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Original Research Article

A competency-based medical education on personal drug selection among medical students: a prospective, cross-sectional study

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ABSTRACT

Background: This study was conducted to know the students' views regarding the personal drug (P-drug) concept in the rational prescription of drugs and also to give them training on creating and using personal drug concepts.
Methods: The 60 medical students (5th semester) divided into four groups were involved voluntarily three-phase, questionnaire-based, and prospective study. In the first and second phases, students were taught and asked to derive P-drug using different standard textbooks and CIMS by analyzing the efficacy, safety, cost, and convenience of drugs used for stable angina pectoris. The third phase was designed to know the student's perceptions regarding the exercise and difficulties faced in the process of P-drug selection. It contained demographic and 12 questions with the answer using the Likert scale.
Results: Students selected tab. isosorbide dinitrate sublingual as a P-drug in terms of efficacy, safety, cost, and convenience. The 96.6% (58 out of 60) responded to the questionnaire. The overall median score was 2 and interquartile range was 2-5 (IQR 2-5). The majority (73% or 44) of students were in favour of introducing the process of selection of P-drug in the undergraduate pharmacology curriculum.
Conclusions: The P-drug selection exercise helped students to understand the differences among various drugs used for the treatment of stable angina pectoris and gave them a strong foundation for developing rational use of the medicine in their future careers as a doctor.

Keywords: P-drug, Pharmacology, Prescription writing, CBME, Rational use

INTRODUCTION

National medical commission (NMC) introduced new competency-based medical education (CBME) for medical undergraduates in the 2019-2020 session. The new curriculum is based on the concept of goals, roles, and competencies. The undergraduate medical education program is designed to create an "Indian medical graduate (IMG)" possessing the requisite knowledge, skills, attitudes, values, and responsiveness, so that he or she may function appropriately and effectively as a physician of first contact with the community while being globally relevant. To train an undergraduate in these roles, each role is divided into competencies. A competency is an observable activity of a health professional integrating multiple components like knowledge, skills, attitudes, and values appropriately and judiciously.

Rational use of drugs requires that patients receive medicines appropriate to their clinical needs, in doses that meet their requirements, for an adequate period, and at the lowest cost to them and their community.[1] Irrational prescribing is a global problem. Over the past 40 years, several community-based and hospital-based studies done in developed as well as in developing countries had described irrational drug use.[2] Many studies described an irrational prescribing pattern that included prescribing unnecessarily expensive drugs, polypharmacy, and inappropriate use of antibiotics and other drugs.[3,4] All these patterns of irrational prescribing increase the

economic burden on patients, where, in most cases, patients were not even able to afford essential medicines.[5] Despite introducing various interventions namely, educational, managerial, and regulatory, at the prescriber level to promote rational prescribing, irrational prescribing is still a global problem.[6] WHO describes irrational prescribing as a disease which is difficult to treat.[7] Hence the only way to prevent irrational prescribing by future doctors is by training medical students on rational prescribing.

In the year 1994, a principle of rational prescribing 'guide to good prescribing' was developed by the world health organization (WHO) action program on essential medicine.[8] In the year 2001, 'teachers guide to good prescribing' was developed 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 clinical conditions.[9] This method orients students towards their therapeutic goal and exposes them to a sequential decision-making process for prescribing.[10] Historical teaching in pharmacology was marked by passive transfer and memorizing information about drug and their individual compounds. Medical science in general is going through rapid changes and an information explosion and it's important to train doctors for self-directed learning.[11]

P-drugs

P-drugs are the drugs that an experienced physician chooses for a day-to-day prescription for a given condition. The physician is more confident and familiar with these P-drugs. These are preferred drugs for that particular clinical condition and setup. The P- drug concept is not only for the active salt but also includes the dosage forms, dose, and route of the drug also. P-drugs are the drugs with which the physician is confident that they will be beneficial in the given condition and would produce no or minimal harmful effects to the patients. We can call them personal or preferred or P-drugs of the physician.

Steps for selecting a P-drug

Making a diagnosis, set therapeutic objectives, make an inventory of effective groups of drugs, decide the group of drugs to be prescribed and choose the P-drug.

This study was developed to know the students' views or perceptions regarding personal drug concepts in the rational prescription of drugs and also to give them training in creating and using personal drug concepts. So that the outcomes of this study could be used to modify undergraduate pharmacology teaching patterns.

METHODS

This prospective, observational, cross-sectional study was conducted in the Department of Pharmacology, All India Institute of Medical Sciences, Patna (Bihar) after approval of the institutional ethics committee. Sixty, 5th-semester medical students were randomly selected, and divided into four groups, and each group contained 15 students. Students were informed that their participation in this study will be voluntary. Consent was taken from students. The study was conducted in three phases for 1 month.

