Research Article

PERSONAL FORMULARY FOR URINARY TRACT INFECTIONS DEVELOPED BY UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

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 development of personal drug (P-drug) and its description is personal formulary an important step towards rational prescribing. This paper describes the teaching of development of personal formulary for urinary tract infections, which demonstrates the usefulness of P drug concept approach, relevance in understanding a particular topic and rational drug prescription. Development of personal formulary 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.

Keywords: Personal Formulary, UG, UTI.

INTRODUCTION

Selecting correct drugs for disease is not an easy task. It requires careful selection and repeated search for appropriate drugs. Physicians' are influenced by various factors like efficacy, safety, cost, and availability of medicine during the process of drug selection. Unfortunately, however, selection is not always done carefully as it is often based on previous experience or promotional campaigns by pharmaceutical companies.[1,2] The fundamental need of prescribing practitioner is the quality of therapeutic reasoning and prescribing skill. Currently, these skill are inadequate as traditional prescription writing exercise followed in many medical school in India are no more than a recall test and they hardly ensure art of scientific prescribing[3] i.e. prescribing based on certain criteria .

In 1994, a manual on the principles of rational prescribing called 'Guide to Good Prescribing' was developed by the World Health Organization (WHO) Action Program on Essential Drugs.[4] In 2001, 'Teachers' Guide to Good Prescribing' was developed as a companion volume to help medical teachers better use the 'Guide to Good Prescribing' for teaching undergraduate medical students. Students are taught to develop a standard treatment for common disorders and a set of first-choice drugs called Personal or P-drugs; its description is personal formulary. Students develop their set of P-drugs using National and International treatment guidelines, formularies, textbooks and other sources of drug information**.**[5] It is a method of orienting students towards therapeutics and to expose them to a sequential decision-making process for developing prescribing skills.[6]

In Narayan Medical College, jamuhar, India, established in year 2008, where the lectures are conducted in well-organized lecture hall. The practical classes are conducted in the departmental laboratory. They are conducted in small groups containing 10-12 students for 2 hrs. It consists of demonstration of animal experiments by computer added, prescription writing for common diseases and emergency conditions and problem based learning. However we do not teach selection of P drug as per the method described by Joshi and Jayawickramarajah and "Guide for good prescribing" published by WHO.[5,6] Rai has recommended inclusion of P-drug concept in the undergraduate pharmacology practical curriculum in India.[7] However very few medical school of India have P drug selection exercises as part of their pharmacology practical curriculum. The faculty of department of Pharmacology of Narayan medical college took initiative to teach undergraduate (UG) students regarding the development of personal formulary. This paper describes the teaching of development of personal formulary for Urinary Tract Infections (UTI), which demonstrates the usefulness of P drug concept approach, relevance in understanding a particular topic and rational drug prescription. It also brings in focus the utility of P drug concept in prescription writing.

MATERIALS AND METHODS

The study was carried out among the fourth semester UG medical students at Narayan Medical College, Jamuhar, during the month of May 2012, after the permission from Principal of institution and Head of department of pharmacology to develop personal formulary for UTI. In fourth semester students are taught microbiology,

pathology, forensic medicine in addition to pharmacology as per Medical Council of India guidelines. Narayan medical college, Jamuhar admits hundred UG students four groups of students are randomly selected, each group contains 12 students. They were taught P drug concept and then they took part in development of personal formulary for UTI. Initially they were taught for regarding overview of P-drug concept as per Joshi and Jayawickramarajah.[6] In the next phase they were develop personal formulary for UTI. The UG students carried out the exercise in their groups using Current Index of Medical Specialties (CIMS) to determine cost of drugs[8] and they also used textbooks and reference materials available in the college and departmental library for other criteria.

RESULTS

In this study personal formulary was developed by using parameters like efficacy, safety, cost and convenience (Joshi and Jayawickramaraja).[6] The fluroquinolones as a group was chosen (Table 1) and among this group individual drug ofloxacin emerged as Personal formulary for anxiety disorders (Table 2). The cost comparison of drugs was done by using CIMS (Table 3). The personal formulary is description of P-drug ofloxacin (Table 4).

