectures. So in such methods students get equal chance to present their view.

Some difficult topics which are not properly covered in theory or for those topics where time allotment is less are better understood - most of students were neutral for this statement. By acting like a facilitator, teacher gives equal chance to student to think and apply his mind so that he can clear his doubts and have a better understanding. Students agreed that selection of P-drug was a time consuming process.

P-drug is different from drug of choice - students' opinion varied from neutral to agree in interquartile range. P-drug can be different from drug of choice. Drug of choice is mainly selected by evidence based medicine and the experience of physicians, whereas P-drug is selected on different criteria i.e efficacy, safety, suitability and cost.

Students' opinion varied from neutral to agree in interquartile range regarding the idea that comparing efficacy was more difficult than comparing safety. This can be due to the fact that most of the textbooks highlight side effects more than the efficacy. Also students should not confuse the term efficacy with potency of a drug. Students agreed that using CIMS, textbook and reference books was helpful in selection of a P-drug.

Students agreed P-drug selection exercises should be included in undergraduate pharmacology

practical curriculum. Students found that this exercise was however difficult to perform in comparison to conventional prescription writing as for such exercises one should have adequate reference books of recent editions in the classroom. Hence, finding the right drug from a group is time consuming process. In such exercises, they need to know about all the drugs in detail that can be used in a particular condition. Also while comparing the efficacy within a group, students observed that books give much detail about prototype drug only with scarce information about others. Safety profile of drugs varies from one system to other and it becomes sometimes difficult to differentiate which drug is more harmful.

The criteria for convenience and cost vary with the condition. Authors feel that all such difficulties can be overcome by adequate infrastructure of teaching institutions and adequate training.

Our study had limitation that the information was collected only from one batch i.e. fifth semester whose admission year was 2008. Such limitations can be overcome by increasing the sample size. While giving scores

it became difficult for students to differentiate between two nearby scores say 4 and 5. However, we reduced this bias by using group consensus.

The basic motive of teaching P-drug concept is that instead of memorizing one can develop personal formulary after proper discussion and know how to prescribe rather than what to prescribe. In a recent study on P-drug, students were of the opinion that process of P-drug selection helped them to understand pharmacology better.^[14]

This study affirms that the students are of the opinion that P-drug selection exercises can be included in undergraduate pharmacology practical curriculum. The exercise on P-drug selection has the objective of promoting rational use of medicines by students in their future career as doctors. If Medical Council of India includes P-drug selection in undergraduate pharmacology practical curriculum, it will be a vital step in the development of this concept from infantile to adult stage.

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