In the first phase, each group was taught for 1 hour regarding P-drug selection on stable angina pectoris by using power-point slides, and standard textbooks. Students were also taught about how to analyze and give a score (α) to drugs for four parameters like.[12]

Efficacy was derived according to the efficacy profile written in standard textbooks. Drugs with more efficacy were given a higher score.

Safety of a drug was described according to the side effect profile written in standard textbooks. Drugs with more side effects were given a lower score.

Cost was compared by taking an average of costs of different brands written in the current index of medical specialties (CIMS).

Convenience was compared according to the availability of the drug, dosage form, dosage schedule, and route of administration.[13]

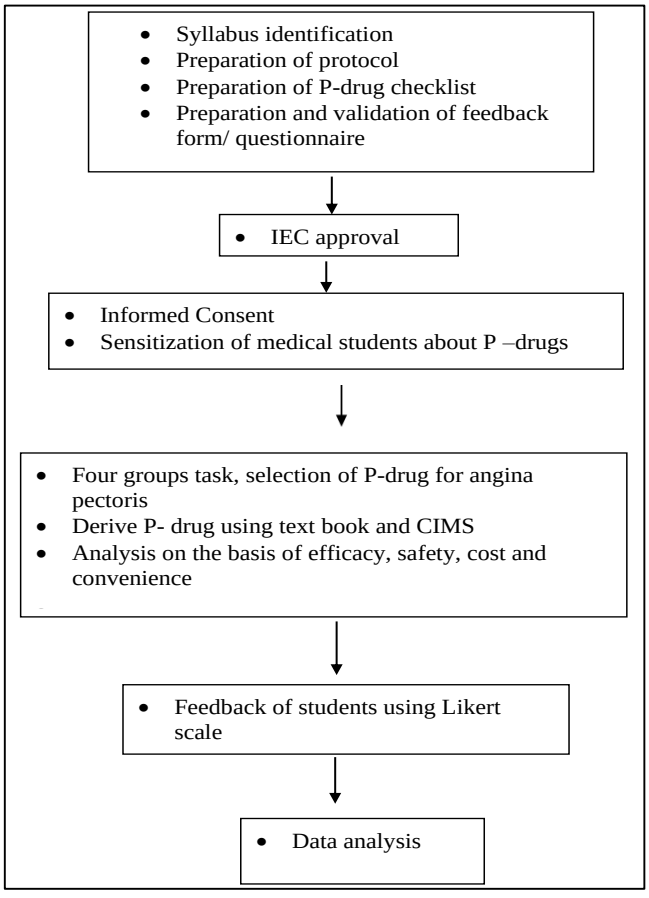

Figure 1: Study methodology.

Scores were given to every four parameters from 1 to 10 for each drug. Each parameter had given a fractional numerical rating (β) according to its importance i.e., 0.4 for efficacy, 0.3 for safety, 0.2 for cost, and 0.1 for convenience. Score (α) was multiplied by fractional numerical rating (β) to get the total score (γ=α x β). A higher total score indicated a better value.

In 2nd phase, students were asked to derive/ select a P-drug among drugs used for treatment of stable angina pectoris.

In the third phase, students were asked to complete a questionnaire (Annexure 1). This phase was designed to know the students' views or perceptions regarding the exercise and difficulties faced in the process of P-drug selection. This phase of the study consisted of two parts. The first part had demographic-related questions and other relevant information and the second part of the questionnaire consisted of 12 statements to know students' points of view regarding personal drug concept (P drug concept). The students were asked to score each individual statement and denote their degree of agreement by using a Likert-type scale with the following key: 1-strongly disagrees, 2-disagree, 3-neutral, 4-agree, and 5-strongly agree with the statement.

Students were instructed to use whole numbers only. The questionnaire was based on a previous study.[14,15] The reliability of the questionnaire was assessed and discussed with the faculty members of the department of pharmacology, AIIMS, Patna.

Statistical analysis

Responses from participants were tabulated. The quantitative data were expressed as the median and interquartile range (IQR). Data were analyzed through graph Pad software.

RESULTS

Out of 60 students, 42(70%) were males and 18 (30%) were females. Out of 60 students, 57(95%) participants had a medium of instruction in school in English, and 03(5%) were in regional language. Out of 60 students, 39 (65%) liked mathematics at school. Out of 60 students, 43 (71.66%) liked chemistry at school.

According to Table 1, students selected Tab. isosorbide dinitrate sublingual as a personal drug in terms of efficacy, safety, cost, and convenience for the treatment of stable angina pectoris. The 96.6% (58 out of 60) participants responded to the questionnaire. The overall median score was 2 and interquartile range was 2-5 (IQR 2-5). The majority (73% or 44) of students were in favour of introducing the process of selection of P-drug in the undergraduate pharmacology curriculum.

Table 1: Selection of personal formulary (P-drug) from drug groups of stable angina pectoris.