Table 1: Selection of personal formulary from drug group for U.T.I.

Drug/ Drug group	Efficacy (0.4)	Safety (0.3)	Cost (0.2)	Convenience (0.1)	Total
1.Fluroquinolone	9 (3.6)	8 (2.4)	6 (1.2)	7 (0.7)	7.9
2. Cephalosporins	8 (3.2)	8 (2.4)	5 (1.0)	6 (0.6)	7.2
3. Cotrimoxazole	7 (2.8)	6 (1.8)	8 (1.6)	7 (0.7)	6.9
4. Amoxicillin+ Clavulanic acid	8 (3.2)	8 (2.4)	4 (0.8)	6 (0.6)	7.0
5.Nitrofurantoin	7 (2.8)	8 (2.4)	7 (1.4)	7 (0.7)	7.3

Table 2: Selection of personal drug among fluroquinolones for U.T. I.

Drug/ Drug group	Efficacy (0.4)	Safety (0.3)	Cost (0.2)	Convenience (0.1)	Total
1.Norfloxacin	7 (2.8)	8 (2.4)	8 (1.6)	7 (0.7)	7.3
2.Ceprofloxacin	5 (2.0)	7 (2.8)	6 (1.2)	7 (0.7)	6.7
3.Ofloxacin	9 (3.6)	8 (2.4)	6 (1.2)	7 (0.7)	7.9

Table 3: Coast of drugs/ drug group available in India used in treatment of U.T.I.

Drug/ Drug group	Dose	No. of Brands	Average Cost for lowest dose for course of treatment
1. Fluroquinolones			
a. Norfloxacin	400mg. (BD)	10	27.15
b. Ciprofloxacin	500mg. (BD)	44	65.00
c. Ofloxacin	200mg. (BD)	43	55.70
2. Cephalosporins			
a. Cephalexin	250 mg. (QID)	20	128.41
b. CefpodoximeProxetil	200 mg. (BD)	44	198.40
3. Cotrimoxazole	960 mg. (BD)	6	13.00
4. Amoxicillin+ Clavulanic acid	500+125 mg. (TDS)	40	346.15
5. Nitrofurantoin	100 mg. (BD)	2	52.50

Table 4: Description of Oflxocin as personal formulary for UTI

Tablet 200 mg	UTI	Ofloxacin
DOSAGE UTI:- In adults -200 mg. BD for 5Days. **WHAT TO TELL THE PATIENT** **Information:** Ofloxcin is effective against causative organism (gram negative Bacteria). Side effect:- Nausea, Vomiting, headache, dizziness, insomnia. Contraindication –Hypersensitivity to quinolones, pregency, lactation. **Instruction**: Take Tab. Ofloxacin 200 mg. two times per day for 5 days. Take plenty of water. **Next appointment**: Review after 5 days. **Follow up**: UTI:- Review after 5 days and see the improvement and repeat the culture and sensitivity test.		

DISCUSSION

Training of students in pharmacology should be in such a way that they are able to prescribe rationally for common diseases, calculate dosages depending upon age and sex and prevailing health status of individuals, administer the drug through appropriate route and also identify adverse drug reactions and interactions[9]. There is a need of developing patient oriented problem solving system of teaching in pharmacology in which students are oriented to learn rational use of drug by proper training.[10] Rational use of drugs (RUD) entails that patients should receive medications appropriate to their specific clinical needs, proper dose and duration, with the lowest cost to them and their community.[11,12] The above requirements will be fulfilled by the WHO Guide to Good Prescribing which gives medical students a normative model for therapeutic reasoning and prescribing by selecting of a standard (p-drug) treatment for the disease in general, and verify its suitability for the particular patient and alter the drug if necessary.