Drugs/drug group	Efficacy (0.4)$^{\beta}$	Safety (0.3)	Convenience (0.2)	Cost (0.1)	Total (γ)
Tab. isosorbide dinitrate sublingual (5 mg)	4 (1.6)	3 (0.9)	3 (0.6)	4 (0.4)	3.5
Tab. isosorbide dinitrate (10 mg)	3 (1.2)	3 (0.9)	3 (0.6)	3 (0.3)	3.0
Tab. isosorbide mononitrate	3 (1.2)	3 (0.9)	3 (0.6)	3 (0.3)	3.0
Beta-blockers	4 (1.6)	3 (0.9)	2 (0.4)	3 (0.3)	3.2
Ca channel blockers	4 (1.6)	3 (0.9)	2 (0.4)	3 (0.3)	3.2

Table 2: Student's view /perception on personal drug selection exercise.

Questionnaires	Median	Interquartile range (IQR)
P-drug concept gives in-depth knowledge about drugs, classification to which drug belongs, and other drugs in this group	3	2-5
While comparing the different drugs in the same group the intragroup variability is highlighted	5	2-3
As compared to prescription writing, the P-drug concept helps in selecting a drug for a disease rather than for a patient	2	3-5
P-drug concept will have a long-term impact on your mind as compared to prescription writing	2	3-5
P-drug gives a better idea of the cost of different drugs in the same group	5	1-3
Teaching of P-drug concept is a two-way learning process where students get an equal chance to present their view	3	2-5
Some difficult topics which are not properly covered in theory are better understood	4	2-5
Selection of P-drug is a time-consuming process	2	4-5

Continued.

Questionnaires	Median	Interquartile range (IQR)
P-drug can be differing from the drug of choice	5	2-3
Comparing efficacy is more difficult than comparing safety while selecting a P-drug	2	4-5
Using CIMS, textbooks, and reference books is helpful in the selection of a P drug	2	4-5
P-drug selection exercises can be included in the undergraduate pharmacology practical curriculum	3	2-5

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.[16] This can be fulfilled by the use of the 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.[17] To the process of rational prescribing: (1) define the patient's problem, (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, while scoring for efficacy, the highest score was given to isosorbide dinitrate sublingual, beta-blockers, and calcium channel blockers which are very efficacious for stable angina pectoris. Considering safety, it was found that all groups have side effects; and were given the same score.

On comparing costs, we found an average of a costly brand and cheap brand of a particular drug and finally the cost of full treatment. Isosorbide dinitrate sublingual is cheaper and was given a higher score as compared to others. While comparing convenience, we compared the availability of drugs, dosage form, dosage schedule, and route of administration. Isosorbide dinitrate sublingual (5 mg), isosorbide dinitrate (10 mg), Isosorbide mononitrate were given a same score as it is convenient to take a drug. Then we multiplied and summated the scores and the isosorbide dinitrate sublingual scored highest (Table 1). After discussion, the Isosorbide dinitrate sublingual with the highest score was selected as P-drug for stable angina pectoris (Table 1).

The p-drug concept helps in selecting a drug for a disease rather than for a patient because P-drugs is our priority choice for a given indication.[17] For this question, students' opinions varied in an interquartile range of disagreeing to agreeing. It requires to stress that a personal drug is for disease and it is personal or preferred by the doctor. The p-drug concept will impart a clear concept while choosing drugs for prescription writing - students agreed to this and gave the reasons that the process of P-drug selection is an interactive and interesting way of learning. This concept will enable them to discriminate between different drugs while prescribing. The drug selection process gives the idea about the cost of the drugs in a group which is not taught in a conventional prescription writing exercise. The teaching of the 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 an equal chance to present their views.

P-drug is different from the drug of choice students' opinions varied from neutral to agree in the interquartile range. The 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' opinions varied from neutral to agree in the interquartile range regarding the idea that comparing efficacy was more difficult than comparing safety. Students agreed that using CIMS, CMDT, textbooks, and reference books were helpful in the selection of a P-drug. Students agreed P-drug selection exercises should be included in the undergraduate pharmacology practical curriculum.

The basic motive of teaching the P-drug concept is that instead of memorizing one can develop a personal formulary alter proper discussion and know how to prescribe rather than what to prescribe. In a recent study on P-drug, students thought that the process of P-drug selection helped them to understand pharmacology better.[18]

Our study had limitations in that the information was collected only from one batch i.e., fifth semester whose admission year was 2019. Such limitations can be overcome by increasing the sample size.

CONCLUSION

P-drug selection exercise helped students to understand the differences among various drugs used for the treatment of stable angina pectoris and gave them a strong foundation for developing rational use of the medicine in their future careers as a doctor. Our study affirms that the students think that P-drug selection exercises can be included in the undergraduate pharmacology practical curriculum. The exercise on P-drug selection has the objective of promoting rational use of medicines by students in their future careers as doctors.

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