Consequently, UG students to develop a standard treatment for common disorders and develop a set of personal formulary by using National and International treatment guidelines, formularies, textbooks and other sources of drug information. The emphasis is that future doctors should master both steps of the drug-selection process, i.e. verification of suitability and alter the drug to individualize treatment.[13] We followed the method described by Joshi and Jayawickramarajah. The four criteria of efficacy, safety, cost and convenience are considered while selecting a P-Drug. For each drug group/drug a score was given between 1 and 10 (say x). For a particular disease, each of the four criterions was given a score between 0 and 1 (say y) depending on the importance of the criterion for the disease condition. The total scores of the four criteria should add up to one. Multiplied x and y to get a new value (say xy) for each drug for all four criteria, then for each drug, add all (xy) values get the total score. The drug with the highest score became the personal drug choice. Next step is to verify suitability for selected P drug for particular patient. Then the students wrote theprescription.[6,14,15]

The students carried out the exercise in their groups using reference materials, to determine cost of drugs using Current index of medical specialties (CIMS)[8] and textbooks available in the college and departmental library. The students worked on this exercise and then presented their findings. The presentation was followed by a discussion. For an UTI, each of the four criteria was given a score between 0 and 1 and further divided into by considering efficacy as more important parameter given score 0.4, safety 0.3, cost 0.2, and convenience 0.1. Then they determined drug/ drug group by using standard text book.[16]

Drug/drug group in UTI are fluroquinolones, cephalosporins, cotrimoxazole, amoxicillin + clavulnic acid and nitrofurantoin. The decision of which drug class to prescribe for a particular indication depends upon the availability of different medications, on the basis of efficacy, safety, suitability and cost of each class making the choice mucheasy.[17] Further the parameters were taken up one by one and scoring was done. First we gave score for efficacy between drug groups, highest score was obtained by fluroquinolones which are valuable in complicated cases of UTI and bacteria resistant cotrimoxazole. Nitrofurantoin inhibits many gram-negative bacteria but due to development of resistant activity is now restricted to E. coli. and generally less effective to fluroquinolones, while remaining groups are less efficacious.[16] In safety considerations cotrimoxazolehas serious side effects like stevens-johnoson syndrome given less score others have not much differences in safety profile, given equal points (table 1) Subsequently we determined cost of individual drugs considering the lowest effective dose of average cost for 5 days and compared them. Nitrofurantoin was cheapest with the highest score for this criterion (table 3).[8] For convenience we compared availability of drug, dosage form, dosages schedule, routes of administration.[15] Drugs are given twice daily orally except cephalosporins, and amoxicillin + clavulanic acid.[16]

Fluroquinolones as group got highest scores (table 1). Whenever there are large choices of agents is available, for same class, similar considerations are involved. Thus, choosing a particular drug from a class for therapy is very important.[18] So, we did comparison of individual agents in the fluroquinolones group. Among fluroquinolones, ofloxacine mergesed as P-drug has less resistant to causative organism of UTI[19] and more costly and twice daily like other fluroqinolones.

We verified the suitability of selected P drug for patient of UTI by using a problem solving exercise and write the prescription for same. We followed same pattern as described by Shankar.[14] After the selection of the P-drug, personal formulary is developed which includes information in the form of loose-leaf notebook, containing details about the effects of the drug, side effects, instructions, warnings & next appointment according to Guide for Good prescribing[4] (table 4). There are many difficulties during teaching or developing personal formulary, like large number of brands and their variation in cost, comparing efficacy, comparing among class as large number of drugs belong to same class.[20] Our study had limitations like the contribution in development of personal formulary was only from one batches of 48 UG students. The selection of drug for UTI, there is not much difference in scores between two group of drugs or drug among group. It was not possible to exactly pinpoint ofloxacin as a P-drug for UTI. However we reduced this bias by using group consensus or majority vote to give values. There are differences in opinion and argument over choice for particular disease and the whole purpose of exercise is defeated by such argument. The basic motive of teaching P drug concept is that instead of memorizing, students can develop personal formulary

after proper discussion and have know- how to prescribe rather than what to prescribe which is the goal of WHO.[15] Application of the WHO method has improved the prescribing skills of undergraduate medical students.[21] Consequently, undergraduate students are taught how to define their own P-drugs and are encouraged during their pharmacology teaching to develop a personal formulary**.**

CONCLUSION

The teaching of P-drug concept to UG students will help them acquire proper skills in the development of personal formulary. Students can develop personal formulary after proper discussion and have know- how to prescribe rather than what to prescribe which is the goal of WHO. The whole exercise will be helpful in promoting rational use of medicines by students in their future career as doctors.

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